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IMPROVING A SERVICE CATALOG WITH USAGE ANALYSIS

— CASE IT SERVICE PRODUCTION

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HELSINKI UNIVERSITY OF TECHNOLOGY ABSTRACT OF MASTER'S THESIS Department of Computer Science and Engineering	
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<p>The purpose of this study was to evaluate the Service Catalog of the company's IT (Information Technology) production organization. The evaluation was conducted with the help of usage analysis to the main target organizations: the Sales, the Product Management and the Production itself.</p> <p>The study was done combining semi-structured interviews with some applied usability study methods: context of use analysis, ethnographic interviews and exploratory testing. The interviewees were also asked to form a workflow diagram of the value chain from their own perspective. This was done in order to get a better understanding of the whole value chain and the work processes in it. It also showed the present as well as the potential role of the Service Catalog in these different situations.</p> <p>It was found in the study that there has been a demand for the Service Catalog and that it provides a useful data bank. It documents, what the Production does and how it produces the services. It can be used especially, when there is a need to check specific details or how the service is produced in general. It also has great significance in the service development. The advantages can be seen most clearly in the Production's communicative situations, but also in cases, when special customized solutions are needed.</p> <p>The format and the user interface of the Service Catalog should still be developed, since it should support better quick searches. There have also been definite deficiencies in its communication. Still the Service Catalog is being developed continuously, which is important, since its greatest challenges appeared to be its ability to develop and to be kept up-to-date.</p> <p>Three different workflow diagrams were formed on the basis of the interviewees' diagrams: one of the creation and delivery of the customer solution, one of the maintenance phase and one of the service development. These diagrams emphasize the role of the Service Catalog in the Production's interfaces.</p>	
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<p>Tämän tutkimuksen tarkoitus oli arvioida yrityksen IT-palveluiden (informaatioteknologia) tuotanto-organisaation palvelukatalogia. Arvioinnin perustana käytettiin käyttötilanneanalyysia, joka kohdistettiin palvelukatalogin tärkeimpiin kohdeorganisaatioihin: Myyntiin, Tuotehallintaan ja Tuotantoon.</p> <p>Tutkimus tehtiin yhdistämällä puolistrukturoituja haastatteluja käytettävyystutkimusmenetelmiin. Käytettävyystutkimusmenetelmistä työssä sovellettiin käyttökontekstianalyysia, etnografista haastattelua ja vapaata läpikäyntiä. Haastateltavat muodostivat myös arvoketjun mukaisia työnkulkukaavioita omasta näkökulmastaan. Näiden kaavioiden avulla voitiin ymmärtää paremmin koko arvoketjua ja sen sisältämiä työprosesseja. Ne myös osoittivat palvelukatalogin nykyiset sekä mahdolliset tulevaisuuden käyttötilanteet.</p> <p>Tutkimuksessa havaittiin, että palvelukatalogille on ollut selkeä kysyntä ja se tarjoaa käyttökelpoisen tietopankin. Sen avulla dokumentoidaan tuotanto-organisaation tekeminen (eli tarjotut palvelut) sekä kuinka tuotannossa tuotetaan tarjotut palvelut. Palvelukatalogia käytetään etenkin tilanteissa, joissa on tarve tarkistaa joitakin tiettyjä yksityiskohtia tai halutaan tietää, kuinka jotakin palvelua yleisesti ottaen tuotetaan. Palvelukatalogilla on myös suuri merkitys tuotekehityksessä. Sen edut voidaan havaita parhaiten tuotanto-organisaation viestintään liittyvissä tilanteissa, mutta myös tapauksissa, joissa asiakkaalle tarjotaan jokin erityinen räätälöity ratkaisu.</p> <p>Palvelukatalogin formaattia ja käyttöliittymää tulisi edelleen kehittää, sillä sen tulisi tukea nykyistä paremmin nopeaa tiedonhakua. Lisäksi palvelukatalogin viestimisessä kohderyhmille on ollut selkeitä puutteita. Palvelukatalogia kehitetään kuitenkin jatkuvasti, mikä onkin tärkeää, sillä sen suurimmiksi haasteiksi havaittiin kyky kehittyä sekä pysyä ajan tasalla.</p> <p>Haastatteluissa tehtyjen kaavioiden perusteella voitiin muodostaa kolme työnkulkukaaviota: asiakasratkaisun muodostaminen ja toimitus, ylläpitovaihe sekä palvelukehitys. Näissä kaavioissa korostuu palvelukatalogin merkitys tuotanto-organisaation eri rajapinnoissa.</p>			
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DEFINITIONS

Table 1. The definitions of the most important terms and abbreviations used in this thesis.

Term	Definition
CCTA	(British) Central Computer and Telecommunications Agency (OGC 2001).
Context of use	Users, tasks, equipment and the physical and social environment in which a product is used (ISO 9241-11).
eTOM	Enhanced Telecom Operations Map (TM Forum 2005).
ICT	Information and Communications Technology.
IT	Information Technology.
ITIL	Information Technology Infrastructure Library. A set of documented best practices that are used to aid the production of ICT services (OGC 2001).
ITOC	IT Operations Center. A group in the Production organization that is responsible e.g. of monitoring the systems and servers.
ITSM	IT Service Management. A framework that defines how service management is applied within specific organizations (Kaitovaara 2004).
IRC	Internet Relay Chat.
OGC	(British) Office of Government Commerces. (OGC 2001)
OLA	Operational Level Agreement (OGC 2001).

Process	A logically related series of activities done toward a defined objective (Van Bon et al. 2004 p. 26).
Production	In the topic production covers all activities needed to deliver the service to the customer (e.g. production, productization and sales). Later in this thesis the Production organization refers to only the one specific part of the whole value chain.
SBU	Strategic Business Unit (Porter 1985).
Service Catalog	A detailed description of the customer's operational services written in the customer's language with a summary of the service levels the IT organization can provide to its customers (Van Bon et al. 2004 p.119).
SLA	Service Level Agreement (OGC 2001).
SLM	Service Level Management (OGC 2001).
SQP	Service Quality Plans (OGC 2001).
Usability	Extent to which a product can be used in a specified context of use by specified users to achieve specified goals with effectiveness, efficiency and satisfaction (ISO 9241-11).
Usability evaluation	Methods for evaluating the usability of a product (Faulkner 2000).
Value chain	The set of operations done to design, produce, market, deliver and support a product organized in logical order (Porter 1985).

1. INTRODUCTION

1.1. Motivation

During the recent decades IT technology has had an increasing effect on business processes. IT services are offered by many services providers and the quality of their services has become an important issue. In the 1980's the service quality provided to the British government was such that they decided to develop an approach for producing high quality IT services in a cost-effective way. As a result, the ITIL framework was gathered. (Van Bon et al. 2004)

The Production organization of the target company started to form a Service Catalog (OGC 2001) during the year 2003. The formulation process has been quite time taking and challenging. During the process the Service Catalog has not been evaluated properly and other organizations have not been asked how they see the Service Catalog or how it should be developed. Also is known that the Service Catalog should have an important role in the communication between the different organizations, but this has not been evaluated nor developed properly. The main reason for the implementation of the Service Catalog was that it would document what the Production organization does and, therefore, offer a basis for the services the company offers its customers.

The Service Catalog evaluated in this thesis is based on the ITIL (Information Technology Infrastructure Library) framework, which is a collection of best practices for producing IT services (OGC 2001). ITIL has become increasingly popular during the past years. The theory has been originated in Britain but has become very popular in the Netherlands.

The purpose of this research is to get a more extensive picture of the usage and the advantages of the Service Catalog. The problem has been that there are only few people, who have been working with the Service Catalog, and they are very deeply connected with the subject. Therefore, it was necessary for someone to evaluate the Catalog and get a wider view. To accomplish this, were the people who do not work with the Service Catalog on daily basis asked how they experience and use it. Thus, this helped to evaluate how the Service Catalog has been used (or if it has been used at all), what are the problems with it and how could it be improved.

The research gave a possibility to informally communicate about the Service Catalog to different people and at the same time give them a possibility to participate in its development. The research also helped the representatives from other organizations to understand the Production better. Thus, communication is one important aspect of the Service Catalog. This study helped to discover also how communication is handled between different organizations within the company and how the workflows through the corporation. This helps to understand how the Service Catalog could bring additional value to the communication.

In the target company the target unit has been the first one to introduce the ITIL theory. The Service Catalog came out as one part of this. Recently it has been decided that the Service Catalog will be implemented also in a few other parts of the organization. Therefore there is an obvious demand for a more in-depth study about the use, development opportunities and communication of the Service Catalog.

Usability study methods (Faulkner 2000) have matured greatly since the first methods were developed. Recently some researchers have also been studying how the methods could be applied in the organizational processes, culture and decision-making (e.g. Rosenbaum et al. 2000b). Usability study methods provide good adaptable methods that could be used more widely. Therefore they should be experimented in different contexts.

1.2. The Case Study

The company related to this study is a large Scandinavian company that provides among other things IT and ICT Services. (More about IT and ICT services e.g. in Kaitovaara 2004) The Production organization, whose Service Catalog is evaluated in this thesis, is a part of a larger production entity. The organization decided to implement a Service Catalog so that the Production could describe better what it does. This way the Product Management and the Sales would know, what are the Productions' preferences and what at all is possible to produce. Figure 1 presents the simplified organization structure. The target organization is underlined (IT Service Production). Later in this thesis with the Production or the Production organization is meant the IT Service Production organization. The Design and Delivery unit is divided into two organizations: the Sales and the Production, which is why it appears twice in the picture.

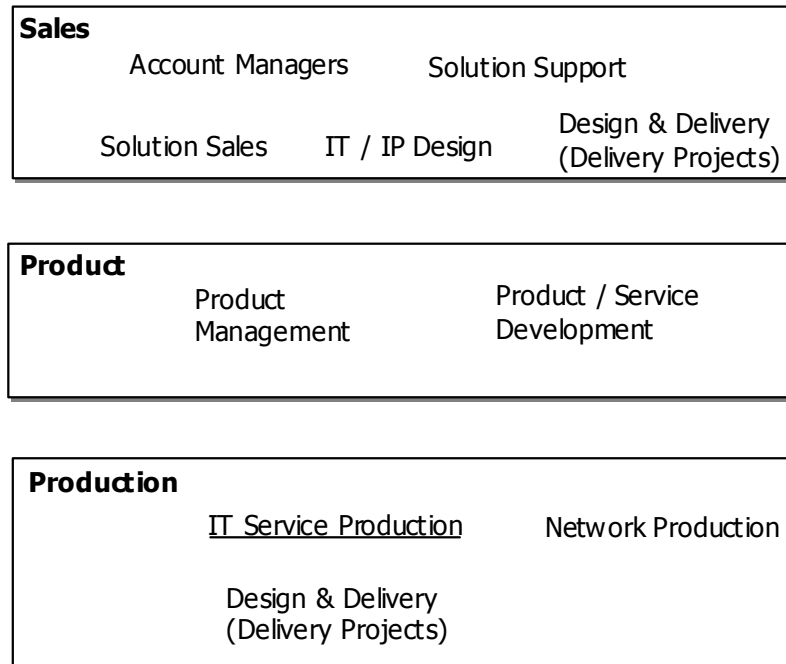


Figure 1. The simplified organizational construction of the target company.

The purpose of the Service Catalog is to document, what is done in the production. It consists of over fifty documents, each of which describes one of the Production's workings. The workings can be e.g. Server Hardware Management or Account Management. The creation of the Service Catalog has been quite a long process – about two years. At the same time its format and usage situations have been formed. At the moment the Service Catalog is already in use, although, it still partly needs to be completed.

The Service Catalog is intended to provide information to the Production itself, the Product Management and the Sales organizations. Therefore, all these groups are covered in this study. There is a small, three-person, group working with the Service Catalog. Their task is to develop, communicate and interpret the Service Catalog. However, this study is out of the scope of their work, so it has been done as a stand-alone study.

1.3. Structure of This Thesis

This thesis begins with presenting the research goals, questions and the scope of the study. Chapter three will introduce the conceptual and methodological framework: some theories related to the production of IT-services, the concept of the value chain analysis, the usability study methods and methods for data analysis. At the end of chapter three is a short summary of the theories and a description of their effects on the study. Chapter four describes first the research methods used in this study. After that are presented the results of the study, first the ones concerning the Service Catalog and then the ones concerning the communication. In chapter five conclusions will be presented, including answers to the research questions. Finally, chapter six concludes with discussion about this study and future research possibilities.

2. AIM OF THE RESEARCH

In this chapter is presented the goals of the research, the research questions and the scope of the study.

2.1. Research Goals

The thesis can be seen as an evaluation of the context of use, the context in this case being a social environment rather than a physical one. Therefore, first it was necessary to define, who are the users of the Service Catalog and how they use it. Also the purposes and goals of the users were discovered.

The main goal of the research was to get a view of how the Product Management and Sales use the Service Catalog and what are its deficiencies. At the same time it was seen, how the information of the Service Catalog is passed throughout the value chain. After finding out the flaws, possible improvement ways could be considered. An additional advantage was to find out the possible situations, where the products' service descriptions are inadequate i.e. when the Service Catalog is needed, and why.

One important goal of the research was to model the information- and workflows between the organizations in different situations. After this the role of the Service Catalog could be defined in more detail. This also helped to figure out, how the Service Catalog has been and could be used in different situations.

This study applied some usability study methods. One goal of the research was to find out if these methods could bring some additional value to this kind of study. Also one aim was to see, how these methods can be applied to different contexts and if different methods could be used in the future to evaluate this kind of a situation.

Figure 2 presents the study area of this thesis (SC indicates the Service Catalog).

