



QUALITY OF EIS SUPPORT AND MAINTENANCE SERVICES

Tiina Laakso

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ABSTRACT

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Company X delivers integrated information systems for enterprises operating in various business areas. In addition to planning, implementing and deploying these systems, the company provides continuous support and maintenance services to its customers. However these services have not been systematically developed and quality of service can vary greatly.

The purpose of this thesis was to identify the problem areas causing low customer satisfaction and operational inefficiency. The objective was to understand how the identified problems are related to each other and present some ideas on how service quality could be improved.

Customers and Company X employees were interviewed and results were analyzed and compared to theoretical frameworks. Service quality gap analysis indicated that the service delivery processes were insufficient and lacking the support of top management. This caused the customers to perceive the service as unreliable and unresponsive even if the employees were knowledgeable and service oriented.

Recent indications of poor service quality and the identified potential for growth has increased the interest of the company's top management. Changes are already being done, but the effectiveness of these changes and improvements on operational efficiency, service quality, and customer satisfaction need to be monitored and regularly analyzed. Similar activities as presented in this research can be performed to continually improve the services and a long-term focus on customer service orientation is needed to stay competitive.

Any classified information about the studied company is presented in the appendices that are available only for relevant authorities.

Key words: continuous service improvement, enterprise information systems, software maintenance, service quality

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GLOSSARY or ABBREVIATIONS AND TERMS (choose one or other)

B2B	Business to Business
BAU	Business-as-usual
CSI	Continual Service Improvement
EIS	Enterprise Information System
IS	Information System
IT	Information Technology
ITIL	Information Technology Infrastructure Library
SLA	Service Level Agreement
WIP	Work in process

1 INTRODUCTION

As the information technology (IT) industry has matured it has developed a service focus to better meet the business objectives of the customers. The shift from a technology-centric thinking to end-to-end service approach is greatly influenced by the increasing complexity of service delivery. (Agutter 2013, 2, 12)

Systems have become more complex as customers need to integrate different activities of each functional area to stay competitive (Monk 2009, 3). Increasing complexity, pressure to downsize and centralization of core competencies has led to specialization and higher demand of outsourced services (Oliva & Kallenberg 2003, 160).

For system providers, services make it possible to create continuous, long-term customer relationships and services are becoming more significant also in financial terms. However, service delivery has fundamental differences compared to project delivery and system providers more experienced with projects can experience challenges. For services, there are less concrete milestones that can be measured and customer needs may vary significantly throughout the system lifecycle making service delivery and development more challenging. (Ojansivu 2014, 33-34).

This thesis studies one case company that provides enterprise information system (EIS) support and maintenance services for its customers. The company has traditionally focused on projects and has experienced challenges in service delivery and customer relationships. By interviewing customers and company employees this research aims to define in more detail what the experienced challenges are, what is creating these challenges, and what is their relation to each other. The study focuses on customer satisfaction and operational excellence. Interview results were analyzed using theoretical frameworks and compared to literature and previous research.

2 RESEARCH PLAN

2.1 Focus of the research (topic)

Company X provides large-scale enterprise information systems (EIS) for organizations operating in various industries. In addition to planning, developing, integrating, and deploying these systems the company provides support and maintenance services to its customers.

The support and maintenance services are becoming more important for the company as the number of support and maintenance customers is increasing and the business area is becoming financially more significant. Keeping customers satisfied throughout the service lifecycle from designing the system to maintaining the system is essential when operating in a limited and highly competitive market.

Company X has experienced some challenges maintaining a high level of service quality and has recognised the importance of improving service specification, delivery process and quality management to increase customer satisfaction. In order to focus the measures taken to improve the current situation, the company needs to understand what the experienced problems are, what is causing these problems and what could be done to prevent them. This research aims to find answers to these questions by interviewing both customers and company employees, by making observations while working in Company X and reviewing literature related to EIS maintenance and service improvement.

The existing process in Company X is too general to provide enough support for the maintenance service delivery. Currently the way of working can vary greatly depending on service manager skills and resources and there is no standardized methods that are actively used for ensuring service quality. Both project delivery and maintenance teams experience numerous problems from resourcing to knowledge gaps and frequent customer complaints. To increase customer satisfaction, ensure continuity of customer relationship, improve operational efficiency, and enable organizational learning and growth, Company X needs to address these problems. Services need to be assessed and improved on a more regular basis to ensure continuous quality and organizational learning.

The increased competition in the business area makes it even more important to have clearly defined services and value propositions and focus on customer satisfaction. The transition from delivery project to support and maintenance services and quality of service delivery are causing some concern although in practice, all delivery projects in Company X are currently continued in the form of support and maintenance and customers have not been lost. However, customers are free to acquire the needed services from any another provider. There are positive examples of this in Company X, as they have gained new customers from competitors, but so far have not lost any.

2.1.1 Company X

Company X is a large company that provides different kind of information systems solutions and services for a variety of different kind of national and international companies. The company has a certified quality system that includes core processes for all service types including delivery projects and continuous services. In addition to the core process, more detailed processes have been developed and are used for different types of solutions and services within different departments.

The company is organized based on the product or service and each organizational business unit is highly specialized. As some solutions offered to customers include services from several business units some co-operation exists between the units although managing methods and best practices have not been actively shared.

The business unit studied in this research has a silo organizational structure and is divided in three production teams that operate in a multi-project setting (figure 1). Resourcing in the unit is done from one common resource pool between all teams. The support and maintenance is not currently separated from the development. In addition to the production teams, there are several senior managers working for the business unit supporting in sales, customer relationship management and high-profile projects.

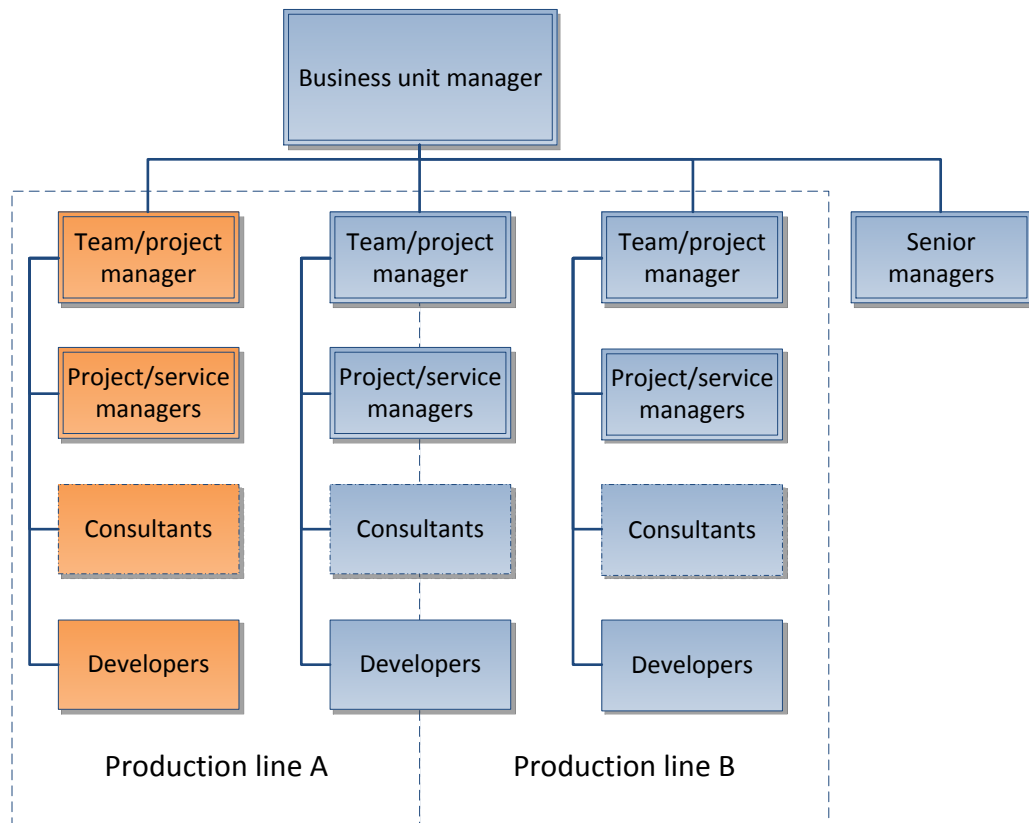


FIGURE 1. Organizational structure of the studied business unit

Company X has a companywide service desk that functions as the first line support that receives the support requests. Service desk itself does not provide any actual support to the customers, but simply forwards the support requests to the correct team to be solved. The service desk also tracks the response and resolution times but does not automatically provide any reports to service management or the customers.