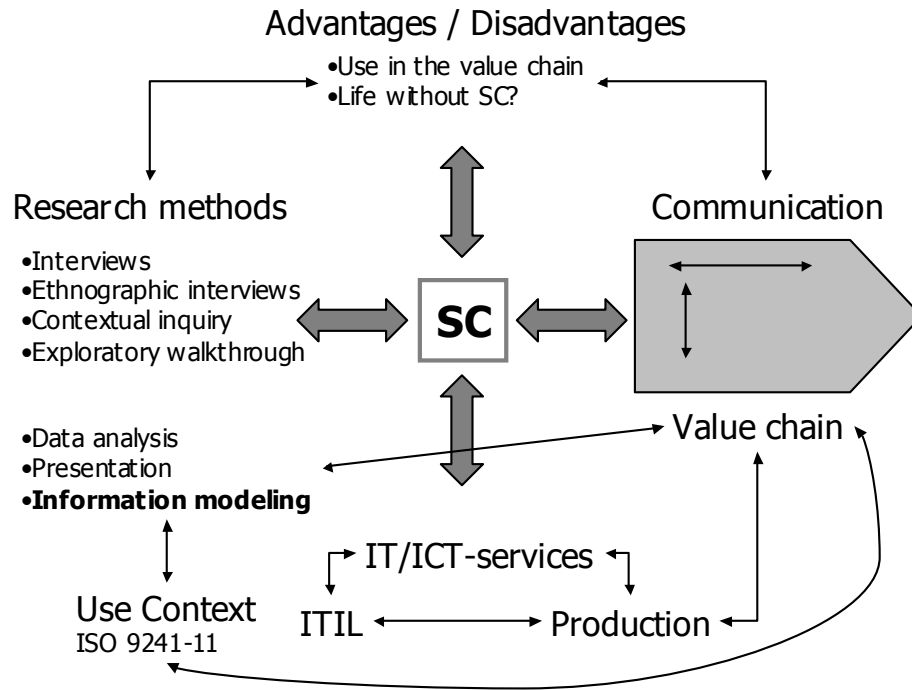


Figure 2. The study area and most important frameworks of this thesis

2.2. Research Questions

The main research question of this study is:

How is the Service Catalog used throughout the value chain?

The sub questions of this study are:

How does the information of the Service Catalog pass throughout the value chain?

What are the advantages of the Service Catalog in each organization?

Since the study applies usability study methods, the following methodological issue can be addressed:

Does the use of usability study methods bring additional value to the research?

If it does bring additional value, what kind of value does it bring and how?

2.3. Scope of the Research

There are certain exclusions in this thesis. First of all this thesis does not discuss if the selected ITIL model is suitable or not. Therefore, other alternative and supportive frameworks, like the eTOM (enhanced Telecom Operations Map, TM Forum 2005) have been excluded. This thesis does not consider if the ITIL framework has been implemented and applied properly. Also the creation process of the Service Catalog is excluded from this study. Thus, it is not considered if the creation has been done effectively or in the best possible way.

Also the ability of the corporation to answer to the customer needs is excluded. The customer needs might be mentioned in the thesis, but what the needs are, is not a part of this study. This thesis covers mainly the Production organization, whose Service Catalog is being evaluated and improved. Therefore, only the main interest groups are included in the study.

3. CONCEPTUAL AND METHODOLOGICAL FRAMEWORK

The theory of this thesis consists of IT service production concepts (which include the principles of the Service Catalog), value chain analysis, usability study and interviewing techniques and data analysis methods. These are presented in the following chapters.

3.1. IT and ICT Services

Next the framework of producing IT and ICT (Information and Communications Technology) services is discussed. First IT and ICT service production in general is addressed and it is followed by an introduction to the ITIL framework. Finally the packaging of IT services is shortly discussed, since the Service Catalog is very closely related to the topic.

3.1.1. IT- and ICT-Service Production

Service production differs from product production, since its quality cannot be assessed in advance. The quality of the service depends also in the fact how the customer and the service provider interact and what are the customer's expectations. The customer can also change the services while they are delivered, which is not possible in product manufacturing. (Van Bon et al. 2004 p. 13)

Quality is an important aspect of service production. Quality can be defined as the extent to which the service meets the customer's expectations and requirements (Van Bon et al. 2004 p. 13). The most important factor of quality is its continuance: the customer will be disappointed if the service provider occasionally exceeds the expectations but disappoints at times. However producing constant quality services is very difficult. The continuance of the services is especially critical in ICT services, since the customers' business critical systems often depend on their functioning. Must be recognized that most businesses are heavily dependent on the ICT infrastructure as well as its quality and availability (Macfarlane & Rudd 2001 p.4).

The ITIL framework presents a process driven approach to IT services. It is applicable to both large and small IT organizations. These processes introduce also a business perspective to the production. (Macfarlane & Rudd 2001 p.4)

3.1.2. ITIL and the Service Catalog

In the following paragraphs the theory of the IT Infrastructure Library will be presented. It is an essential part of the company's operations and also serves as the ground for the Service Catalog.

ITIL

The Service Catalog, which usage was evaluated in this thesis, is based on the Information Technology Infrastructure Library (ITIL). ITIL is based on a collection of the best practices to provide IT services. They were gathered in the 1980's, when the quality of IT services provided to the British government was found to be inadequate. The purpose was to collect the best practices used to provide IT services in a cost-effective way. The organizing party of this project was the CCTA (Central Computer and Telecommunications Agency), later OGC (Office of Government Commerce). The purpose of ITIL is, therefore, to offer guidelines for providing high quality IT services in a cost-effective way. (Van Bon et al. 2004 p. 11)

The ITIL framework includes five principle elements, each of which is related to the others (itSMF 2005):

- The business perspective
- Managing applications
- Delivery of IT services (Service Delivery)
- Support of IT services (Service Support)
- Manage the infrastructure

The relationships between these elements are presented in Figure 3 (Macfarlane & Rudd 2001 p. 7). The Service Management and Service Delivery parts are highlighted in the figure since they are the most significant parts regarding this thesis.

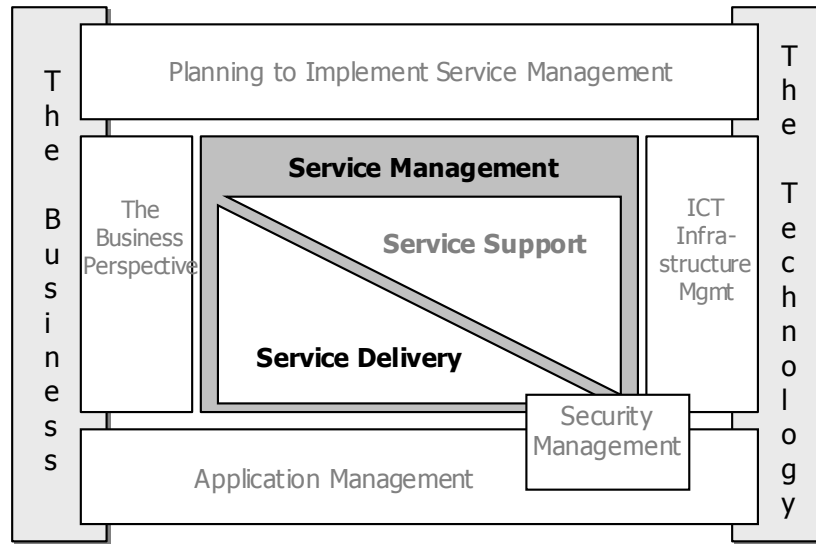


Figure 3. The ITIL framework (Macfarlane & Rudd 2001).

The Service Delivery and Service Support elements form the core of the ITIL, the IT Service Management. They together include ten processes and one function (Macfarlane & Rudd 2001 p. 6). With these processes, it is possible to describe the IT Service Management best practices apart from the organization structure (Van Bon et al. 2004 p. 31). The Service Catalog evaluated in this thesis is a part of the IT Service Management.

ITSM

IT Service Management (ITSM) has three objectives: (Macfarlane & Rudd 2001 p. 4)

- To align the current and the future business needs with the customer needs.
- To improve the quality of the IT services produced.
- To reduce the production costs in the long run.

The IT Service Management consists of two elements: Service Delivery and Service Support. The purpose of Service Support is to ensure that the end-user gets the needed support for him/her to be able to perform the business supportive tasks (itSMF 2005). This part includes five processes and one function (Service Desk, the contact point).

The purpose of Service Delivery is to describe, what actions the company needs to do in order to provide the adequate support for the customers (itSMF 2005). The Service Catalog concept is in the Service Delivery part.

Service Delivery

The Service Delivery part includes five processes that describe, what is needed to provide the services that the customer needs to support their business.

The five processes are:

- Capacity Management
- Financial Management for IT Services
- Availability Management
- Service Level Management
- IT Service Continuity Management

The Service Level Management (SLM) process includes the concept of the Service Catalog. Its objective is to make and implement agreements with the customer about the type and quality of the IT services delivered. Therefore the SLM needs information about the customer's needs and the service provider's capabilities and resources. When the customer's needs are known, it is easier to produce and provide proper services for the customers, which leads to increased customer satisfaction. (Van Bon et al. 2004 p. 36)

Service Level Management includes the following documentation:

- Service Level Agreements (SLA)
- Operational Level Agreements (OLA)
- Underpinning Contracts (UC)
- Service Quality Plans (SQP)

From these documentations the SLA is between the service provider and customer, the OLA is between an internal customer and an internal IT department, the UC is done with an external provider (i.e. a subcontractor), and the SQP is an internal document for managerial

purposes. In order to provide these documents, efficient monitoring and reporting of the produced services is needed. (Van Bon et al. 2004 pp. 119-120)

The Service Catalog

The purpose of the Service Catalog is to document the services provided (TechRepublic 2004). The ITIL documentation itself does not advise much of the Service Catalog's format or how it should be done. It does, however, advise that the company forms a Service Catalog in order to profile itself better as an IT Service Provider instead of a technology implementer and maintainer (Van Bon et al. 2004 p. 119). The Service Catalog has also an important communicational role, since it describes the available services in a language and a way understandable to the customers. Even though, the Service Catalog is based on ITIL, it should be noted that it can serve as a valuable baseline document even if the company does not support ITIL or ITSM otherwise (TechRepublic 2004).

The Service Catalog lists all the services produced. It should include their characteristics as well as the maintainers and the customers of each service. It is also suggested that the different types of services or the service hierarchy are defined in the Service Catalog. At the simplest the Service Catalog can be a simple matrix of the services sold to each customer. However, it can include much more information, it can even be included in a configuration management database and, therefore, have a more extensive use. (OGC 2001 pp. 33-34)

Michael McGaughey (2004) discusses the fundamentals and advantages of the Service Catalog. According to McGaughey the Service Catalog is one of the more difficult, new and not so easy to grasp aspects of ITSM. In many companies the first questions are as fundamental as: "What really is the Service Catalog and why should it be implemented?" These questions need to be addressed before the Service Catalog can be formed. The impact of the Service Catalog depends on what the company wants it to be. However, the possible uses could be (McGaughey 2004):

- Simplifying Operational Level Agreements (OLA)
- Standardizing Service Level Agreements (SLA)
- Improving IT performance metrics
- Helping IT Governance & Portfolio Management

In addition, the Service Catalog can help identify, what services are available to each customer and with what boundaries (TechRepublic 2004). However, the Service Catalog can provide a standard SLA as well. It can also improve communication inside the company, as well as outside it, between the company and its interest groups (Van Bon et al. 2004 p. 120). Therefore, it can be seen that the Service Catalog has great potential, but its purposes need to be considered carefully.

ITIL itself does not advice much in the contents of the Service Catalog (OGC 2001). Therefore, official advice in the structure and contents of the Service Catalog could not be found. The searches were done e.g. in ACM Digital Library and Google with at least the following search words: ITIL, Service Catalog, structure, contents. However, since in this case only some examples of the possible contents and structures of the Service Catalog were wanted, it was decided that the following examples (QwikiWiki 2005 and TechRepublic 2004) could be used.

QwikiWiki (2005) and TechRepublic (2004) present two outlines for the Service Catalog. These two models do not differ much; both include the description of the service as well as its scope and service hours (or SLAs). However, the differences between these two are that QwikiWiki's model is made from the viewpoint of the Service Desk. It advises to list the prices for the services as well as the specifications (technical and functional), where TechRepublic advises to give contact information and customer procedures. (Figure 4)

Service Catalog Template – Examples	
TechRepublic (2005)	QwikiWiki (2005)
Service Name	Service Name
Description	Description
Support Contact	Customers
Responsible Manager	Options
Users	Price List
Inputs	Dependencies & Contributors
Outputs	Functional Specification
Default, Optional & Excluded Items	Technical Specification
Service Hours	Support Activities
Performance	Customizations or Variants
Standards	Existing SLAs
Customer Procedures	Restrictions
Charges	

Figure 4. Examples of the Service Catalog structure (TechRepublic 2005, QwikiWiki 2005).

The Service Level Agreements (SLAs)

The SLAs are discussed separately since they are one of the most important objects that can be affected by the Service Catalog (e.g. OGC 2001, TechRepublic 2004). The SLA is an agreement between the customer and the service provider. It documents the services in non-technical terms. SLA's purpose is to provide means to measure and adjust the services provided (Van Bon et al. 2004 p. 120). In recent years, the SLAs have become also a managerial instrument to follow the customer's expectations (Trienekens et al. 2004).

When the SLAs are done right even the end users can see improvements in the following areas: the performance weakening can be shown with actual measures, critical applications can be pointed out and better service can be delivered to them, and costs become more controlled (Passmore 1996). Even though, the SLAs are considered important, they are not often formed in a way that would satisfy both, the customer and the service provider (Trienekens et al. 2004). Therefore, extra attention should be paid to the metrics used in them. The problem is to find metrics that are measurable and define a specific goal (Passmore 1996).

The most common problems with the specification of the SLA documents are (Bouman et al. 1999 and Trienekens et al. 2004):

- Most SLAs concentrate on the operations that are taken if the service fails, however the focus should be in the service's effectiveness to the customer's business processes.
- The definitions of the service specifications are too inaccurate.
- The service specifications are incomplete.
- The cost management is insufficient and the cost per service is not specified at an appropriate level.
- The SLAs become documentation that only a small expert group can understand, instead of being a document in the customer's language.

Passmore (1996) advises that the SLAs should be built with the following three steps:

- Establish a baseline. This is the basis to which all future measurements will be compared.
- Establish current and future requirement. This needs to be done in co-operation with the users and the senior managers in order to assure that the requirements match to the real user and managerial needs.
- Build the SLAs from the requirements gathered. This should include the minimum and maximum levels of performance, security, reliability and costs as well as the metrics for each part.

In this situation the differences in the interests of the different stakeholders should also be considered (Trienekens et al. 2004). The customer's interests are in specific assets (e.g. application or hardware), whereas the service provider is interested in the service processes delivered to the customer. Therefore, in addition to the fact that the SLAs are in non-technical terms they should also take into account these differences.

3.1.3. Packaging IT- and ICT-Services

One aim of the Service Catalog is to provide standard components that can be used in the product development, productization and service packaging. Kaitovaara (2004) has discussed the packaging of IT-services, which even though is based on traditional service packaging, still differs partly from it. Should be noted, though, that not any service that is produced and delivered with IT is an IT service. IT service can be defined as the tools different parties need to solve their problems or achieve their goals. More thoroughly, Kaitovaara (2004) divides IT services into the following three categories:

- Services that are created, delivered, enabled or used with IT.
- Services that rely heavily on a person, who supports design, creation, management or use of IT.
- Services that combine the previous two service types, i.e. services that combine information-and-technology-based services with people processing professional services.

Lehtinen (1986 p. 37-39) discusses the packaging of services. He presents that the service package consists of a core service and peripheral services. The core service is the reason for the customer to buy the services. However, it might be important or even necessary that the peripheral services are used as well in order to be able to use the core service. Lehtinen argues that there are two points to be kept in mind about the packaging:

- The amount of the peripheral services needed is a strategic decision and has nothing to do with service quality.
- It is possible that sometimes profits are made only of the peripheral services.

Grönroos (2000), on the other hand, argues that dividing the service package into two parts (core and peripheral) is not enough. Instead the service packages consist of three distinct groups of services:

- Core service
- Facilitating service and goods
- Supporting services and goods

IT service packaging is “a transformation process of existing IT services and tasks into IT service products.” (Kaitovaara 2004 p. 149) Kaitovaara (2004 p. 192-193) presents that the IT service packaging is somewhat more complicated. In addition to the core IT service, there are also two types of peripheral IT services: enabling and enhancing. However, the total service package is also affected by context of the service and the product. Therefore, there are altogether five groups of services (or four groups of services and one product group).

About IT service packaging Kaitovaara (2004 p. 195) argues that in each IT service product there should be a clear view of the available parts, the IT services should be made modular and the process may vary depending on the IT service. These are the basic principles that should be taken into account when designing, how the IT or ICT services are packaged.

Also it should be noticed that the service package as a whole consists of three parts: the standard part, optional modules and the customized part (Kaitovaara 2004 p. 91, adapting Sipilä 1996). The objective should be that the customized part is the smallest, but it is important so that the customer feels that the service is customized for his/her needs. However, the standard part and modular objects should be well defined and provide the largest part of the total service.

3.2. Organizational Factors

This chapter discusses the organizational view to the study. This includes the value chain analysis and the organizational communication.

3.2.1. Value Chain Analysis

The most well known method for value chain analysis is Porter's in the 1980's developed value chain analysis (Shapiro 2001, Hitt et al. 2003, Johnson 1999). It is widely used in business strategy and value chain analyses. The analysis grounds on Porter's theories for competitive advantage and competitive strategies. Porter's value chain analysis is formed for traditional concrete products, but can still be applied to service production.

According to Porter (1985 pp. 51-54) value chain is the basic tool when analyzing systematically company's functions and their interdependencies. One aspect of the value

chain is how cost-efficient it is. However, what also matters is, how well the company's value chain suits with its customers' value chains.

The idea of Porter's value chain is that the company consists of functions needed to produce the end product for the customer. These functions can be presented in a value chain. The basic value chain presented by Porter consists of five basic functions and four support functions. This can be seen as the minimum amount, however the amount of functions is dependent on the company; the appropriate level of functions is a strategic business unit (SBU) level (Figure 5). After the main value chain is formed, it can be divided into smaller parts. This thesis focuses on the primary activities.

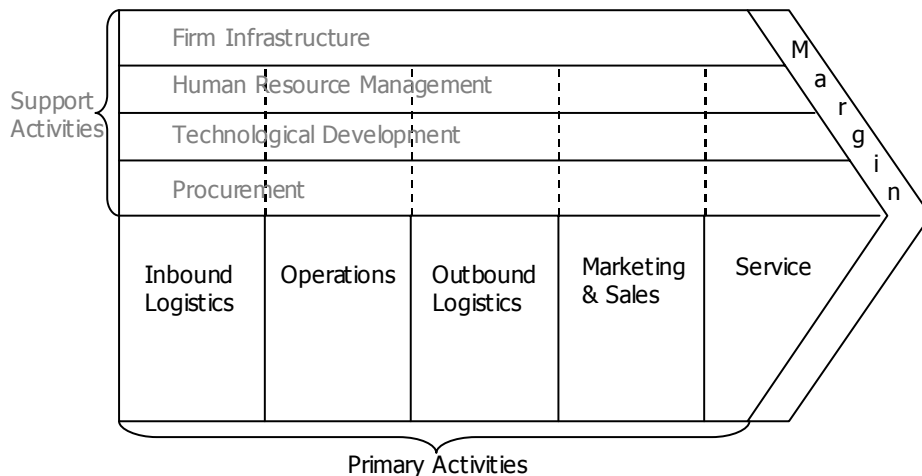


Figure 5. The Value Chain model by Porter (1985 p. 55).

According to Johnson (1999 p. 157) the company's cost-efficiency is the result of four parts: economies of scale, supply costs, product/process design and experience. With the Service Catalog the three first parts mentioned by Johnson can be affected. The catalog helps to form standard components that help to produce the services to different customers in a similar way; this leads to economies of scale and more efficient service development (cf. product design). Supply costs can be reduced, when the Service Catalog can help to organize the service production in a more efficient way.

3.2.2. Communication in the Organization

Communication is the process of information exchange between two or more systems (i.e. people) (Barnett 1997 pp. 3-4).

Since communication does not happen in a vacuum, different distractions apply to it. This causes that the message's intended effect is not the same as its attained effect. Different disturbing factors can be divided into four categories: barriers, loss, distortion and noise (Wiio 2000 p. 214). These are the reasons why Wiio (2000 p.224) is not optimistic about the success of communication. According to him:

- "Communication usually fails, except by chance."
- "If communication can fail, it will fail."
- "Even if communication cannot fail, it still usually will fail."

Therefore, the communicational viewpoint is an important topic, especially in large, communicated systems.

In a traditional organization the source of the information was the manager and the receiver was the employee. The purpose of the communication was to inform, how a job was to be completed. Over time feedback was added to the communication, which gave the source an indication whether the message had been understood. Later it was seen that the message could originate at any point of the organization. Therefore the studying of organizational communication has become more complicated with the development of the organizational culture. (Barnett 1997 pp. 3-4)

The communication within the organization is a critical factor for the company to succeed. Communication is often said to be the topic that needs more improvement. Some of the ITIL processes too give assistance in communication, but the processes also need to be communicated to every factor in the organization. (Macfarlane & Rudd 2001 p. 69)

There are different methods that can be used when studying communication in organizations (e.g. socio-metrical methods and network analysis). These methods are not covered in this thesis in more detail since the focus of this study is not in the organizational communication.

3.3. Usability Study Methods

ISO 9241-11 standard defines usability as, “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.” Usability issues are important when designing and improving products, since they affect the ability to work effectively, efficiently and with satisfaction. Thus the usability can be improved by applying features that have been found to benefit the users in a specific context of use. (ISO 9241-11)

According to the ISO 9241-11 standard (Annex D) usability can be measured in three ways:

- Analyzing the features of the product that are needed for a specific context of use.
- Analyzing the tasks carried out by the user during process of interaction with the product.
- Analyzing the effectiveness, efficiency and user satisfaction that result from the use of the product in a specific context of use.

However should be noted that the usability experienced by the user is also affected by the quality of the software as defined in ISO/IEC 9126 (ISO 9241-11).

Interviews are a good, basic research method. They give a more thorough picture than questionnaires. However basic interviews might not be quite thorough enough. This is why also additional methods have been developed. In this thesis three methods will be introduced in addition to interviews: contextual inquiry, ethnographic interview and exploratory testing. The two first methods have a common attribute; they should be held at the user’s natural environment. This brings additional value to the basic interview (e.g. Anschuetz & Rosenbaum 2003, Kantner & Keirnan 2003a, Beyer & Holtzblatt 1998).

3.3.1. Context of Use Analysis

ISO 9241-11 standard defines context of use as, ”Users, tasks, equipment (hardware, software and materials), and the physical and social environments in which a product is used.” Therefore, in order to analyze the context of use properly the users, users’ tasks, their equipment and the environment need to be defined and studied. This can be done best by

visiting the user's site and learning about the users at their natural environment i.e. conducting field studies.

The purpose of the context of use analysis is to collect information about the users, user tasks and technical and environmental constraints. The main information about the context can be gathered in a meeting with representatives from the target company. In a more complicated case the information can be collected through field studies. The information needed should cover the following four areas: product, users, tasks and environment (UsabilityNet 2003a).

(UsabilityNet is a European Union funded project to promote usability and user centered design, and spread information about usability in general. It has been used in this thesis as only one source among others for additional information of some usability study methods. Therefore, it can be considered as a valid reference in these cases.)

According to Jakob Nielsen (2002) field studies are very significant in system design. They help discover user needs better. Nielsen also gives some common advice to field studies e.g. not to view your own opinion during the interview. Nielsen (2005) states that the users (or interviewees) should represent the real users i.e. they should be the people who actually do the work, not their superiors. They should not discuss, what they assume someone else thinks or does, but talk only about how they self feel. Nielsen also recommends that one effective task is to ask the interviewees to pretend that their superior wanted them to list a few main pros and cons of the system and then list them.

Process Analysis

Hackos and Redish (1998, p. 135-137) present a user study method which purpose is to understand the users' tasks and the whole work process. The idea is that the interviewer walks through a task or work process with the user. It is important that the actual people who do the work are interviewed and that representatives of all the groups involved in the process are interviewed. The interviews can be made to one person at a time or to a group at once.

In practice, during the interview the interviewer gathers a list of the user's actions and tasks and forms the whole process out of these tasks. Of each part of the process the interviewer needs to find out at least the following points:

- What triggers the part?
- Who does the part?
- What information does the user have before the part and what comes out of it?
- What people are involved before and after the part?
- What happens after the part?

As a result the researcher gets a thorough picture of the work tasks and the whole process. After the information has been gathered, a process map or flowchart should be formed to be able to present the task flow and the whole work process.

3.3.2. Interviewing Techniques

Interviewing is a very widely used method and has many varieties (e.g. Seidman 1998, Rubin & Rubin 1995, Kvale 1996). The purpose of interviews is to understand other people and their experiences, and for this purpose the interviews can be seen as a necessary, though not complete, method (Seidman 1998).

There are many types of interviews varying from tightly structured to open-ended or unstructured conversations (Seidman 1998). Structured interviews or questionnaires are categorized as a quantitative method, whereas semi-structured and unstructured interviews are qualitative methods. Many interviews include both unstructured and semi-structured interviewing techniques (Rubin & Rubin 1995). Interviews can take place e.g. face-to-face, via telephone or through questionnaires, the most common form being a face-to-face conversation (Denzin & Lincoln 2000).

In structured interviews the interviewer has a list of questions, established in advance, which are asked identically from all the interviewees. There is regularly only little variation in the answers and often answer possibilities are presented along with the question. The answers are recorded according to a constructed recording scheme. The interviewer has to be careful not to give any hint of his/her personal opinions or interpret the questions to the interviewee

during the interview. Structured interviews are therefore one form of a questionnaire. (Denzin & Lincoln 2000)

In semi-structured interviews the interviewer introduces a topic and asks guiding questions during the interview. Rubin & Rubin (1995 p. 145) introduce three different types of questions for the interview: main questions, probes and follow-up questions. Main questions are the basic questions that begin and guide the conversation. Probes clarify incomplete answers and guide the interviewee to answer in appropriate depth. They also help to give a feeling that the interviewer is listening and following the conversation. Follow-up questions are responses to main questions and can therefore not be prepared. They give more depth to the interview and add perspectives to the answers gotten for the main questions. With follow-up questions the interviewer can also return to something discussed earlier during the interview.

In unstructured interviews the interviewer gives a topic to discuss and in addition only a few more specific questions, which can be of the types introduced above (Rubin & Rubin 1995). Unstructured Interviews can therefore give a great variety of qualitative data (Denzin & Lincoln 2000). For open-ended or in-depth interviews Seidman (1998) recommends that the length should be 90 minutes.

3.3.3. Contextual Inquiry

Contextual inquiries are used to get a deeper understanding of the customer's or the user's work tasks. Therefore they help to get a deeper understanding of work structure and the tasks performed. The main idea is that a researcher goes to the customer's work environment to observe and interview the customer doing his/her everyday tasks. In a contextual inquiry the emphasis is in observation (Kantner & Keirnan 2003a). It helps to get a complete picture of the work and see things that the customer might not even realize his/herself.

Contextual inquiry has four principles: context, partnership, interpretation and focus. Context means that one should go to the customer's (or user's) workplace and see the work as it really happens. This is the most fundamental requirement of the contextual inquiry, since everything related to one's work is located there. The meaning of the partnership is that the customer and researcher work together in order to understand the customer's work.

The idea is that both work as equals, in contrast to a regular interview, where the interviewer has too much of the power. Interpretation indicates that it is not enough to collect the data but also needs to be defined, what the customer's words and actions really mean. Focus means that the interviewer needs to define, which of the customer's actions really need to be concentrated on. Together all these four principles define the basis for contextual inquiries. (Beyer & Holtzblatt 1998 p.46)

Compressed Contextual Inquiry

Kantner & Keirnan (2003a) describe a compressed form of the contextual inquiry. Its purpose is to help those, who do not have enough resources and time to conduct the actual contextual inquiry. The main difference compared to the classical contextual inquiry is that the work observed during the session is limited. Therefore, it is a good method for analyzing workflow of certain tasks and related artifacts.

3.3.4. Ethnographic Interview

Ethnography is studying of culture that is done systematically and without hypotheses (Ramey et al. 1996). It grounds on cultural studies conducted by social-anthropologists, where the researchers had only little knowledge beforehand of the studied culture (Ford & Wood 1996). A similar, though less-challenging, situation can be found in usability studies, when the researcher wants to examine an unfamiliar context of use.