When starting this research, I was newly hired to Company X to work as a service manager. This made the topic of this thesis very valuable to me personally as conducting this research familiarized me with my work and the known issues related to it. The complexity of service management in this area of work has become more evident and ideas about how to improve service quality and customer satisfaction in my daily work have become more structured.

2.1.2 Terminology

The use of some of the terms used in this thesis is somewhat conflicting in the literature and the meanings are therefore explained in more detail.

In this study enterprise information system (EIS) is defined as a highly complex, integrated, customized, modular based system that handles several functional areas of the customer organization and the system environment is composed of software and hardware. The functional areas that the system covers can include for example marketing, finance, human resources, logistics and manufacturing. EIS is developed from a business point of view and modifications to the system are made as the business environment changes for example due to changes in legislation.

EIS delivery projects are comprised of project planning, customer and system requirement assessment, system design based on customer's processes, system development, testing, deployment and transition to normal system operation state.

Transition phase is defined in this study as the shifting from a delivery project to support and maintenance services. It should be noted that transition phase in ITIL framework is used to refer to the system development and delivery, or as defined in this study, the delivery project.

The term support and maintenance is used to describe the continuous services provided to the customer after project delivery. In ITIL framework this phase of a system lifecycle is referred to as operations.

Operational manager is defined as project or service manager responsible for the daily operations and project or service delivery.

In this research top management is used to describe all the managerial levels that are not involved with the operations and are higher up in hierarchy from the operational managers.

2.2 Thesis objective, purpose and research questions

This thesis aims to identify the areas of concern in support and maintenance service delivery and customer satisfaction in Company X. The objective is to understand the relation between the identified problems and direct the attention to the root causes that most need to be developed in Company X in order to improve service quality. In addition to identifying and clarifying the problem areas, this thesis explores possible solutions to the identified issues in the scope of this research.

The purpose of this research is to combine both internal and external perspectives to get a full view of how the current service delivery is experienced. The results can be used to focus the efforts on improving the main areas of concern, and also as a reference for evaluating the future status and measures taken after this research.

The following research questions have been identified and are used as guiding principles for defining the research methods and reaching the research objectives.

- What problems occur in EIS support and maintenance services in Company X?
- Why these problems occur and what is their relation to each other?
- How can support and maintenance services be improved?

ITIL framework acknowledges gaps between customer expectations and perceived quality as well as between project delivery and support and maintenance. If these gaps have not been addressed in Company X they could be one of the root reasons causing problems during support and maintenance services. Also as Company X is very technology and project oriented, this could be causing some problems for services as different skills and methods are needed for successful service delivery.

The purpose of this research is to understand the current situation well enough so that whatever actions are taken they focus on solving actual problems. After this research is completed, Company X needs to evaluate if any further research is needed, assess and prioritize the findings and improvements suggested in this study, and plan any future actions for measuring and controlling the identified gaps. Next steps for service improvement, e.g. new service organization model, key performance indicators, updated service

descriptions, and more detailed process descriptions are already being discussed and the results of this thesis will hopefully provide some additional value to the discussion.

This research does not address the used technologies for developing or maintaining the system, the software tools used to deliver the service, the financial view point of the service delivery, or the internal knowledge management of the company.

2.3 Concepts and theory

The main concepts of this thesis are service quality, service management, customer satisfaction, and continual service improvement. These concepts are broad and any of these alone could work as the theoretical framework for this research. By examining the current status of Company X from different perspectives, a more thorough analysis can be made and the relations between different aspects can be studied. However, only a few theories and frameworks of these main concepts have been discussed in this thesis.

The general viewpoints of this research were selected based on Balanced Scorecard, a strategic planning and management system that is complementary to ITIL (Office of Government Commerce 2007a, 107, 108). The main theories used for collecting and analysing research results were service quality dimensions and service quality gap model. Other theories studied in this thesis include organizational orientation, service management, maintenance team structure and EIS maintenance.

2.3.1 Balanced Scorecard

Balanced Scorecard is a planning, management and measuring system first introduced in the early 1990s by Dr. Robert Kaplan and David Norton. Financial measures were recognised as insufficient for managing businesses. To improve strategic performance and results, three other perspectives, internal processes, learning and growth, and client perspective (figure 2), were included to provide feedback from both internal business processes and external outcomes in addition to the financial goals. (Balanced Scorecard Institute 1998-2014; Continual service improvement 2007, 107, 108.)

Lepmets, Cater-Steel, Gacenga and Ras (2012, 28) as well as Office of Government Commerce (2007b, 184) recommend using Balanced Scorecard for measuring service operation performance. Service effectiveness should be measured using customer-defined service quality, continual improvement and employee empowerment as the focus.

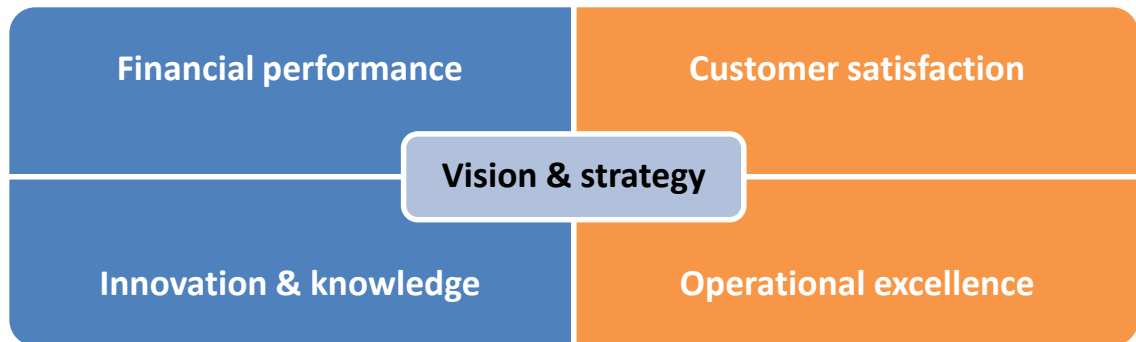


FIGURE 2. Balanced scorecard (Office of Government Commerce 2007a, 108; Balanced Scorecard Institute 1998-2014)

Two of the perspectives, financial performance and organizational innovation and knowledge, are not included in the scope of this research. These aspects need to be taken into consideration in the future when further improving the service.