Ethnographic interviewing is a lighter, interview based, field research method that can be used when a full contextual inquiry cannot be conducted (Rosenbaum 2000a). It aims in collecting information about the people and their context of use. The idea is that the interview is conducted in the original environment in order to get a better understanding of the context and a view of possible artifacts that add value to the questions (Anschuetz & Rosenbaum 2003).

Ethnographic interviewing can be seen as a method similar to contextual inquiry, but its focus is more in asking questions about use. It can be used when the time is limiting form conducting contextual inquiries or they are not seen practical. Kantner et al. suggest that ethnographic interviewing is used among other methods when you are gaining perceptions

of a service or finding out why the service is not being used in order to improve communication methods. (Kantner et al. 2003b)

The ethnographic interviews are an interviewing technique with a top-down approach. Before the interview takes place, it is necessary to first get used to the user's language and terminology. In order for the user to be able to describe his/her work in a natural way, it is essential that the interview takes place in the user's work environment. Still despite of the natural atmosphere, focus must be kept all the time on the subject. (Wood 1996)

Wood (1996) recommends that the interviewing questions are presented in the users own, domain-specific, language. He discusses three different question types, which are Grand Tour, Case-Focused and Native-Language. With Grand Tour questions the interviewer can get a large picture of the user's tasks. An example of a question this type is, "Could you describe the steps you take when making an order?" Case-Focused questions discuss a certain part of a task, e.g. "Can you show me how you fill out the order form?" Both of these question types are also good for a large-scale elicitation of the user's terminology. Native-Language questions can be used to collect detailed terminology of a specific part of the task. The interviewer can ask for example, "What do you call the buttons in that specific interface?" or "What is the purpose of that field in the order form?"

The recommended length limit of one interview session is one hour. After the interview the researcher analyses the data and creates a description of the work. Wood emphasizes that iteration should be used with the description: there should be another interview with the same user and before that session, the user should review and correct the description made on the grounds of the first interview. (Wood 1996)

Condensed Ethnographic Interview

Bauersfeld & Halgren (1996) and Kantner & Keirnan (2003a) present a less time-consuming form of the ethnographic interview. The purpose of the condensed ethnographic interview is the same as the regular version, i.e. to understand the user's work processes, responsibilities, used tools, time sinks, frustrations and needs. Also this version aims in drawing workflow models and creating descriptions of the user's tasks. The main difference is that the iteration is left out and the analysis is not as thorough as in the regular ethnographic interview.

In the study conducted by Bauersfeld and Halgren (1996), the focus was on the user's daily responsibilities and tasks. The users were first asked to describe their normal activities and thereafter, additional questions were asked of all interesting daily tasks. The users were also asked to describe and demonstrate the tasks and the tools needed to execute the tasks. The researchers asked to see artifacts and tools the users used during the tasks and they also asked the users to describe, what is frustrating and how they would improve their daily routines and tools. The total length of the interviews varied between 30 and 90 minutes.

3.3.5. Exploratory Testing

Exploratory testing can be defined as: a usability study method where the user tries the system tested independently (Adage 2004). The test instructor does not interfere unless the user needs help.

In exploratory testing (also known as 'informal walkthrough') the user does not have predefined test tasks. Instead the user is asked to use the system freely as in a normal use situation. This does not mean, though, that the test would not be controlled. The test instructor might have a list of features the user is wanted to try out during the test and if the user does not find these functions alone, he/she may be guided to try out the functions. (Riihiahho 2000)

With this method can be tested, how well the system's functions and ways of use are communicated to the user (Riihiahho 2000). Therefore, this method fits in testing a ready or almost ready product, when the aim is to find out, what functions the user searches in the product (Adage 2004).

3.4. Data Analysis

Data analysis and interpretation are required to bring order and understanding to the data (Taylor-Powell & Renner 2003). The analysis depends on what questions need to be answered and the resources that can be used.

Miles and Huberman (1994 p. 10) discuss qualitative data analysis. According to them the analysis consists of three concurrent activities: data reduction, data display and conclusion drawing/verification. Data reduction includes selecting and simplifying the data, it occurs

throughout the entire qualitative research process. Data display is needed prior to conclusion drawing of the data. It includes organizing and assembling the data as e.g. graphs, charts and networks. Conclusion drawing and verification begins simultaneously with the research; the first conclusions are made upon the first interviewing comments. However, it should be noted that the researcher should not get too attached with the first conclusions; they need to be verified later during the study.

Miles and Huberman (1994 p.50) also recommend that an early analysis is conducted. This helps data gathering, since the analysis can lead into gathering better data. This also helps the analysis phase, since the researcher does not need to analyze all of the data at once.

Taylor-Powell & Renner (2003) advice that, during the analysis process, the researcher gets to know the data. This is done by listening to the tape recordings and reading the text over and over again. The focus should be on the key questions that need to be answered. After this the information is categorized so that connections between categories and patterns can be identified. Finally the data is gathered together and interpreted. The interpretation can be done by e.g. listing the main findings or drawing a diagram or a mind-map. It is a good idea to involve others in the analysis and get an outside view. However, the main target is that the data is combined and put in a presentable form.

3.4.1. Information Modeling

Information needs to be presented in a clear and understandable way. Modeling is essential in order to present and improve work environments (Levas, A. et al. 1995). Therefore, many researchers have addressed information modeling (e.g. Beyer & Holtzblatt 1998, Harrington 1991, Miles & Huberman 1994).

Beyer and Holtzblatt (1998 p.86) present five different work models to represent work environment: flow model, sequence model, artifact model, culture model and physical model. Harrington (1991) also uses flowcharts (cf. flow model), but to address process pictures. He gives quite detailed instructions of the different symbols that can be used in them. Also the value chain model presented by Michael Porter (1985) can be used to support organizational modeling, as well as the process simulation method discussed by Levas et al. (1995). It can be seen that there are several ways to do the information modeling. However, many of them are different variations of the flow model.

3.4.2. Affinity Diagrams

The purpose of affinity diagrams is to sort large amounts of data into logical groups (UsabilityNet 2003b). The diagram organizes the individual notes from the user studies into a hierarchical structure that shows the common topics and key issues (Beyer & Holtzblatt 1998 p. 154). It can be used for e.g. to analyze findings from field studies (UsabilityNet 2003b).

Affinity diagrams are a bottom-up data analysis method, which helps the researcher to form concrete issues from the individual notes gotten during the user research. The process of creating an affinity diagram starts with writing important parts of the interviews or user studies on to sticky notes. The notes are stuck on a white board or a wall. Then the notes are moved, grouped and rearranged over and over again, until they all have found a suitable, logical place. All groups are then labeled and reviewed again. (Hackos & Redish 1998 pp. 329-331)

One advantage of the affinity diagram is also that it combines the views of all researchers or the team members participating in its creation (Beyer & Holtzblatt 1998 p. 161). It also helps to achieve a consensus over the studied area, since it motivates communication between the team members. The best way to form an affinity diagram is in a team.

3.5. Summary and Effects of the Theory

The theory of this thesis consists of the following areas: the production of IT and ICT services, organizational theories (including the value chain analysis and communication), the usability study methods, and the data analysis.

The usability study methods contributed the research methods both generally and by providing some specific details and questions. As the literature indicates, the context of use is an important aspect of the usage situation analysis. Therefore, it was considered an advantage that the users were interviewed in their normal work environment. This was influenced by both, the ethnographic interview and the contextual inquiry. The basis for the interviews was a semi-structured interview, however, some parts reminded more unstructured interviews, since the interview was partly more of a conversation and the questions were used more as topics for the discussion. Exploratory testing was used in one part when, the interviewees went through a few of the Service Catalog documents. The

length of the interviews was approximately one hour. This was seen as a proper target time, since the length recommended in the literature varied from one hour to 1½ hour. More of the interview as well as the interview questions can be seen in chapter 4.1.1 as well as in Appendix A.

According to the literature it is recommended that the data analysis starts at the same time as the gathering of the data. Also before the gathering starts it should be considered, what kind of data is needed for the study. This was taken into account during the study as well as some other basic recommendations presented especially by Taylor-Powell & Renner (2003). The affinity diagram was used in the data analysis to arrange the data and find out some special issues.

The previous studies conducted on the Service Catalog showed guidelines for a suitable structure of the Service Catalog. The Service Catalog evaluated in this thesis could then be compared to those. Also it was discovered that the packaging of IT service requires modular services that are clearly defined. In addition the SLA theory gave some guidelines to the evaluation, since the Service Catalog necessarily influences the SLAs. The Service Catalog is used as a baseline information source for the SLAs. However, still should be studied better the customer requirements for the SLA information.

The Porter's value chain model was taken as a basis for organizing the different organizational groups in a suitable order. Also the information modeling methods gave an insight to the modeling of the workflow. Since the chances for communication to succeed are quite small, the communication was one topic discussed in this study.

Since the researcher was situated in the Production organization it was important that the research covered all of the main groups that affect the value chain. The Production is situated in the beginning of the chain, so the path up to the customer is quite long. With this research that path could be made more visible and familiar.

4. METHODS AND RESULTS

This chapter describes the methods used in this study as well as the results gotten. Chapter 4.1 describes the used methods, after that starting from chapter 4.2 are the results. The results start by discussing some general findings, mostly based on the affinity diagram (presented in Appendix B). Each organization's view of the Service Catalog and some results regarding the terminology and publishing of the Service Catalog are presented next. After that in chapter 4.6 is addressed the communication, which is followed by the descriptions of the workflow. Finally there is a short summary of the results. More thorough comments from the interviews, including the interviewee's number, can be found in Appendix C.

4.1. Methods

In this research altogether two methods was used, which were combined together. First there were semi-structured interviews (e.g. Rubin & Rubin 1995) that applied usability study methods, mostly ethnographic interviews (Wood 1996) and exploratory testing (Riihiahio 2000), conducted on the main target groups of the Service Catalog. During the interviews, the interviewees were asked to draw a model of the value chain (Porter 1985) or a workflow diagram (Beyer & Holtzblatt 1998) from their perspective. The methods are described more closely in the following part.

4.1.1. Method 1: Interviews throughout the Value Chain

Altogether 14 interviews and a pilot interview were conducted from different parts of the value chain. The interviewed groups were selected from the Service Catalog's main target groups; they are presented more closely below in chapter 'The Actual Interviews'. The interview plan, including the interview questions, is presented in Appendix A.

Pilot Interview

One pilot interview was held with a person that was partly familiar with the Service Catalog. He also represented a person, who had used the Service Catalog and had, therefore, an opinion about the pros and cons, as well as, the opportunities and challenges of it.

During the pilot interview it was noted that only a few changes were needed to the interview questions and methods. The changes done after the pilot interview were:

- One question was added about the advantages and disadvantages of the Service Catalog.
- The order of the questions was changed slightly, although the order was only an informal guideline.
- It was noticed that the documents taken to the interview should be the ones that are most closely related the interviewee's work.
- The notes written during the interview needed to be only keywords, since too long writing disturbed the interview (and the interviews were taped so this was not even necessary).

Since only a few changes were needed, the pilot interview could be used in addition to the official interviews.

The Actual Interviews

The main idea of the interviews was to combine condensed ethnographic interviews to semi-structured interviews. Also some influences were gotten from exploratory testing. The methods that affected the research are presented in chapter 3.3. The interview questions are presented in the interview plan in Appendix A. The interviews lasted from 45 minutes to 1½ hour, about one hour being the average as well as the target time. All interviews were tape recorded and transcribed. Each interview was transcribed and gone through before the next interview in order to find possible targets for development. Still, the interview outline developed only slightly during the interviews.

Altogether 15 interviews were done, one of which being the pilot interview. The interviews focused in the different organizations as follows:

- The Production: 5 interviews (4 + pilot interview)
- The Product Management: 4 interviews
- The Sales: 6 interviews

Should be noted that the Production's interviews include also the project managers, whose group has nowadays been divided into the Production and the Sales. The simplified organizational picture is presented in Figure 1 on page 3.

One interview was done via telephone and NetMeeting, since the interviewee was situated too far from the researcher. This arrangement worked quite well and caused problems only during the task, where the Service Catalog was gone through with the interviewee. Naturally, this method also made it more difficult to react to the interviewee's expressions and connect with the interviewee. However, this interview can be compared to any of the other interviews.

4.1.2. Method 2: Drawing Workflow Diagrams of the Value Chain with the Interviewees

During the interviews a special task was given to the interviewees: they were asked to draw a workflow diagram of the value chain from their own perspective using a blank A3-sized paper and colored sticky notes. To help the interviewee get started with the task the interviewer wrote on the notes the interviewee's group as well as the customer and a couple of the groups mentioned earlier during the interview. After this the interviewee could name more groups that affect the value chain. The notes were then arranged in a suitable order and arrows were drawn between the most relevant notes. At the same time, the interviewee described the whole chain from his/her perspective. The task was not very strictly defined in order to get the user's view better.

After the diagram had been done, the interviewees were asked to name a problematic part of the value chain and tell the parts that could benefit most from the Service Catalog. The problematic parts were asked so that it could be figured out, if that point could be aided with the Service Catalog. This task was influenced by the process analysis introduced in chapter 3.3.1, but in this method the work task was considered to be the whole service delivery that reaches through the whole value chain.

After the interviewees' diagrams had been analyzed and combined into three diagrams (the process is described more closely in chapter 4.1.3), the diagrams were sent to five randomly selected interviewees in order to get their comments and improvement suggestions. This gave more iteration to the diagrams and a more extensive solution came out. The

interviewees for the comment round were chosen randomly still considering that they represent the different organizations (i.e. the interviewed groups) as well as possible.

4.1.3. Data Analysis

Next it is described in more detail, how the data was analyzed.

Interviews

The interviews were taped so the first part of the analysis was to transcribe the interviews. This was done mostly right after the interview, so that possible changes could be made to the upcoming interviews. The interviews were not transcribed word for word, but the most important comments and some straight quotes were written down, as well as, the answers to each question. Still, the transcriptions produced approximately three pages of text each.

Important and relevant comments were written down on sticky notes and they were used in an affinity diagram (Beyer & Holtzblatt 1998). After each comment was the interviewee's number so that the comments could be traced back to the original interview and checked from the tape if necessary. The diagram was modified during three days and the final version was documented. The three days was set in advance and it was an appropriate time to form the diagram: it was enough time so that the notes could be arranged over several times and at times some distance could be taken from the diagram, but still there was a firm deadline so that the diagram was finished at some point. A rough outline of the affinity diagram is presented in Appendix B.

Finally, the answers to the most important questions were gathered in a table from the transcribed text. If several interviewees gave the same or similar answer, these answers were combined. After each answer was listed the interviewee's number. The table of the interview answers is presented in Appendix C.

Workflow Diagrams

During the interviews the interviewees formed a workflow diagram of the value chain from their perspective. Workflow diagrams were recommended in the process analysis presented by Hackos & Redish (1998) and the ethnographic interview (e.g. Bauersfeld & Halgren 1996 and Kantner & Keirnan 2003a). These methods are presented in chapter 3.3. After all

interviews were done, these pictures were used to form three diagrams of different situations: creating and delivering the customer solution, maintenance and service development. These models were formed during one day.

The process began by drawing first, on the basis of the interviews, a communication diagram on a white board. This was done based on what each interviewee said that were the groups that they contacted most during the day. This diagram is presented in Appendix D. After this, could be drawn the workflow diagrams. During the drawing process, were the interviewees' models viewed frequently (they were spread out on a table). After the three concluding pictures were drawn on a white board, they were documented and compared to pictures drawn quickly by the interviewer during the interviews. This caused a couple of changes.

Five interviewees then reviewed the three diagrams. The diagrams were improved on the basis of their comments and the final versions were formed. The diagrams are presented in chapter 4.7.

Finally, the interviewed groups were placed in a simplified value chain model, first according to how they situated themselves and then according to the total picture formed during the study.

4.2. General Comments Regarding the Service Catalog

From the affinity diagram could be found how the interviewees defined the Service Catalog. The following points came up:

- An interface document
- A Production's information system
- A prepared surface
- A fine data bank

One interviewee said, "The Service Catalog is a fine ideal scheme of things."

Also was said, "The Service Catalog is an interface document, a method. It does not solve anything by itself, but it needs to be connected to the activities."

One interviewee described the Service Catalog as a recipe, “This (the Service Catalog) is a pizza recipe. It is the basis for the pizzas that are listed in the menu and those are not changed.”

It could be seen that the Service Catalog’s elements should be brought more into the everyday occasions; they should be combined to hands-on situations. In addition, it was noted that the Service Catalog helps that the Sales cannot sell whatever the customer wants, since the Service Catalog shows clearly what is customization or cannot be produced.

4.3. Results by organizations

In the following is presented summaries of the most important comments about the Service Catalog found during the research organization-specifically.

4.3.1. The Viewpoint of the Product Management

This section covers the most common answers to the most important questions presented to the Product management. The Product management covers here the product managers as well as the product or service development. (Table 2)

Table 2. Summary of the Product Management’s answers to the most important questions

Question	Comment
Have you used the Service Catalog? In what situations?	
	Has used to find out, how some things are produced.
	So far the use has been limited in harmonizing the service descriptions with the Service Catalog.
	Has used, when was noticed that the product side needs to face better production’s realities.

The advantages of the Service Catalog?	
	It enables prepared components to be used in products.
	Offers a tool for making the production more efficient.
	It documents, what is done in the production.
The most important parts of the Service Catalog?	
	Costs (mentioned by three interviewees)
	Service Times (mentioned by two interviewees)
How could the Service Catalog be improved?	
	A general picture of the Service Catalog that would help to piece together what it is.
What are the problems or challenges with the Service Catalog?	
	Some of the terminology is not understandable.
	No problems, a challenge is to get the interfaces clear, so that it is known what the different documentations describe.
	One challenge is that the chosen format is kept in the future.

	The challenge is, how to document special solutions in the catalog.
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Also the following issues came up:

- The removal of the Service Catalog would result to the old situation, where services were produced case-by-case or ad hoc. As a consequence the situation would disintegrate fairly quickly and a replacing system would be needed.
- In the future is expected that the costs and metrics can be found from the Service Catalog.

Summary

The advantages of the Service Catalog to the Product Management are that it offers standard components that can be used in the products. It also describes how the Production produces the services used in the products. The biggest challenges are with the terminology and defining the Service Catalog and its interfaces.

4.3.2. The Viewpoint of the Sales

In this section is covered the most common answers to the most important questions presented during the interviews with the Sales' representatives. The Sales covers the Customer Responsible Sales, Solution Sales and IT Design –groups. (Table 3)

Table 3. Summary of the Sales' answers to the most important questions.

Question	Comment
Have you used the Service Catalog? In what situations?	
	Has used to look up service times.

	Has seen a couple times.
	Has used to find out, how some things are produced.
	Has not used. (Two interviewees)
The advantages of the Service Catalog?	
	The promise given to the customer is delivered to the Production.
	It documents, what is done in the production. “Of course, it helps us that we know, how the services are produced. We are the first ones the customers contact if problems occur.”
	It is important that the sales persons know, what is customization and how much work some special feature causes in the production. “We would have a better understanding of, what is done (in the production) and what are its affects on costs.”
The most important parts of the Service Catalog?	
	Costs (mentioned by three interviewees).
	Service times (mentioned by three interviewees).
How could the Service Catalog be improved?	
	It should be made easier to use.

	It should describe, what technologies are really mastered, not just supported.
What are the problems or challenges with the Service Catalog?	
	It has not been communicated properly.
	Keeping the catalog up-to-date.
	“There are no problems with the Service Catalog, only challenges with maintaining it up-to-date.”
	The Catalog is missing a customer perspective.

Also the following issues came up:

- If the Service Catalog would be removed, it would show, “If there was only ten customers, it would not be necessary, but since there is hundreds, everything needs to be documented.”
- The representative from the solution sales is the person, who does the final decisions, what the customer is offered. Therefore they are a critical group from the Service Catalog’s perspective.

Summary

The Sales can use the Service Catalog especially to find out, what parts of the customer solutions are customization and, therefore, need to be charged more. However, it needs to be communicated better to the Sales and especially the Solution Sales groups. Also the customer perspective is wanted to the Service Catalog.

4.3.3. The Viewpoint of the Production

Next is presented the most common answers to the most important questions presented to the Production's interviewees. The production covers all the interviewed groups situated in the Production organization: service managers, project managers and other production's people. (A more detailed description of the interviewees is presented in Appendix A, the Interview Plan.) However, should be noted that some of the project managers are officially in the sales organization. (Table 4)

Table 4. Summary of the Production's answers to the most important questions.

Question	Comment
Have you used the Service Catalog? In what situations?	
	Has used, when has described the produced service to the customer.
	It is a hands-on tool, since it describes the Production's work.
	Has not used. (Two interviewees)
The advantages of the Service Catalog?	
	The services and products can be described through workings.
	It is in the key position, when the service descriptions do not have enough information.
	It documents, what is done in the production.

The most important parts of the Service Catalog?	
	Exclusions (mentioned by three interviewees)
	Tasks and responsibilities (mentioned by three interviewees)
How could the Service Catalog be improved?	
	It could offer a guideline up to the sales.
	It should also take into account the internal customers.
	It could list the supported hardware.
What are the problems or challenges with the Service Catalog?	
	It has not been communicated properly.
	Keeping the catalog up-to-date.
	The development of the catalog is a challenge.

Also the following issues came up:

- Removing the Service Catalog would result in the old chaotic situation.
- “The Service Catalog is an excellent toolbox, but it does not guarantee any functioning devices.”
- The Service Catalog is missing the customer environments’ development function.
- The delivery could be even its own element.

Summary

The basis of the Service Catalog from the Production’s view is that it documents the Production’s workings and, therefore, can answer some of the questions that have been addressed to the Production’s specialists before. The updating and development of the Service Catalog are seen as the greatest challenges.

4.4. The Terminology and Format

One part of the interviews was that all the basic terms of the Service Catalog were gone through. That way the unclear terms could be found and improved.

The unclear terms are listed separately in Table 5. (The total amount of the interviews was 15.) However, it should be noted that since the terms are originally in Finnish, their meaning might have changed during the translation. The problematic terms will not be corrected in the scope of this thesis, since the Service Catalog is in Finnish. Also it was commented that the terminology should be harmonized with the terms used in Sweden and in other documentation. One interviewee pointed out about the terms that are used in different contexts (like the element): “How will these (terms) be synchronized so that they do not get mixed?”

Table 5. The most problematic terms of the Service Catalog.

Term in Finnish	Term in English	Times mentioned
Reuna-arvot	Boundaries	10
Toimitussisältö	Deliverables	5
Suosituksset	Recommendations	4
Toimitus	Delivery	2
Rajaus	Exclusions	1

One important aspect of the Service Catalog is also, how it is presented. At the moment, it is readable through an internal documenting system, which is used through a web browser. During the study it was found out that the present user interface is not clear enough. The document hierarchy is not understandable or at least it should be made more visible. Also the needed information might not be found from the documents even though it might be there. “It is hard to find the thing you are looking for from it (the Service Catalog).” A few interviewees pointed out that a schematic picture that would present the whole of the Service Catalog would be useful. “There could be a general picture, where it (the Service Catalog) would be sketched and outlined.”

In addition, one interviewee said that he would prefer a zip-file or other format that could be kept on the personal computer. This way the Service Catalog could be taken easily to the customer’s site and the customer’s questions could be answered right away.

It was also said that there should be a short introduction page in the intranet that could be found by the search ‘Service Catalog’. That page should include a short description, the contact people and a link to the documentation system, where the actual documents can be found. In addition, it was discovered that since the services require documentation at several levels (i.e. the production documentation, service descriptions, sales material etc.) all these

documents should be linked together somehow. This, however, is quite a large-scale change and influences nearly the whole corporation.

Summary

Most of the terms used in the Service Catalog seem to be understood well. However, there are a few unclear terms that should be checked. The format of the Service Catalog should be developed so that it would better support e.g. search functions. Also it should be made easier to find in the company's intranet.

4.5. Found Problems and Improvement Suggestions to the Service Catalog

The present publishing format of the Service Catalog is not good enough and does not encourage its usage. The documents cannot be found easily enough and the present format does not support search functions. Therefore, the time it might take to find the needed answers from the Service Catalog is too long and it might be left unused. Also the hierarchy and an overall picture of the Service Catalog should be presented first. At least two interviewees mentioned that an overall picture of the Service Catalog would clarify the structure and the concept better. However, the documenting system used suites well since it is starting to get used quite widely in the company and is, therefore, accessible.

Some sort of feedback system would also be necessary. The users could e.g. tell if they did not find the information they were looking for. This way would be known, what information people expect to find from the Service Catalog and it could be developed accordingly. As one interviewee said, "Here should be a feedback button that would ask if you found, what you were looking for." Since the biggest challenge is to continue the development and keep the documentation up-to-date, this feedback option would help in the development.

In addition a version of the Service Catalog that could be carried to the customer's site would be helpful, "I have visited the Service Catalog's site. However, it (the format) used to be better, when I got a zip-file that I could take on my laptop with me to the customer's site." The present intranet documentation system does not support this, since there might not be an Internet access at the customer's site. The Service Catalog should be published in the system in a way that enables easier download (now each document needs to be downloaded

separately). This way the user could download the documents at once and carry them with him/her. The creation of a zip-file is not recommended, since it would increase the maintenance work.

The linkage from the Service Catalog to the other documentation and vice versa is also an important point. There are many levels of documentation varying from the work instructions to the sales material. The customer solution can then be seen as a cross-section of all these different documentation levels. One interviewee said, "The Service Catalog would help a lot, especially if its information would pass to the product and sales materials." This would need a common documenting system and co-operation with the other organizations. The best way would probably be that there would be straight links from one documentation type to another. Also a picture should be drawn to clarify the roles and linkages of each document. Below is presented an example figure of these different documentation types. (Figure 6) However, should be noted that it is only a rough draft and probably does not include all of the different documentation types that are actually needed.

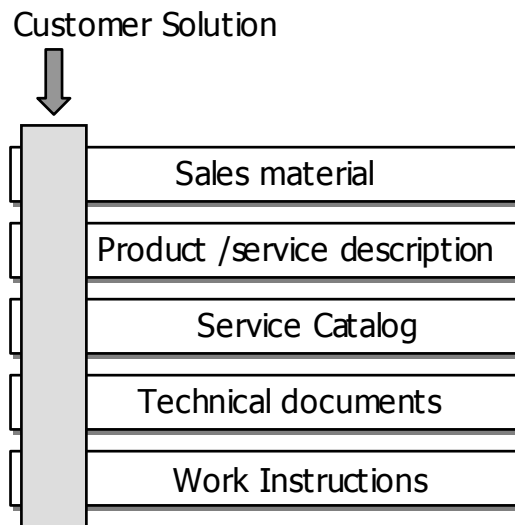


Figure 6. Different levels of documentation.

According to the literature and general guides, the Service Catalog evaluated contains almost all of the most commonly needed topics. However, the customizations and customer specific variations should be documented somehow. As one interviewee said about the standard service times, “It is good that they are listed, but it is theory. How do you describe the customized solutions with the Service Catalog?” The literature indicates also that the Service Catalog should include the customers for each service. This is something that still requires development. It is difficult to discuss specific improvement suggestions, since the Service Catalog is still quite incomplete. However, the metrics should be considered very carefully and in co-operation with some customers (external and internal) so that they would measure things that bring additional value to the customer. After all, the metrics are the part that has the greatest effect on the SLAs.

Also it should be noted that the Service Catalog needs the internal customers’ viewpoint. Adding one more section to the Service Catalog documents, which covers the differences, when the service is offered to an internal customer, could help this problem. These differences occur e.g. with service times, supported technologies and responsibilities.

The communication seemed to be a critical problem with the Service Catalog. This could be improved with an extensive presentation tour in different parts of the corporation. Also, since the intranet is a quite common media in the company, a short presentation could be published there. There seemed to be a definite need for the Service Catalog, but its opportunities and usage possibilities just need to be communicated properly.

Summary

A hierarchy picture of the Service Catalog should be presented first in the user interface of the Service Catalog to give a good overview of the Service Catalog to its users. The site would also need a feedback system. The linkage between the Service Catalog and other documentation should be clarified and presented in a commonly used documenting system. One of the most important issues is that the Service Catalog should be introduced and communicated better with an extensive presentation tour. This would teach the Service Catalog’s purposes, advantages and use methods to the main target groups effectively.