2.3.2 Service quality

Parasuraman, Berry & Zeithaml (1991, 338) have developed a widely accepted service quality assessment tool SERVQUAL for measuring customer satisfaction. The five dimensions of SERVQUAL; tangibles, reliability, responsiveness, assurance and empathy; were used as the basis for assessing customer satisfaction. SERVQUAL was loosely adopted for the interviews of this research. Service quality and the five quality dimensions are further explained in chapter 3.4 Five quality dimensions.

In addition to the five quality dimensions, a model of service quality gaps was used to assess in more detail where the reported problems occur and what is their relation to each other and the different parts of a service delivery process. The model is described in more detail in chapter 3.5 Model of service quality gaps.

2.4 Working methods and data

Maxwell's (2013, 3, 6) model of interactive research design for qualitative research has been used as the research design model for this particular study because of its adaptive approach (figure 3). According to Maxwell, in qualitative study it's not even possible to create a logical strategy in advance and execute it exactly as planned. Instead one needs to construct and reconstruct the different aspects of the research in a more simultaneous manner where each aspect influences the other. The interactive research design has an interconnected and flexible structure. The model embraces spontaneity and improvisation in relation to the available resources. (Maxwell 2013, 2, 3, 6)

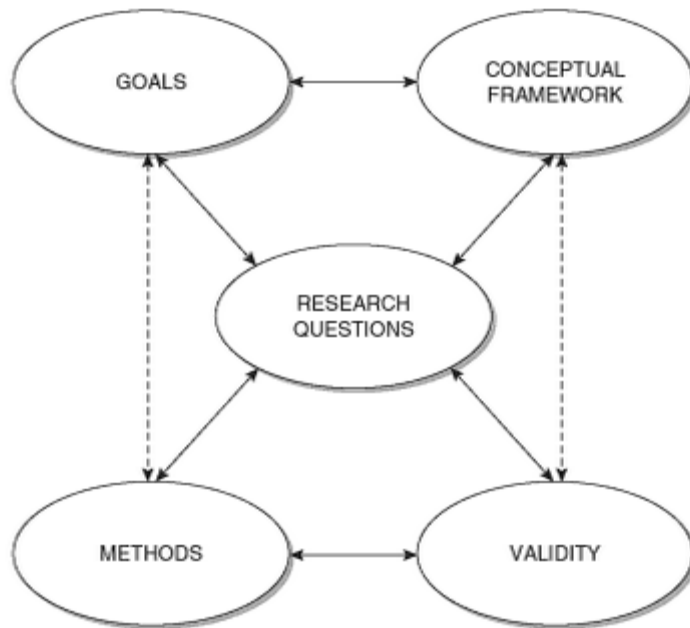


FIGURE 3. An interactive model of research design (Maxwell 2013, 5)

This interactive approach to design where the design can and should be modified along the way reflects the needs of this research. The topic of this research is linked to a wide range of different concepts and in order to define the best research questions some investigation has to be done to form an understanding of the research environment and the different needs of different groups.

2.4.1 Case study

Case study methodology was also applied to the design of this study. Case study works well when studying social or organizational phenomena that require more extensive or “in-depth” description. Case study is a commonly used research method in business when the three conditions of a case study are fulfilled, (1) “how” and “why” type of questions, (2) no control over behavioural events, and (3) focus on contemporary events. (Yin 2014, 4, 9.)

This study tries to answer the question why problems occur and how they can be avoided. As the research focuses on problems already experienced in the past the research has no control over behavioural events but as similar risks and problems are expected to exist also in future problems the focus is on events that did not happen in the past but are currently present.

Yin (2014, 49, 50) introduces four types of case study designs based on dividing studies to either single-case or multiple-case designs depending on the number of cases, and holistic and embedded designs depending on the units of analysis (figure 4).

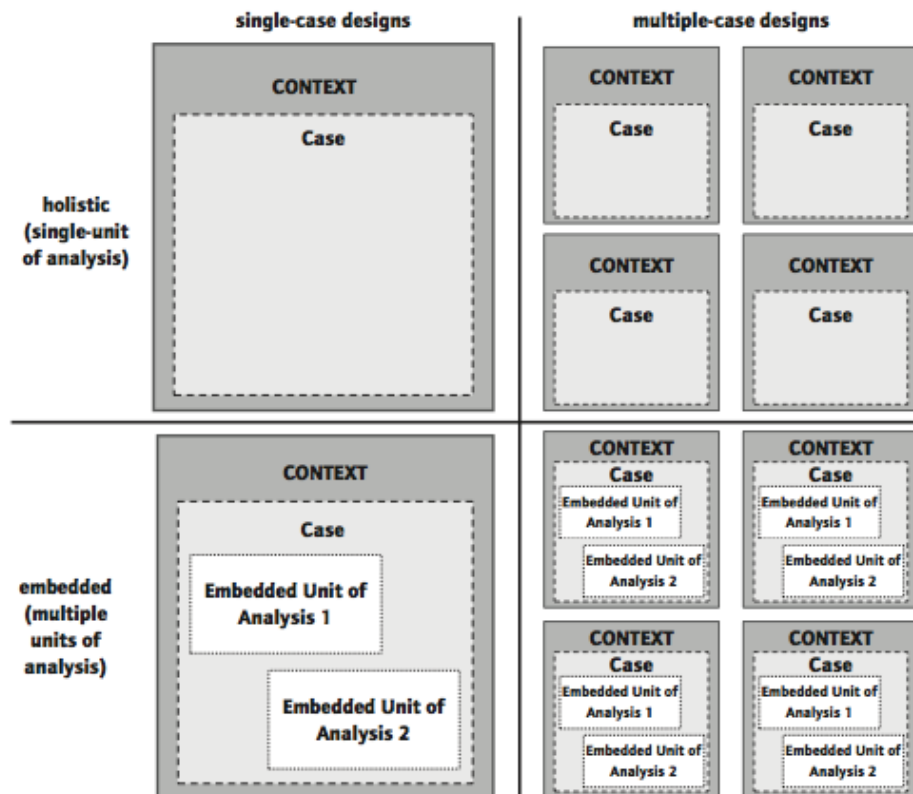


FIGURE 4. Basic types of designs for case studies (Yin 2014, 50)

An embedded single-case design was selected because this study focuses on the problems occurring in one phase of a systems lifecycle, in one unit of a single company. Three customer cases were used to examine the multiple aspects of the research questions and to ensure research validity, but the customer cases were not selected as the defined units of analysis, as the individual customers were not the focus of this research. Instead, two more general aspects, customer satisfaction and operational excellence, were chosen as the defined units of analysis (figure 5). These units of analysis were selected to achieve a more general view on the different aspects of support and maintenance services. By focusing on a wider perspective results can more easily be applied to other customers using similar services.



FIGURE 5. The embedded single-case research design of the thesis

The two perspectives were adopted from Balanced Scorecard, a strategic planning and management system that is complementary to ITIL (Office of Government Commerce 2007a, 107, 108).

2.4.2 Research activities

Research activities were designed to support the research questions and the identified units of analysis and shown in figure 6. A literature review was performed focusing on other similar research, concepts and other theories listed in chapter X, and any relevant Company X documentation including process and service descriptions and service agreements.