4.6. Communication throughout the Value Chain

One part of the study was to find out, how information passes in the value chain. This way it could be seen, how the Service Catalog could help or has helped in the communication. The total amount of interviews was 15. However, one interviewee may have given several answers to one question and therefore the sum of the number of responses may exceed 15. (Table 6)

Table 6. Summary of the answers to the questions addressing communication.

Topic	Comment	Number of responses
How do you know whom to contact?		
	Been many years in the house and has learned who is responsible for each subject. “Experience brings a lot of knowledge.”	9
	Knows certain people, who can help forward.	3
	Searches the intranet for the people who are responsible for certain systems.	2
Problems with communication?		
	The understanding and passing of the customer information forward in the value chain. “It is a great challenge to get the whole organization look through to the customer need.”	3
	Nobody controls the whole.	2

	Information does not pass from the Production to the Sales and vice versa.	2
How does the information pass from the customer?		
	The Sales passes the customer information.	4
	Is in personal contact with the customer.	4
Comments about the communication generally?		
	There are certain formal methods like management groups. These can be useful, but are usually slow and inflexible.	2
What communication methods are used the most?		
	Email is the most important method.	3
	Phone is the most important method.	2
	Other methods: Personal contacts (meetings etc.) NetMeeting IRC (Internet Relay Chat)	

What information systems are used most in regular work? (That pass customer or work information)		
	Job control system.	6
	Asset management system	4
	Reporting systems (four different: two for workings, two for sales information)	6
	Documenting systems (two different)	5
	Invoicing system	3

In general, it was noticed that the information does not pass well between organizations. Some people know how to find out certain things and whom to ask. The problem comes, when someone is new in the organization and does not know the contacts. Many interviewees recognized that problems occur whenever information is not shared. As was said in the interviews, “We (the Sales) need to be in touch with the Production so that we do not create a solution that cannot be produced.” And “The conversation needs to be in place in a project or the results do not satisfy anyone.” Also one interviewee complained that the people responsible for the technical details of the customer solution never know, if the customer has accepted their solution or if it has been implemented. This could be a good possibility for feedback.

Also the communication towards the Production seemed to depend on everyone’s personal contacts; they knew who to ask for certain things. The information did not pass from the Production unless these contacts were used. This is where the Service Catalog can help: it offers information and contacts for the Production’s workings. However, it should be noted that a document can never completely replace personal communication. First of all, the

information in the systems might contain errors. In addition, what came out in two interviews was: the problem is, how to pass the tacit information from the customer to the production; it is not something that can be included information systems.

Most interviewees could not name one communication method above others. Most people use the phone and email equally. The advantage of email was said to be that it documents what is agreed on. On the other hand, it also causes more misunderstanding than the phone. One interviewee said that he prefers personal contacts. There was also interviewees that used different methods for communicating with different groups, e.g. email with the customers, email + phone internally and email + meetings with the subcontractors. Even though email was very widely used, it was still described as “a poor communications method”. The disadvantages of the phone were that some people are hard to get in touch with and not everyone’s numbers are in the intranet.

From the used information systems could be seen that there is no one specific system that would pass the information throughout the value chain. One system is used to manage assets, one to document the work done and two systems to report the work. Then the invoicing system is separately, as well as the systems used by the Sales. When considering all these different information systems, one cannot help but wonder how the system-level information reaches the target at all.

Summary

The communication between different organizations in the company seems to be quite poor. Most people have learned the proper people, whom to contact during their many years in the company. However, there is no good source for this information. The Service Catalog helps this problem in the Production, since it lists a responsible for each working. One specific problem is that the customer information is not passed efficiently within the company and, therefore, the customer’s need is sometimes forgotten. Also different information systems and methods are used for communication, but there is no specific system that would contain all needed customer information. Still, it should be kept in mind that even a very well developed information system cannot replace personal contacts completely.

4.7. Workflow in the Value Chain

On the basis of the interviews could be found three different processes. These were then gathered as three workflow models: the formation and delivering of the customer solution, maintenance, and product / service development. These pictures show also the placement of the Service Catalog (marked with doubles lines). The Service Catalog was set into the pictures according to the models made during the interviews. The pictures show quite well the Service Catalog's role in the Production's different interfaces. (Figure 7, Figure 8, Figure 9) Should be noted that the subcontractors have several roles in these pictures and they represent different service providers.

On the basis of the interviews the interviewed groups could be set into a value chain model that is loosely based on Porter's (1985) value chain model. The interviewees placed themselves in a model and an overall model was also formed as a result of the interviews. (Figure 10, Figure 11)

Workflow Models

Figure 7 presents the creation and delivery of the customer solution. This case describes a more complicated IT management service solution, since it is the type that usually concerns the Production during the formation stage. The process begins with the customer's call for bids. The customer solution is created iteratively inside the dashed box. The Solution Support is in charge of this, but also the IT and IP Design groups as well as the Production and the Product Management are involved. In the second Solution Support box, the final solution is gathered and taken to the customer. If the customer accepts the solution, it is taken into delivery. The Design and Delivery group is the main responsible in this part. However, information is still exchanged between the different organizational groups. The invoicing has two phases: the Design and Delivery starts the monthly chargeable billing and the Production is in charge of the separately chargeable tasks. The role of the Service Catalog is marked with double lines. Can be seen that the Service Catalog is needed in all Production's interfaces, but its use is not very common in the delivery phase.

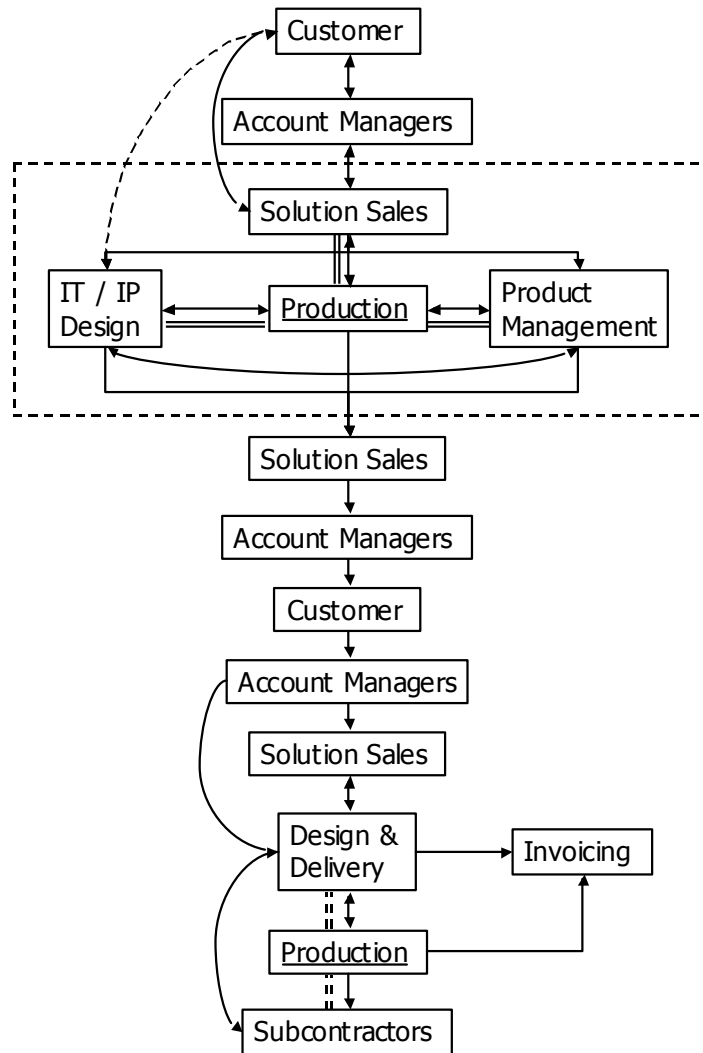


Figure 7. The creation and delivery of the customer solution.

Figure 8 describes the maintenance phase. The service managers are separated from the Production here, because they have a special role in the customer contacting. The customer's primary contact points are the ITOC (IT Operations Center) and the Service Desk. However in more complicated situations also the Service Manager and the Account Manager are used. Sometimes the customer contacts the Production, but this procedure is not recommended or even acceptable. The Product Management is mentioned in this phase too, although, its role is not very significant. The Service Catalog's most important role here is within the Production, but it should be used with the subcontractors as well. Also in

problematic situations the service managers might use the Service Catalog to clarify how some services are produced. The role of the Service Catalog is marked with double lines.

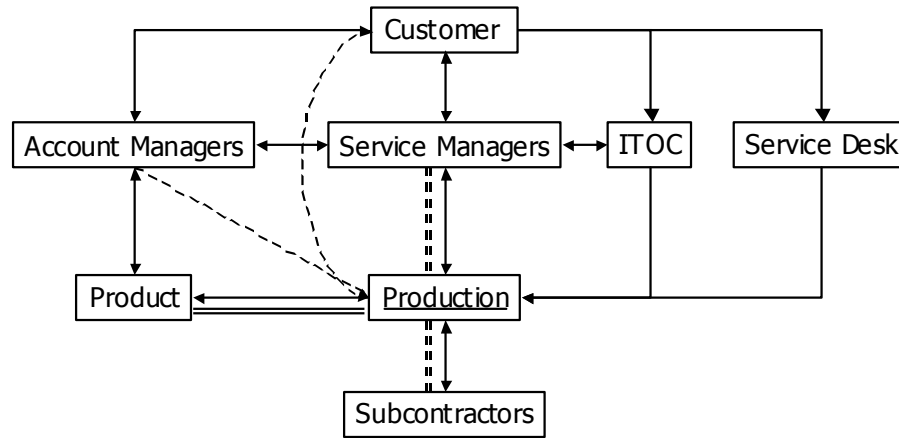


Figure 8. The maintenance phase.

Figure 9 describes the service development. The actual development work is done within the dashed box. The main input for the development comes from the customer. The internal source in this picture refers to other internal input mechanisms. These can be the following:

- A formal board that handles customer feedback.
- A market analysis unit.
- A corporate guidance of future service development.
- An idea of an individual employee.

The Sales has the best knowledge about the “big-picture” of the customer needs. However, the Production’s role in the development function could be greater than it is at the moment. There is a lot of knowledge about the customers’ needs and problems, and also knowledge about possible improvement ways. The role of the Service Catalog is significant in this purpose: it documents the Production’s capabilities and workings and these are in a great role in the service development. The role of the Service Catalog is marked with double lines.

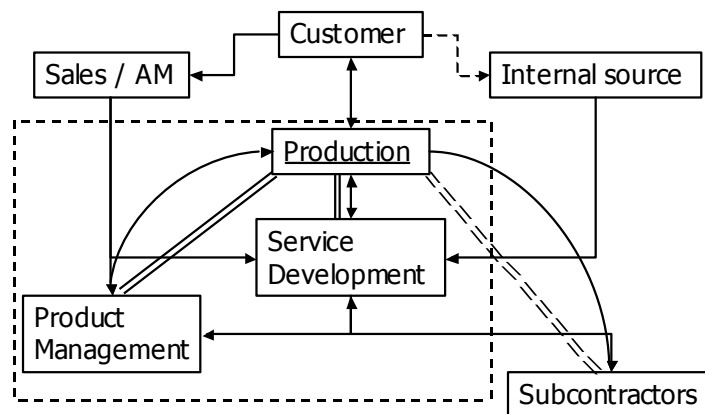


Figure 9. The Service Development.

Value Chain Models

One interview question asked the interviewees to place themselves in an empty value chain model that is loosely based on the Porter's model presented in chapter 3.2.1. These placements are presented in Figure 10. One interesting observation was made during that task: most interviewees placed themselves closer to the end-customer than they actually would appear.

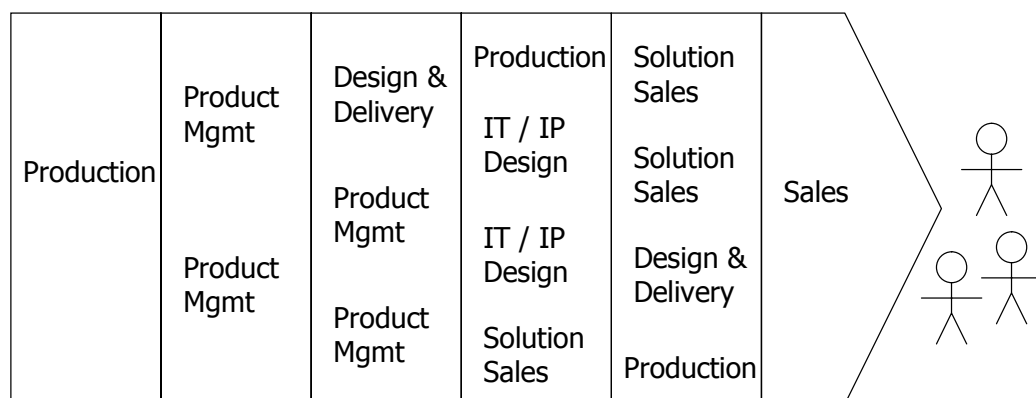


Figure 10. The placement in the value chain done by each interviewee.

On the basis of the previous figure (Figure 10) and the interviews in general, the interviewed groups could be set in a value chain picture. Should be emphasized that the model includes only the groups interviewed, therefore e.g. inbound logistics and services are left out, which does not mean that those activities do not exist. The support activities are also left out of this model, since they were not included in the study and are not significant from the Service Catalog's point-of-view. (Figure 11)

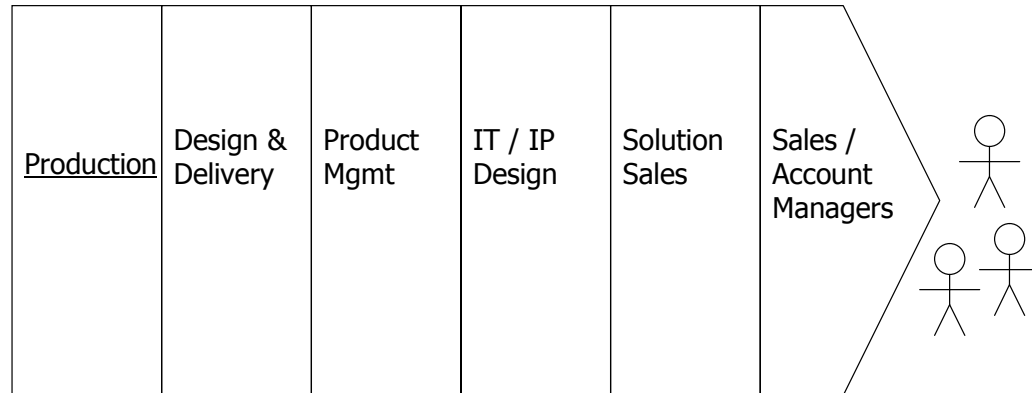


Figure 11. The simplified value chain of the organizational groups in the study.