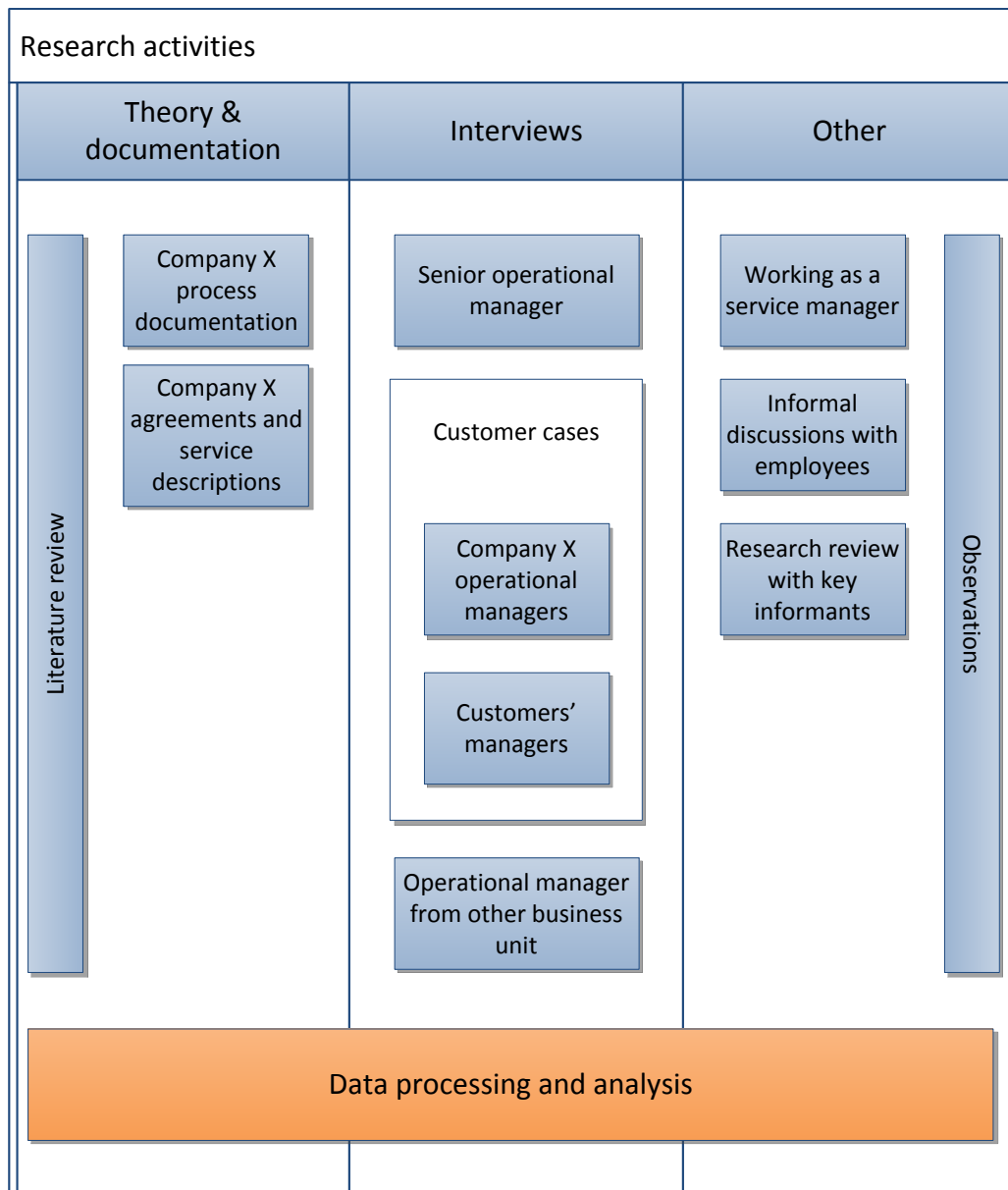


FIGURE 6. Research activity diagram

Internal and external interviews were conducted related to the selected customer cases. Three customer representatives in managerial positions, responsible for the EIS support and maintenance in their own organization, and the corresponding operational managers from Company X were interviewed. In addition to the examined customer cases, two other Company X operational managers were interviewed, one of which was working in a different business unit where support and maintenance services had been more successfully organized. All interviews were semi-structured and performed individually. Interview duration was 1-1,5 hours and all interviews were noted, recorded and transcribed.

Information collected from informal discussions and observations made while working in Company X was used to complement the case study results.

2.4.3 Data analysis

Comments received during the interviews and relevant to the study were collected on a datasheet and categorized according to the theoretical frameworks used. Additionally, patterns and similarities in interview results were identified.

The collected results from the interviews were cross-examined against the theoretical frameworks and previous research. Finally, research results were reviewed and discussed with key informants.

2.4.4 Quality of research design

To ensure the quality and validity of the research, case study tactics as presented by Yin (2014, 45) were applied to this thesis (table 1). Multiple sources from written documents to interviews and informal discussions were used to get a more diverse and reliable view of the current situation. Chain of evidence was established by recording all interviews and categorizing interview results. Logic models and frameworks were used to form a strong theoretical background for examining the results.

TABLE 1. Case Study Tactics for Four Design Tests (Yin 2014, 45)

TESTS	Case Study Tactic	Phase of Research in which Tactic Occurs
Construct validity	Use multiple sources of evidence	Data collection
	Establish chain of evidence	Data collection
	Have key informants review draft case study report	Composition
Internal validity	Do pattern matching	Data analysis
	Do explanation building	Data analysis
	Address rival explanations	Data analysis
	Use logic models	Data analysis
External validity	Use theory in single-case studies	Research design
	Use replication logic in multiple case studies	Research design
Reliability	Use case study protocol	Data collection
	Develop case study database	Data collection

Although representatives from different customer organizations and multiple organizational managers including a representative from a different business unit were selected to be interviewed for this research, it should be noted that top management view is not included in this research and that operational level employees were not formally interviewed for this study.

2.5 Content of the research

The content of this research follows the case study design and is divided accordingly in two chapter; customer satisfaction operational excellence.

Chapter 3. Customer satisfaction describes the customer's organizational environment related to EIS and focuses on service quality and interview results.

Chapter 4. Operational excellence considers the different angels of management related to service delivery, and some aspects related to system maintenance and operational efficiency.

Conclusions and discussion is presented in Chapter 5.

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3 CUSTOMER SATISFACTION

According to Balanced Scorecard Institute (1998-2014) customer focus and customer satisfaction have been leading trends in business development and have become increasingly important in management philosophy. As clients in Company X are able to change their service provider quite easily, customer satisfaction should be highly valued. Poor customer satisfaction can be seen as an indicator of possible future decline even if the financial situation currently shows no signs of decrease (Balanced Scorecard Institute 1998-2014).

As stated by Lepmets et al. (2012 8, 35) and Bairi and Manohar (2011, 476-477) improving service quality aims for improved customer satisfaction. Continuous service improvement is required to stay competitive. By focusing on the service quality, efficiency and profitability can also be improved. (Lepmets et al. 2012, 8, 10, 35)

Services, and service quality are abstract, ambiguous concepts (Lepmets et al. 2011, 8) which makes defining and evaluating services challenging.

3.1 Customer organization and EIS

For customers, the EIS from planning to implementation, deployment and maintenance is a long duration change programme. For the customer organization it usually takes years to get from preparing for a new EIS that can replace multiple systems, to actually running the new EIS. Choosing an EIS provider is an important decision and implementing a new system is a big investment. EIS projects can be thought of as nonrecurring as systems are replaced rarely, business and system environment has changed over the time, and people in the customer organization usually participate only in one similar EIS development project.

In a global customer organization various dimensions need to be taken into account during the project (figure 7); globally managed projects need to be implemented locally, staff requirements may change because of the new system, new standardized processes need to be created, organizational roles and responsibilities go through a change, service levels

need to be designed, technology is aligned according to plans, business continuity must be ensured and cultural differences or way of working has to be taken into account. (Tattersall 2013, 2-4.)

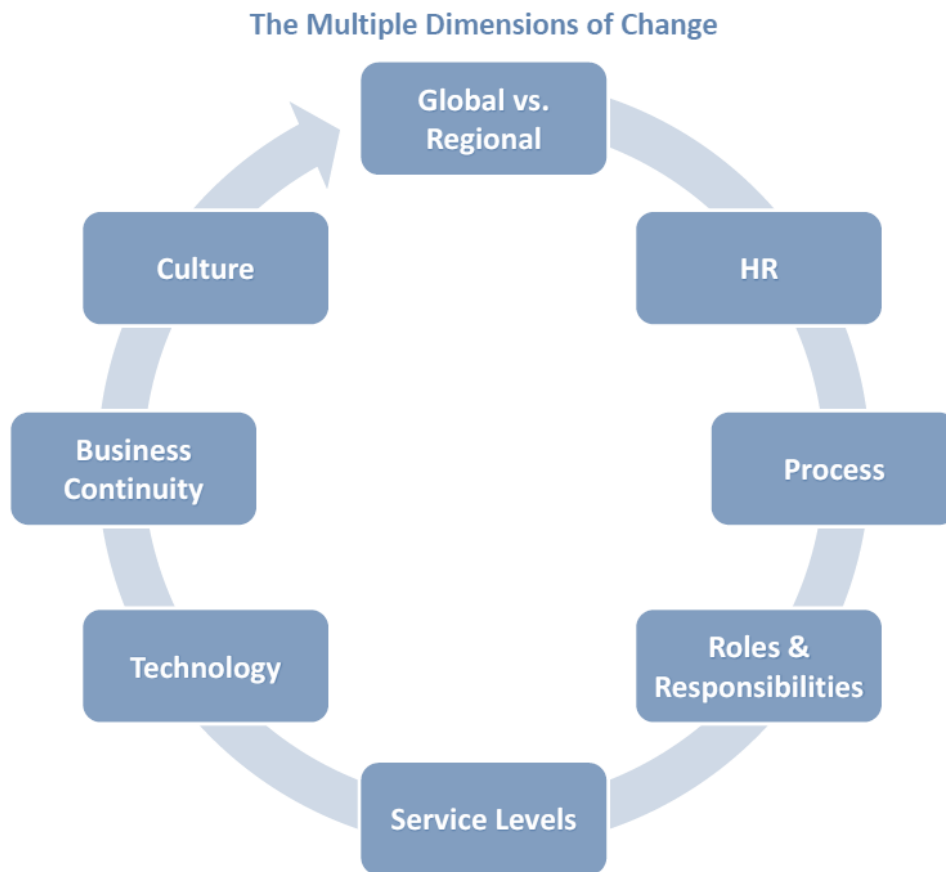


FIGURE 7. Customer's dimensions of change (Tattersall 2013, 2)

Benefits of the new system can only be obtained by successfully deploying the system, making the transition from delivery to daily operations especially important (Pyne 2013, 4). When the delivery project is handed over and closed the customers' change programme is still on-going.

Customers' understanding of their internal processes will benefit the system delivery project. In a study conducted by Kumar, Miri-Lavassani, Movahedi and Kumar (2011, 336-337) customer's process orientation was found to reduce challenges during system implementation but when transferring to system operations strong process orientation was found to have a negative effect and increase challenges. This could be explained by the more extensive changes required to shift to a new system from a familiar, institutionalized

system. The success of the delivery project was not found to have a strong correlation to the success of the system operations. The study insinuated that the success of system operations might be more related to the organization's success in change management. (Kumar et al. 2011, 336-337).

According to Pyne (2013, 5), change programmes should pay more attention to leadership, culture and behaviour. Organizational energy and stakeholder engagement can greatly influence the success of a change programme and needs to be taken into account by the programme leader. Four types of organizational energy have been identified, productive, comfortable, resigned and corrosive, and need to be addressed differently to gain the organization's trust. (Pyne 2013, 5-7.)

It seems that a somewhat different set of skills and capabilities is needed from the customer organization for a successful system delivery project compared to successful system operations. From the support and maintenance service point of view, it is good to acknowledge that the customer organization may still be going through a change. Understanding the different stages of change, resistance related to change and change management methods can help the support and maintenance team to better relate and put possible negative feedback in perspective. Identifying the type of customers' organizational energy and taking this into account in customer relationship management could also help in providing the best possible service.

3.1.1 Customer's support organization

During the research, the importance of customer's internal support organization was also highlighted. A centralized customer's support organization is the first line support for the end users handling all the experienced incidents. The centralized support organization enables the customer organization to gather information and learn to solve typical problems themselves and to filter unnecessary service requests thus reducing the costs of the service. Customer's support organization can also improve incident handling efficiency by directly contacting the correct service provider. Customer's well-functioning processes and internal support organization help manage the service and costs and to plan needed improvements.

3.2 Services

Gronroos (1988, 10) states that service itself is a complicated phenomenon and the meaning of the word can vary widely. Services are observed in a subjective manner and evaluation of services is challenging as exact values are difficult to give for an experience. The following four basic characteristics that are common for all services have been identified:

- Services are more or less intangible.
- Services are activities or a series of activities rather than things.
- Services are at least to some extent produced and consumed simultaneously.
- The customer participates in the production process at least to some extent.

(Gronroos 1988, 10.)

There are numerous definitions of a service. Because Company X's processes are based on ITIL the following definitions have been adopted for this research:

Service

“A means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks.” (Office of Government Commerce 2007a, 208)

IT service

“A service provided to one or more customers by an IT service provider. An IT service is based on the use of information technology and supports the customer's business processes. An IT service is made up from a combination of people, processes and technology and should be defined in a service level agreement.” (Office of Government Commerce 2007a, 201)

Business service

“An IT service that directly supports a business process, as opposed to an infrastructure service, which is used internally by the IT service provider and is not usually visible to the business. The term business service is also used to mean a service that is delivered to business customers by business units. For example, delivery of financial services to cus-

tomers of a bank, or goods to the customers of a retail store. Successful delivery of business services often depends on one or more IT services.” (Office of Government Commerce 2007a, 194)

3.3 Attributes of service quality

For customers, the experience of service quality is a broad concept and can be mainly formed by non-technical aspects of the service. In contradiction, many companies especially technology oriented businesses view quality from a more narrow perspective of product or feature related quality. Customer’s also experience and evaluate services only for the visible part of the production and most of the production process is invisible to the customer. (Gronroos 1998, 10-11.)

Service quality has been proved to be related to organizational performance (Lepmets et al. 2012, 8, 10, 35). High quality and performance has a positive effect on business profitability and market share and is therefore widely seen as one of the top strategic business goals (Parasuraman et al. 1991, 335). When a company aims to improve its service quality, it should make sure it aligns its definitions of quality according to customers’ view in order to invest and measure the things that really matter to the customer (Gronroos 1998, 11).

The idea that service quality should be determined by the customer and not by the service provider is widely accepted. The quality and value of a service can be measured from both customer and service provider perspectives. Lepmets et al. (2012, 8) identify two characteristics that form the services:

- intrinsic attributes that make up the service offering and
- the people providing or delivering the service.

(Lepmets et al. 2012, 8.)

3.3.1 Intrinsic quality

According the Lepmets et al. (2012, 8) service quality can be seen from two perspectives; 1) the customer perspective of how the service is experienced, called the extrinsic quality,

and 2) the service provider perspective of how service is created and managed, the intrinsic quality. Intrinsic quality is comprised of service design, delivery and management, and is closely related to customer satisfaction. Both customer perception of the service and the intrinsic service design need to be understood by management to be able to improve the service quality. (Lepmets et al. 2012, 8.)