Summary

From the workflow pictures drawn during the interviews three different situations were found: the creation and delivery of the customer solution, the maintenance, and the service development. In addition, the different organizations could be arranged in a value chain model based on the model presented by Porter (1985). From the workflow pictures the placement and the most important interfaces of the Service Catalog could then be seen. At the moment they are between the Production and the Product Management (including the service development) and the Solution Sales.

4.8. Summary of the Results

In this part a short summary of the main points of the results is presented.

The advantage of the Service Catalog is that it documents, what is done in the Production. Its greatest challenge seems to be keeping it up-to-date. The production seemed to find the exclusions as well as the tasks and responsible persons as the most important parts of the Service Catalog, whereas the Sales and the Product Management found the service times and the costs the most important parts. It was also noticed in nearly every interview that there has been a great deficiency in the Service Catalog's communication.

It was noted that the people outside the Production saw the Service Catalog more as a Production's internal tool that also includes useful information for other organizations. However, many interviewees from the Production did not see that the Service Catalog could help the internal operations.

The presentation format and the user interface of the Service Catalog should be more visual and clear. The hierarchy and an overall picture should be presented first and a search function would be needed. The users should be able to find answers to their questions efficiently and in detail.

There seems to be problems with the communication inside the company, especially between different organizations. One problem is that there is no clear indication, who is responsible for each area, so the only way people know whom to contact is by their own experience. The Service Catalog presents a person responsible for each working, so it provides some help about the Production's contacts. The passing of customer information and customer need was mentioned as a problematic part by many interviewees. There is also no specific information system that would pass the customer information forward. The information is scattered around in different systems and documents and no one can reach all the information. Still it should be kept in mind that also personal communication is needed; everything cannot be passed through information systems.

The role of the Service Catalog could be defined from the workflow pictures drawn from three different situations. The Service Catalog has an important role as an interface document, but especially during the maintenance phase its role as an internal tool for the Production is emphasized.

5. CONCLUSIONS

In this chapter answers to the research questions defined in chapter 2.2 are presented. After that the communication and the role of the Service Catalog is discussed.

The research questions of this study were:

How is the Service Catalog used throughout the value chain?

How does the information of the Service Catalog pass throughout the value chain?

What are the advantages of the Service Catalog in each organization?

Does the use of usability study methods bring additional value to the research?

If it does bring additional value, what kind of value does it bring and how?

The next chapter presents each question separately along with the answer to it.

5.1. Answers to the Research Questions

The main research question of this study was:

How is the Service Catalog used throughout the value chain?

As was seen from the interviews, there certainly seemed to be a demand for the Service Catalog. There were comments like, “Finally these documents have been done.” Also many interviewees saw that if the Service Catalog was removed some replacing documentation would be needed or the company would return to the same old chaotic situation.

The Service Catalog is mostly used to look up some facts like the service times or what workings are included in some service. The Production used the Service Catalog in a different way than the other organizations. Other organizations used it to look up information, but the production also saw it as a way to influence their work and as a guideline.

However, at the moment the factor that mostly prevents the use of the Service Catalog is its incompleteness and unfamiliarity. Some of the interviewees had heard about the Service Catalog, some had used it, but there also were a few interviewees that had no idea what it was.

The sub questions of this study were:

How does the information of the Service Catalog pass throughout the value chain?

As was seen from most of the interviews, the Service Catalog appeared not to have been communicated well. Not even the people in the Production knew well enough what the Service Catalog was, how it could be used and what its advantages are. Also seemed to be unclear, how complete the Service Catalog was, how it is kept up-to-date and how new items or workings can be added.

Still even though the interviewees complained about the Service Catalog's communications could be seen that it is an important document in the Productions' interfaces. The Productions' people cannot always be reached and the Service Catalog can offer quick answers to some basic questions that come up often in different situations like, when building the customer solutions.

What are the advantages of the Service Catalog in each organization?

The Sales saw that they can look up information from the Service Catalog especially when no one from the Production is present. From the Service Catalog they can also check some more simple facts and, therefore, do not need to ask everything, especially the service times and costs.

The Product Management thought that the Service Catalog could give information to the service descriptions. The service descriptions are a summary of the Service Catalog's documents made for the customer. Therefore, it can be used as an information source and it also describes the Production's capabilities. In product development the Service Catalog offers standard parts that can be used in new services. Thus, not everything needs to be discovered all over again and the service development becomes faster and more efficient.

From the Production's view could be seen that the Service Catalog documents what the Production does. It serves as a basic documentation. Its advantages are also that it can reduce some of the questions that come to the Production's specialists and can, therefore, free their time to do the real productive work.

The additional methodological issue that could be addressed was:

***Does the use of usability study methods bring additional value to the research?
If it does bring additional value, what kind of value does it bring and how?***

The study was done by applied usability study methods. During the study was seen that the methods used were useful and brought additional value to a basic interview. Regular interviews would not have given enough information about the real use situations of the Service Catalog. Also doing the interviews in the regular work environment helped the interviewees to identify better with the normal work situation. This was seen by comparing the interviews held in meeting rooms to the ones held at the interviewees' work place. The workflow diagram drawing task was an excellent way to get a picture of the workflow from each interviewee's own perspective.

Still some additional methods could have been used to get even more information about the use of the Service Catalog. However, the resources of this study did not enable the use of more methods and a larger sample.

5.2. Communication, Workflow and the Role of the Service Catalog

Generally can be said, when looking at Figure 7, Figure 8 and Figure 9 presented on pages 52-54 in chapter 4.7, that all the groups included in this study communicate with each other – or at least were expected to do so. Also it was noticed that the information does not pass as effectively as it is supposed to. One reason is that the organizations lack formal boards that would have representatives from different organizational groups. In addition, was noticed a slight egoism and self-centeredness, which causes that things are necessarily not asked, since there is a believe that the things are known best in the own organization. However, this is partly caused by the fact that there is no system that would tell who to contact in each issue.

During the interview, it was noticed that all groups tended to emphasize their own role. The interviewees also tended to speak off topic at times since they got a feeling that they were listened. This is nothing unique, but is still something that should be considered in all organizations. One problem seemed to be that the responsibilities are not specified clearly. This causes that different internal organizations blame each other, when problems occur, when, in fact, they should work in co-operation so that similar situations would not recur in the future.

Also the role and knowledge of the Production is underestimated in many cases. However, the Production itself is one reason for this, since it does not have proper mechanisms and resources to manage the contacting and informing. One interviewee said, “The Production is situated too far.” This comment meant physically as well as organizationally. This gap should be narrowed with different communicative mechanisms.

Although, the information systems and documentation have been discussed quite a lot, it should be pointed out that the information systems cannot replace all communication. There is always a bigger chance of misinterpretation, when the information is put in digital format and the information can be entered wrongly. However, the use of well-defined, fixed components in the information systems can reduce this. This is where the Service Catalog can help. It can offer ready-made, reusable components for the information systems, as well as, for the service development and the creation of the customer solutions.

6. DISCUSSION

In this chapter is discussion about this thesis and future research opportunities.

6.1. The Validity and Reliability of the Methods Used

The methods applied in this study appeared to be very useful when compared to a regular and more formal interview. Special advantage was of the interviews being held mostly at the users' own work place i.e. the actual context. The interviewees could relate better to their real work situations and they could better see how the Service Catalog could fit in their normal work. A few of the interviews needed to be held in the meeting rooms since the interviewees did not have their own rooms and the environment would have caused too much disturbance during the interview.

The use of a regular usability lab test would not have helped in this study, but the more unstructured method like exploratory testing (which has influenced this study) was found quite suitable. This helped the interviewee to better imagine the real work situation. Planned tasks would not have been possible since everyone's normal work tasks differ quite a lot. It would also have required extensive studying beforehand to understand everyone's work well enough to be able to design proper tasks and in this research there was not enough resources to enable this.

6.2. Analysis of this Research

The purpose of this study was to analyze the usage of the Service Catalog in different organizations and find possible problems and improvement suggestions. At the same time could be seen how the customer solutions are actually formed and how the workflows in the maintenance and development phases. After this the role of the Service Catalog could be defined. These objectives were filled well.

However, this study was mainly a one-person study, which means that the researcher was deep in the subject. Sometimes another person's view was needed, but this could not always be arranged. Therefore, the viewpoint might at some point have been slightly narrow.

Also at times, like during the interviews, some problems with the concentration and focus were noticed. This was seen especially at the point when most of the interviews were held. The routine was naturally also an advantage; during the interviews it was learned how certain things should be asked. However, some things might not have been asked in every interview or at least the way that the questions were asked changed slightly. Nevertheless, this did not affect the reliability and the validity of this study significantly.

The data analysis is always a very challenging task. In this case the analysis methods were quite adequate. However, there would have been a demand for an outside view at some point of the analysis. Especially the affinity diagram should be formed in co-operation with other people involved in the case. Unfortunately this was not possible to accomplish since there was not any available resources. It can be said that the study was possible to conduct by oneself but the view might have been left somewhat narrower and the quality might vary.

About the topic was noticed that ITIL and the Service Catalog are at the moment quite hype in the IT Service industry. This has some downsides: there is not yet much scientific research done and reported, and the companies tend to keep their own material confidential. Hence, there was not much written material to be used about the usage of the Service Catalogs.

At the time of the study the company held co-operation procedures. This caused that the general atmosphere was not as good as normally. It also delayed the starting of the interviews and caused a small hurry in the analysis phase. However, this was not seen a problem. What did cause small problems was, though, that the organizational structure changed partly as a consequence. Therefore, one group, the Offering, which was later seen as one of the main target groups as well, was left out of the study. The co-operation methods between the Production and the Offering will be defined later and this study might help in the formation.

One situation that affected this study was the constant development of the Service Catalog. This caused small problems in the evaluation. However, the constant development of the Service Catalog is highly recommended and necessary, so this situation is only natural and a positive factor.

About the research methods can be said that the selected methods were useful and worked well. Still some other methods like focus groups could have been used to bring more views. The drawing of the workflow diagrams was found as an excellent method; the interviewees remembered the groups involved in their work much better while drawing, than when asked about the groups earlier in the interview. This helped also in the formation of the whole workflow picture. The affinity diagram that was used in the analysis was found to be very useful. It helped to find essential comments and topics of the interviews – things that were not necessarily straight interview questions. However, it is always a subjective analysis method and cannot be used alone. It was also noted that in the drawing of the workflows possibly two different situations should have been done during the interviews: one picture of the creation or delivery of the customer solution and one of the maintenance phase. However, the need for this was found only at the later analysis phase.

In general it can be said that despite all, this study gave a good general picture of the study area, which was not known at all in advance. The user interface of the Service Catalog was not paid much attention. Nonetheless the usage situations should be analyzed before the interface can be developed. After this study e.g. the user groups and use situations are better known.

6.3. Future Research

Next is presented the areas of future research related to this study; first regarding this case and then more generally in the field.

6.3.1. Regarding this Case

After this study two different branches should be taken in the research: the communication and its development and the usage, user interface and format of the Service Catalog. After these two topics have been studied in more detail, they could be combined again.

In the communication study more thorough research would be needed. It should cover more different groups and more representatives from each group. Also the aspect of the communication between the managerial level and the employees should be studied. In addition, some more thorough methods for analyzing communication like network analysis (Scott 2000) could be used. The different work processes, i.e. the customer solution's

creation and delivery, maintenance and development, could be taken under more careful examination. This could be done e.g. by a simulation method (e.g. Forssen & Haho 2003, Evokari & Smeds 2003).

The usability aspects of the Service Catalog are one possible future study area. The user interface of the documentation system should be designed to support fast and easy information search. Since the Service Catalog was seen as a toolbox or data bank, this function should also be supported by the user interface. Other things to consider about the interface are: what information it should contain (in addition to the Service Catalog documentation), to what information it should be linked to (e.g. service descriptions), what the most important parts that should be highlighted are and how the hierarchy of the documentation should be presented.

The terminology turned out to be a challenge: it should be harmonized throughout the corporation. This is also one study area. Different terms should be gathered and the terms to be used should be decided on managerial level. This can also be done in a smaller scale considering only the Service Catalog. The terminology of the Service Catalog could be checked and changed to corresponding terms that are used in some other context.

One topic for research is the process model that is used in the company. More research could be conducted on what is the best suitable model or theory to be applied. Is the ITIL model the best one or should some other model like eTOM (TM Forum) be chosen? Also should be studied, how these models are used in the company. A couple of the interviewees said that it would be time to apply common processes and methods within the whole company.

Finally one task that should be done inside the Production is hands-on modeling. Different real-life situations could be described with the help of the Service Catalog. This could not be done in the scope of this study, since the material is confidential. However it would be an important task and it might motivate the use of the Service Catalog, since its advantages would be seen in practice. The Service Catalog is still quite new and on a development stage. Therefore, a lot could be done with simple studies.

6.3.2. In General

Generally in this study field is still much to study. First of all the ITIL framework and its usage in different contexts should be evaluated. Since the ITIL itself does not advice how the processes should be introduced and applied, it could be studied how the framework has been adapted in different organizations.

Also different Service Catalogs should be compared; in particular the different formats and use situations. This way the Service Catalog could better be developed and possibly a common format could be established. Perhaps it could even lead to a common way to define the Service Level Agreements. A common Service Catalog format would make the comparison between organizations easier, but its formulation is quite a challenge. Also the usage of Service Catalogs without the implementation of the ITIL framework would be a useful study area. As was noted earlier, the Service Catalog does not require the ITIL framework even though it is a part of it.