3.3.2 Culture of quality

According to Srinivasan and Kurey (2014) 75% of B2B customers rely on peer reviews and recommendations. As service quality has a great impact on customer satisfaction and through that the company reputation, quality should be the top priority of any company.

Simply following the quality guidelines is not enough. Managers are now seeking to create a culture of quality where employees take ownership of the quality provided to the customer. (Srinivasan 2014)

In their research, Srinivasan and Kurey (2014) found out that the typical tools to increase quality including training, knowledge sharing and incentives did not seem to bring the expected results. To create a culture of quality a company should ensure management commitment and participation, message credibility, continuous peer involvement and empowerment of employees. Quality should be constantly present, be talked about and be proud of. (Srinivasan 2014)

Customer orientation of the employees could also play a significant role in creating a culture of quality. Customer orientation is further discussed in chapter 4.1.1 Customer-centricity and service orientation.

3.4 Five quality dimensions

Parasuraman et al. (1991, 338) have developed a widely accepted service quality assessment tool SERVQUAL for measuring customer satisfaction. The five dimensions of SERVQUAL used for quality assessment and also as the basis for the interviews performed for this study are:

Tangibles: appearance of physical facilities, equipment, personnel and communication materials.

Reliability: ability to perform the promised service dependably and accurately.

Responsiveness: willingness to help customers and provide prompt service.

Assurance: knowledge and courtesy of employees, and their ability to inspire trust and confidence.

Empathy: caring, individualized attention the firm provides its customers.

(Parasuraman et al. 1991, 338.)

In the case of EIS support and maintenance services, the three dimensions of reliability, responsiveness and assurance are more obvious and quite easy to understand as system needs to be up and running and professional support readily available as agreed. These three dimensions were more directly addressed during both internal and external interviews. The dimensions tangibles and empathy seem to be less acknowledged and were discussed in a more indirect manner. Patterns and key terms were identified from the interview results and categorized according to the five dimensions as follows:

Tangibles: personnel, documentation, tools e.g. JIRA, 3rd party software system

Reliability: complying with agreements e.g. SLA, service delivery process, cost management, prioritization of support and maintenance customers

Responsiveness: incident resolution time, resourcing, communication

Assurance: quality of solutions and modifications, competence of service manager and maintenance team, product knowledge

Empathy: long-term business process and EIS development, ownership, complying with customer needs

Issues related to the *tangibles* dimension can sometimes be interpreted by the customer as issues with reliability, responsiveness or assurance. For example, too few employees can cause resourcing problems, but is seen by the customer as low responsiveness. Documentation and the use of issue tracking tool JIRA received positive feedback from the customers. However, when customers gave negative feedback related to the service desk tool, they were describing problems as reliability and responsiveness issues.

Customers were the least satisfied with service *reliability* and *responsiveness* and felt that these two dimensions were the core of the support and maintenance service. The issues described and discussed in more detail in chapter 3.5.1. Service quality gap analysis.

Most of the positive comments were related to *assurance* dimension. Employee attitude and skills were generally on a good level. The importance of service manager competence and team's product knowledge were especially highlighted during interviews.

Empathy and caring as such were not considered very relevant in a technology oriented B2B service environment. All customers were however highlighting the importance of "ownership". Ownership was described as taking personal responsibility of the problems from the customer point of view to understand the importance and urgency of the issue. This could mean ensuring quick incident resolution even if the incident was caused by another service provider and not necessarily the responsibility of Company X. Another example of the described ownership is not trying to simply fix the critical problem, but solving issues in the system and the customer's business process on a larger scale with the customer's best interest in mind. The service provider is not required by contract to provide this kind of service, and ownership is seen by the customer as additional value not automatically included in the service. Ownership is caring about that specific customer and in the case of EIS maintenance the term empathy could be replaced with ownership to be better understood by both customer and service provider. It should be noted, that strong ownership and proactive systems development has caused problems also as the customer may see it as additional, unnecessary costs that were not agreed upon. Proactivity needs to be supported by processes and communication to create a collaborative way of working. Also customers were hoping that their opinions and system modification requests would not be taken into consideration as much or as easily as they currently have been. This is a somewhat conflicting request and has been difficult to deal with by the employees.

Lepmets et al. (2012, 9) states that customer satisfaction assessments provide useful indicators on how to improve services, but that managers also need to understand the internal processes and their relation to customers' perceptions. The interviewed customers were the least satisfied with reliability and responsiveness related issues which, they felt, made up the core of the provided service. However, customer perception of the issues and

reasons behind them could be misleading as pointed out by Lepmets et al. (2012, 9) and interpretation requires understanding of internal processes.

To specify in more detail what was causing the poor service experience, a model of service quality gaps was used to further analyze the interview results.

3.5 Model of service quality gaps

Parasuraman et al. (1991, 337) have developed a conceptual model of service quality that identifies five gaps, gap 1-5, that can cause customer to experience poor service quality. This model has been further extended with gaps 6 and 7 and is presented in figure 8 (Shahin 2010, 2).

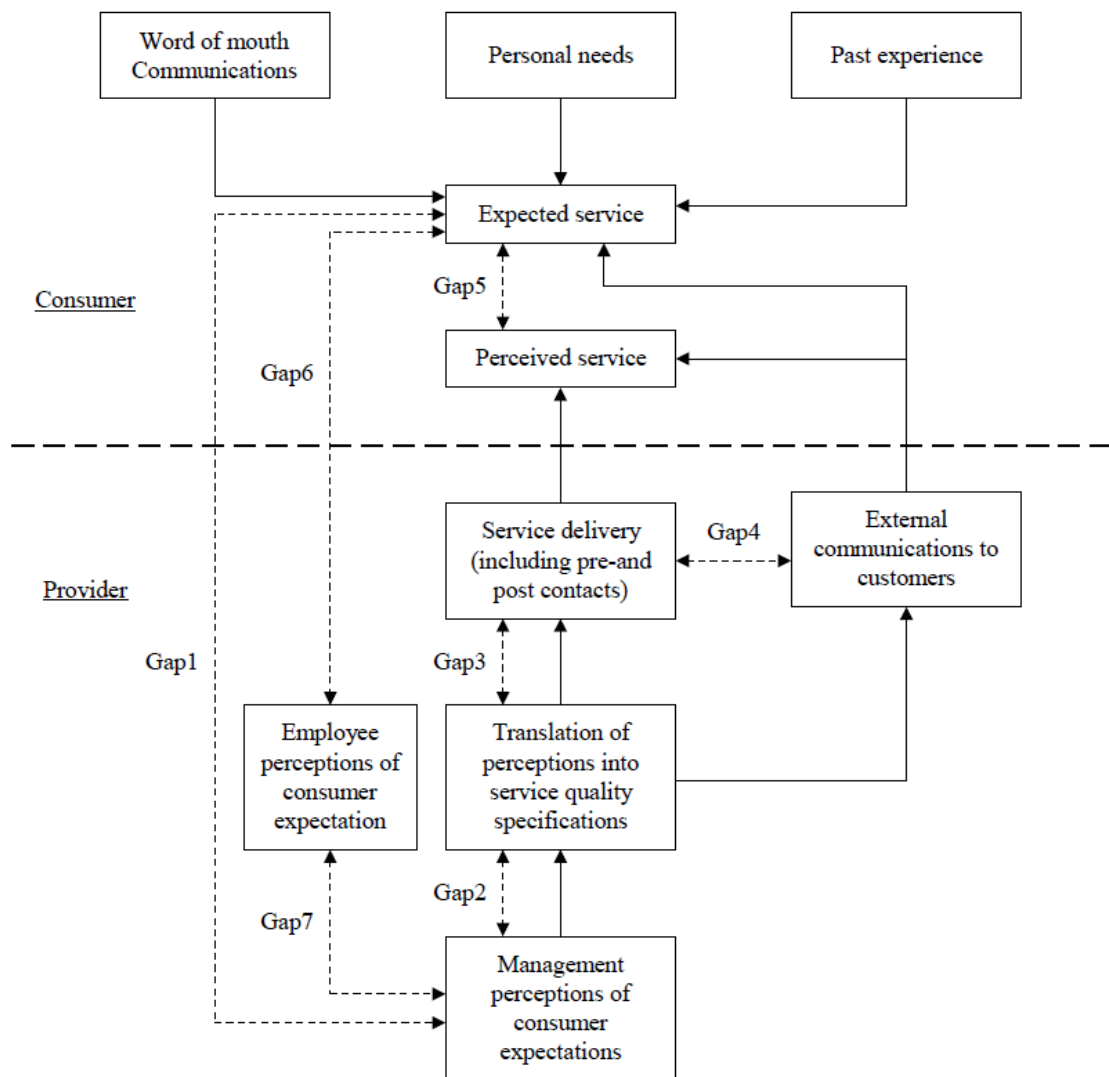


FIGURE 8. Extended model of service quality gaps (Shahin 2010, 3)

According to Shahin (2010, 2) gaps 1, 5 and 6 are more directly related to external customers and gaps 2, 3, 4 and 7 are more closely associated to intrinsic quality. Below are the explanations for each identified gap as described by Shahin (2010, 2).

Gap1

Customers' expectations versus management perceptions: as a result of the lack of a marketing research orientation, inadequate upward communication and too many layers of management.

Gap2

Management perceptions versus service specifications: as a result of inadequate commitment to service quality, a perception of unfeasibility, inadequate task standardization and an absence of goal setting.

Gap3

Service specifications versus service delivery: as a result of role ambiguity and conflict, poor employee-job fit and poor technology-job fit, inappropriate supervisory control systems, lack of perceived control and lack of teamwork.

Gap4

Service delivery versus external communication: as a result of inadequate horizontal communications and propensity to over-promise.

Gap5

The discrepancy between customer expectations and their perceptions of the service delivered: as a result of the influences exerted from the customer side and the shortfalls (gaps) on the part of the service provider. In this case, customer expectations are influenced by the extent of personal needs, word of mouth recommendation and past service experiences.

Gap6

The discrepancy between customer expectations and employees' perceptions: as a result of the differences in the understanding of customer expectations by front-line service providers.

Gap7

The discrepancy between employee's perceptions and management perceptions: as a result of the differences in the understanding of customer expectations between managers and service providers.

(Shahin 2010, 2.)

3.5.1 Service quality gap analysis

External and internal interview results were categorized according to the gap model. As the interviews focused on operational level and customer view, most of the comments were related to gaps 3, 4 and 6 that are more closely related to service delivery and customer communications. Management related gaps 1, 2 and 7 were generally discussed but not addressed in detail during the interviews.

It should be noted that the top management point of view is not included in this research, and employee view is limited and based on observations and informal discussions. Therefore this study cannot provide a full view on quality gaps and some additional research is needed to complete the analysis. Nonetheless, all gaps were rated according to observations, discussions, and interviews made during the research. Similar remarks were received from both internal and external sources. Gap ratings and illustrative comments from the interviews are shown in appendix 1.

Customer view (Gap 5)

During interviews, it was clearly stated by customers that they were not satisfied with the support and maintenance service (gap 5). Customers felt that even agreements were not fully complied and some parts of the agreed service had been forgotten or were not followed. However, customers did not emphasize this fact and agreements were seen more as a formality that could not guarantee good service.

The following matters were brought out more strongly by all interviewed customers; top management's commitment to support and maintenance customers, lack of processes and

control, too high level of EIS customization, and lack of long term development concerning the EIS, customer's processes and way of working. Customers felt that the support and maintenance service focused only on the operational problems in the production environment. Customers were expecting to receive more proactive service with regular preemptive measures and collaborative process development. They had also expected to be challenged during EIS development to modify their processes rather than modify the system. The impact of high level of system modifications is more visible during maintenance and may not be fully understood by the client during the delivery project. The difficulty of system modifications and maintenance is further explained in chapter 4.7 EIS maintenance.

Management perception (Gap 1, 2 and 7)

Customers felt that management did not necessarily see things from their perspective and did not always understand what was valuable to the customers. For example, customers felt that the suggested solution for their problems was additional sales when customers were more interested in more efficient use of existing tools, systems and processes.

Based on informal discussions and internal interviews, it seemed that the management was fairly well familiar with customers' expectations, but was not always fully aware of low customer satisfaction. However, even when customer complaints, and support and maintenance service needs, e.g. resourcing needs, were communicated to the management, operational managers felt that delivery projects were always prioritized over maintenance. This was pointed out also by two of the customers who felt that they were not valued by the top management.

Internally operational management and employees felt that management should take action to create standardized processes, and clarify roles and resourcing. They felt that this requires initiative from management as operational management or employees cannot spend time on non-billable work unless the work is assigned to them and do not have the required status to initiate and drive organizational change.

Why management did not seem to regard support and maintenance services as important as employees working on the operational level was not fully clear to the employees. It

was thought that the delivery projects were seen as more profitable and that the culture and incentives directed management and sales to put more effort on large individual deals.

As service requirements and quality are on some level continuously discussed with management both internally and externally, the management perceptions are most likely quite accurate, but there seems to have been other inducements affecting the decision-making process which has resulted in lower prioritization of the maintenance and support service. However, this has not been verified as management was not interviewed during this study.

Service specifications vs. service delivery (Gap 3)

Various problems related to gap 3 were reported. As maintenance has not been separated from development it causes problems in service delivery in the form of role ambiguity and resourcing issues. Service managers usually have a double role as project managers and may not be available as required. Unpredicted peaks in resourcing demands are experienced in projects and maintenance services and these peaks cause problems to both. However, as delivery projects have been prioritized higher, support and maintenance services usually experience more dramatic drops in service levels during peaks in demand.

The problem of specious service to comply with service level agreements was commented by customers and is acknowledged also internally. Specious service where support request appears as in progress even if nothing is done to advance it is usually caused by lack of resources when employees with the required skills are simply not available but service levels need to be followed. According to observations made, also task switching, disorganized way of working and inefficient operational management causes resolution times to increase and leads to seemingly specious service.

The unmethodical way of working was pointed out by most of the interviewees. The customers were demanding for better supervisory control systems for task tracking and budgetary control. Customers felt that they needed to oversee and track work progress themselves for the work to get done. They also pointed out problems in controlling which support requests create a system modification request and when request is for example so small it does not need to be solved in the system but a workaround in the working methods can be used instead.

Customers also felt that working methods or tasks included in the agreement did not necessarily actualize. For example, the support requests sent to service desk were completely ignored and service planning and development was not part of the delivered service even if it was mentioned in the agreement.

In general, the lack of functional processes was seen as the most important reason why quality of service delivery was not on the expected level. The incoherence in service delivery can cause operational management and employees to seem incompetent.