The appliance of different usability study methods in the evaluation of companies' functions and the organizations' decision-making processes is one research area. The study area of strategic usability has already started this research, but it could still be widened to different situations and more study methods.

Finally, it should be noted that all organizations are different. Therefore, methods that have been useful in one situation might not fit to another organization and context. So in the end the context of use is probably the most important factor to remember in these studies.

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Appendixes

APPENDIX A – Interview Plan

APPENDIX B – Affinity Diagram

APPENDIX C – Interview Answers

APPENDIX D – Communication Diagram

APPENDIX A – INTERVIEW PLAN

In this appendix the interviews are described in more detail. Fourteen people will be interviewed, plus one pilot interview. The target is that the interviews last approximately one hour. The purpose of the interviews is to find out in what situations the Service Catalog is used and how the information of the Service Catalog is passed throughout the value chain. Also communication in the value chain in general will be discussed as well as the terminology of the Service Catalog. One point of the interviews is also to find out the advantages of the Service Catalog as well as improvement ideas and get some general feedback. Also some common questions about the interviewee's work and organization were asked in order to get a complete view of the interviewee's work tasks and environment. If some question or part of the interview is especially affected by some method, it is mentioned in parenthesis after the question.

The main groups of the interviews

The people interviewed represent the following groups:

- The Product Management
- The Sales
 - Solution Sales
 - Sales Support
 - IT Design
- The Production
 - Design & Delivery
 - One Service Manager
 - One Group Manager

The Product Management

From Product Management the product managers from the two main products are interviewed. Also two representatives from the Product Development are interviewed.

The Sales

The Sales department interviews can be divided into three groups: Solution Sales, IT Design and Sales Support. From the both two first groups two representatives will be interviewed and the third group is covered with one interview with a sales director.

The Production

The Production's interviews consist of three groups: Service Managers, The Design & Delivery team and Group Managers. These groups are covered with only one interview from each group, except the Design & Delivery from which will be interviewed two people. The purpose of the Design & Delivery group is to manage the delivery project. The purpose of the Service Manager's interview is to get a picture of the customers' side (same purpose as the Sales Director's interview). The Group Managers were selected to give an aspect to the value chain and the communication aspects from productions side. The Production's questions will differ a little from the basic questions, since they cannot discuss their communication to the production. Instead they will discuss the communication to other organizations.

Pilot Interview

One pilot-interview will also be arranged with someone familiar with the topic. For this purpose someone from the Production is suitable, since the purpose is only to test the questions and tasks.

Interview Questions

The interviews will be held in Finnish; therefore the original questions were also in Finnish. However they have been translated for this document.

Background

- Describe your organization, position and main tasks?
- Where in the value chain do you see you are situated in?

- Do you know anything about the Service Catalog?

What?

Have you used it?

- How much are you involved with the production?

In what situations?

- What are your contacts with the end customer?
- What information systems do you use in your work?
- How (through whom) does the information pass to you from both ends of the value chain?

The following questions varied a little depending on how much the interviewee had used the Service Catalog.

- With which groups do you communicate the most during the day?

Why?

What information is exchanged?

- What is the most common communication tool?

How do you know whom to contact?

- Describe a normal situation when you are communicating with the production.
- Describe a normal situation, when you need/use the Service Catalog.
- How does the Service Catalog suite in your normal work activities?

Does it bring some additional value?

What and how?

How could it help more?

- Are there some problems with it?
- If the Catalog would be taken away, do you see that something would change?
- Go through a normal work task related to the Service Catalog.

Do you use some notes (artifacts)?

- Go through example documents of the Service Catalog. (Exploratory testing, Riihiahho 2000)

Which parts are the most useful for you?

What information is still missing?

Where would you start to find out the answers?

Go through the terminology of the Service Catalog (the most used terms, which are listed in the documents).

Is the terminology understandable?

The final questions

- About pricing (if the interviewee is involved)

How does the pricing happen?

Who does it?

In what information do the prices ground on?

- Technology choices, e.g. software, hardware (if the interviewee is involved)

Who does it?

In what information does it ground on? (What information is needed etc.?)

- If your superior would ask you for the advantages and disadvantages of the service catalog, what would you say? (Nielsen 2005)

- Go through the value chain from the interviewee's perspective.

Draw a picture of the communication process.

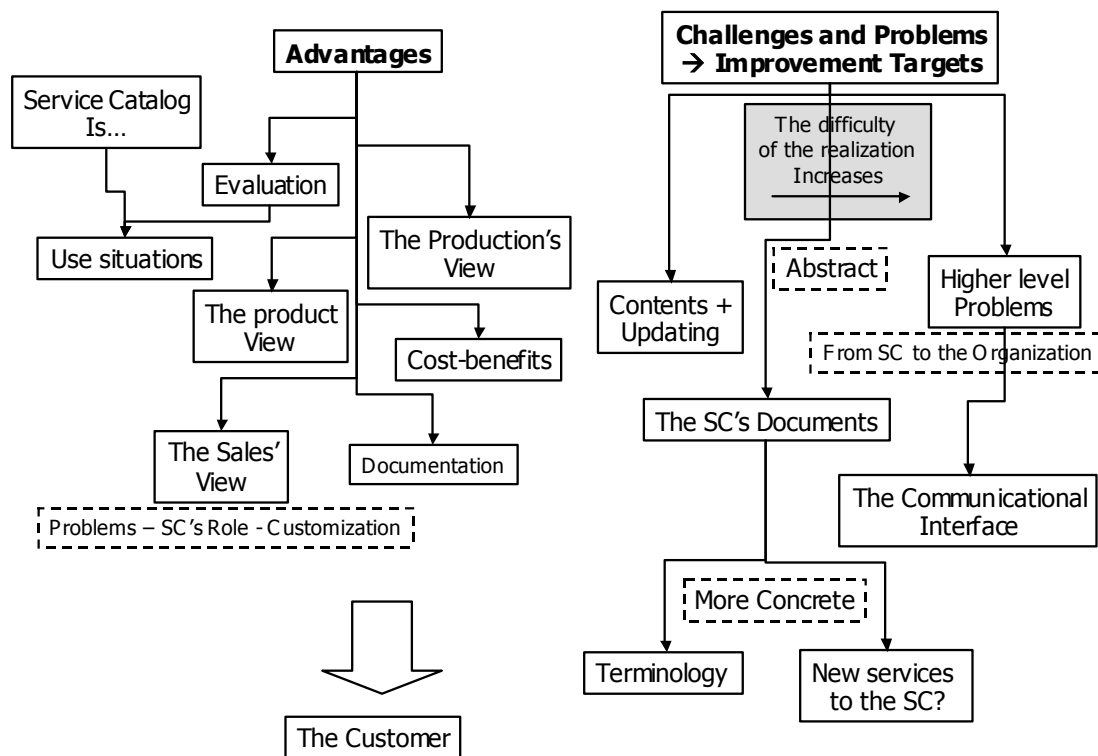
Which parts are problematic?

In which parts is the Service Catalog placed?

- Anything else to comment on the topic?

APPENDIX B – AFFINITY DIAGRAM

Below is an upper-level picture of the affinity diagram formed during the analysis. Its purpose was to help outline the data and find some specific comments that might not have been noticed without it. In general the idea of the affinity diagram is that it helps the researcher to group and sort large amounts of information (Beyer & Holtzblatt 1998). The affinity diagram has been presented with the data analysis methods in chapter 3.4.2.



APPENDIX C – INTERVIEW ANSWERS

The first table is the questions that discuss the Service Catalog and in the second table are the questions that discuss the communication in general. Interviewees 1, 3, 11 and 14 are from Service Management; interviewees 2, 8, 9, 10, 12 and 13 were from the Sales; and interviewees P, 4, 5, 6 and 7 were from the Production (P stands for the pilot interview).

Question	Answer	Interviewee
The Advantages of the Service Catalog?		
	The promise given to the customer is delivered to the Production.	3, 10
	It enables that prepared components can be used in products.	3, 11
	Offers a tool for making the production more efficient.	3
	Good that there are documents from where information can be searched.	1, 9
	It is important that the sales persons know what is customization and how much work some special feature causes in the production.	1, 10, 13
	It documents what is done in the production.	1, 2, 4, 10, 13,
	The services and products can be described through workings	6
	Appears to be detailed enough.	6
	Good, that these things have finally been documented.	7
	The catalog could help in the sales situation, e.g. with service times.	9
	It is useful when the specialists are not reachable.	12
	It serves as an interface document to production.	14
	It is in the key position when the service descriptions do not have enough information.	P
Have you used the Service Catalog? (In what situations?)		
	So far the use has been limited in harmonizing the service descriptions with the Service Catalog.	3
	It can help more the "upper level" products.	3
	Has used to find out how some things are produced.	1, 12
	Has used to look up service times	2
	It is a hands-on tool, since it describes the Production's work.	6
	Has not used	5, 7, 8, 9, 11
	Has used, when has described to the customer the service produced.	P
	Has seen a couple times.	10, 13
	When was noticed that the product side needs to face better productions realities	14
The most important parts of the Service Catalog?		
	Required elements	1
	Tasks and responsibilities	P, 1, 6, 7, 9, 12
	Costs	1, 2, 11, 13, 14
	Description	P, 2, 7
	Exclusions	P, 2, 4, 5, 10
	The person responsible	4
	Delivery	7, 11
	Service times	7, 10, 11, 12, 14
	Deliverables	11

How could the Service Catalog be improved?		
	It does not list all supported technologies e.g. hardware	P, 3, 12
	A general picture of the Service Catalog, which would help to piece together what it is.	1, 13
	Sometimes searches for more specific information	1, 13
	A short fact sheet in the intra that has all needed contact information and can be found with 'service catalog' search	2
	There could be a feedback system on the Service Catalog's site.	2
	It could offer a guideline up to the sales.	4
	It should describe what technologies are really mastered, not just supported.	12
	It should be made easier to use.	13
	The catalog is to focused on external customers, not internal.	4
What are the disadvantages, problems or challenges with the Service Catalog?		
	Does not see, that there are problems with Service Catalog, some challenges though.	2, 3
	Makes the sales interface more inflexible.	3
	Some of the terminology is not understandable.	1
	It has not been communicated properly	P, 2, 13
	Keeping the catalog up-to-date	2, 4, 10, 12
	You need to search for the information.	2
	The development of the catalog is a challenge.	4
	No problems, a challenge is to get the interfaces clear, so that is known what is described in what documentation.	11
	The Catalog is missing a customer perspective.	13
	One challenge is that the chosen format is kept in the future.	14
Other comments related to the Service Catalog?		
	The challenge is how to document special solutions in the catalog.	3
	Expects that in the future the costs and metrics can be found through the catalog	3, 13
	The catalog is still quite incomplete	4, 13
	The basic philosophy of the Service Catalog is good and extensive.	6
	The Service Catalog is an excellent tool box, but it does not guarantee any functioning devices.	6
	The Service Catalog is one Production's tool.	7
	The Catalog can help alot, especially the information passes to the Product management and the sales materials.	8, 9
	When the customer solution and the productional lives meet, are thing good.	14
	The catalog itself does not resolve anything.	14

If the Service Catalog was removed?		
	The situation would disintegrate fairly quickly.	3
	Would need some replacing system.	P, 3
	There would be no basis where to search information from.	1
	We would return to the old chaos.	4
	It would show; if there was only ten customers, it would not be necessary, but since there are hundreds, everything needs to be documented.	10
	Services would be produced case by case	11
	It would increase calling and asking.	12
	It would cause a greater risk in the customer solution.	13
	It would be a return to the situation where things were done ad.hoc.	14
The placement of the Service Catalog?	Katso vielä kuvien perusteella!	
	Between Product management and Production	P, 1, 3, 11, 14
	Between subcontractors and Production	3, 14
	As a guideline to the Sales	P, 1, 2
	Within the Production.	P, 1, 7, 10
	As a guideline to IT Design	2
	In the sales process	9
	During the maintenance.	9
	In the solution design.	13
	In the interface of development process and maintenance	14

The Communication

Question	Answer	Interviewee
How do you know whom to contact?		
	Has been many years in the house, so knows whom to contact.	8, 12, 13
	Knows certain contacts that help forward.	1, 11
	The problem is, that new people cannot know whom to contact.	5
	Asks someone, who advises forward.	9
	Uses the phone to find out.	10
	Knows the people who know at least someone that can help forward.	14
	Searches the intranet for responsible for certain systems.	10, 12
Information flows from both ends?		
	Customer information comes through the sales organization.	1, 3, 12, 14
	Also Service Desk communicates customer information.	1
	In weekly operational meetings	2
	Information reaches by asking different people about different things.	6
	Customer information comes through the Service Managers.	P
	Information comes through other people from own organization	14
	Is in personal contact with the customer.	2, 9, 10, 13

Problematic parts regarding the communication?		
	Too little resources and competence near the customer.	3
	Different products do not communicate.	3
	IT Design does not communicate with the Production	2
	The responsibilities are not clear.	4
	No prioritization done	5
	Too much customization is done.	6
	Everyone concentrates on their own things, nobody controls the whole.	8, 12
	The solution designers do not know how the solution passes, or if it is rationalized.	8
	To share the customer understandign forward in the organization.	9, 13
	The Sales does not know what the Productions does and vice versa.	10
	Problems come up when ever the information is not passed.	11
	Not everyone is reachable by phone.	12
	The Production does not tell what kind of solutions should be sold.	13
	The whole chain is the problem, the issue is where you want to target it.	14
Other things of communication?		
	There are certain formal methods, like management groups. These can be useful but are usually slow and inflexible.	2, 3
	Information flows very poorly	4
	Other organizations do not know how much work some things cause in the Production	5
	In process business you need to develop it daily, in order to make it work	6
	It is a great challenge to get the whole organization to look through to the customer need.	9
	Communication is needed so that the customer is not sold something that cannot be produced.	10
	Communication is needed, or the project's reluts do not satisfy anyone.	11

APPENDIX D – COMMUNICATION DIAGRAM

Below is a diagram of the most common communication relationships. It has been created on the basis of the interviews especially the question asking: with which groups do you communicate most during the regular workday. D&D stands for the Design & Delivery team, i.e. the Project Managers. From the Production the ones communicating with the customer are the Service Managers.