External communication and employees (Gap 4 and 6)

Customers felt they were left in the dark and were lacking information on any progress made. It was also pointed out that communication often revolves around same tasks and issues without really getting forward and promises made were not always kept. In Company X, any promises to the customers were generally avoided as unpredicted changes could easily make changes in the resourcing and scheduling making it impossible to keep the given promises. Low customer satisfaction was well acknowledged among operational management and employees, but as work prioritization was made on a higher managerial level, operational management felt that they could not do much to improve the situation.

All of the positive comments received from customers were related to employees; their professionalism and willingness to help. In general customers felt that they could trust the employees, but remarked that employees did not always have enough time to concentrate to the given task.

Customers were hoping for stronger product knowledge from the employees and for the employees to challenge customer views as customer's requests may sometimes be unreasonable or impractical. Ownership in general was also highlighted and could be taken into consideration more strongly by each individual employee by personally taking responsibility of making sure that the reported problem gets solved.

Risk of service personification was identified both internally and externally and the company should aim for sharing the knowledge and skills more actively to reduce the risk.

Some employees are currently seen considerably more skillful and their demand is very high for numerous different projects.

Employees experience difficulties in planning their work and schedule as visibility to tasks and resourcing is very limited. Continuous interruptions, task switching, and changes in schedule and prioritization causes dissatisfaction among employees.

3.6 Success factors in customer satisfaction

Baini et al. (2011) studied customer satisfaction in outsourced IT services and critical success factors. Even though their study focused on companies in North America and UK and their IT service providers operating mainly in India, the results and interview quotations were very similar to the results of this study and comments received from the customers.

In their study Baini et al. (2011) propose four critical success factors that can be used to promote customer satisfaction (figure 9). Based on the interviews, Company X should focus the most on keeping and winning customers and avoiding damaging customer relationships.

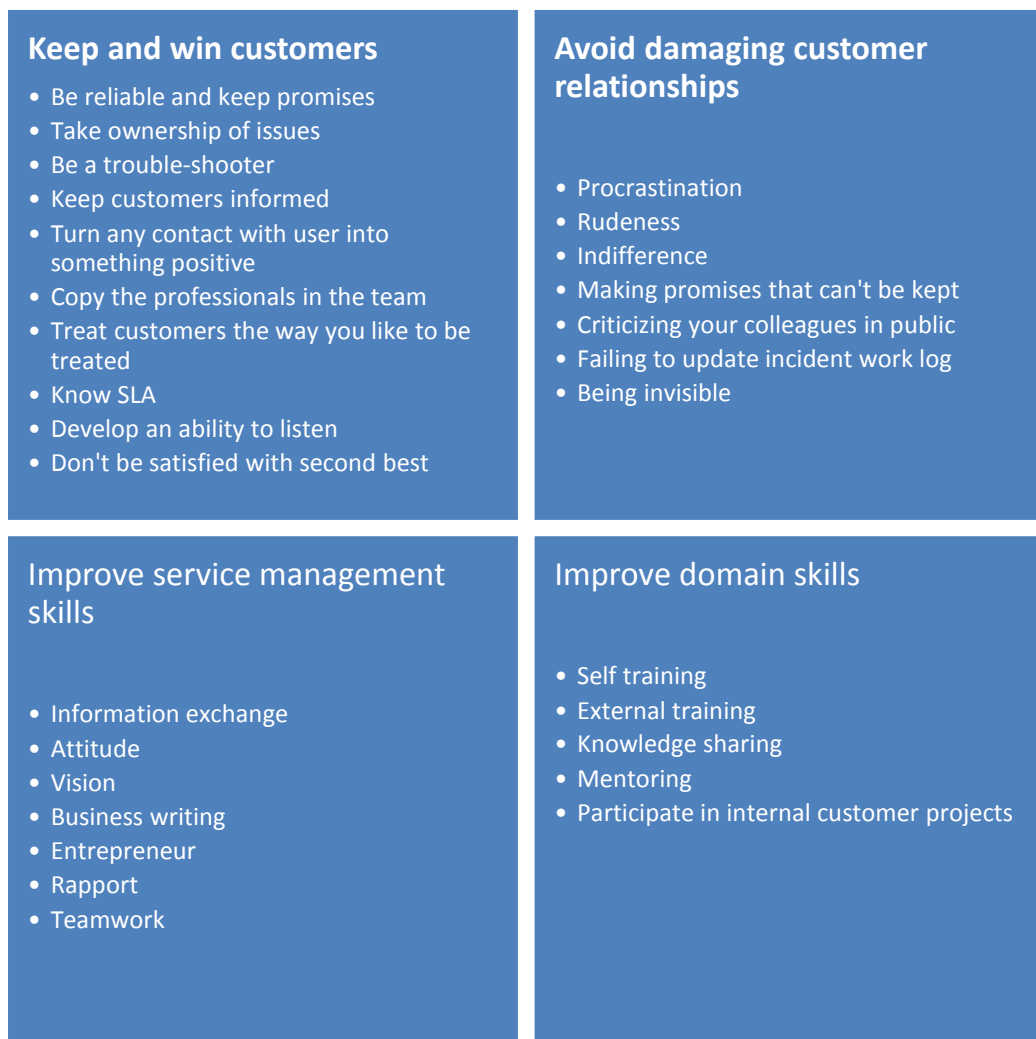


FIGURE 9. Critical success factors in gaining user customer satisfaction in IT out-sourced services (Baini et al 2011, 481)

As shown in figure 9, Baini et al. (2011, 481-487) list activities related to each success factor to ensure customer satisfaction. The operational viewpoint more closely related to improving and ensuring service delivery in practice is discussed more closely in the next chapter.

4 OPERATIONAL EXCELLENCE

In Company X, support and maintenance service quality and operational efficiency have become more important as the number of customers in the researched business unit is growing. However, the operations have not been structured to support these business needs. Warning signs like customer complaints, procrastinated support request handling and inefficient resourcing have been recognized and some measures to improve the situation have already been taken. For example support and maintenance contracts are continuously developed to respond better to both customers' and the company's needs.

Organizing the support functions in a more structured way is one of the current topics being discussed. The goal is to ensure more efficient handling of support requests and improve customer relationship and service management.

4.1 Processes and strategic management

Company X has created a company specific, ITIL based core process for software development that includes both project and service management. This core process provides some tools e.g. document templates for continuous services. Different business units have further developed more detailed process models according to their own needs.

Company X also has a general process for handling support requests through a company-wide centralized service desk. The service desk redirects the support requests to the correct teams that will handle the requests, and tracks the resolution times.

In the researched business unit a product specific process developed by a third party is used as the main process for delivery projects. The process does not provide a maintenance specific process or hands-on support for standardized maintenance services. This third party process describes some activities that can be included in the support and maintenance phase for example system performance optimization. However, these maintenance activities are described in the third party process only on a very general level and do not provide much insight to the actual tasks. As a result, no detailed instructions

for service management or maintenance are available in the studied business unit or at least they are not readily available for all service managers.

Currently the way services are managed varies widely and the business unit has identified a need for a more detailed process. A process is needed to support the everyday needs and provide a more structured way for handling both transition from a project to continuous services as well as running the support and maintenance services.

The organizational culture and management of Company X is technology oriented focusing on delivering systems rather than services. According to Bairi et al. (2011, 478) the IT service industry has been changing its orientation from technology to service management and Company X is likely to follow this trend.

One of the problems identified in Company X is the lack of proactive measures to support customer processes and maintain the system. A reactive approach is typical for technology or product oriented organizations and to achieve a more preventive, proactive way of working the company needs to become more service oriented (Office of Government Commerce 2007a, 156; Oliva & Kallenberg 2003, 168). According to Office of Government Commerce (2007a, 156) service orientation is essential for high quality service management and delivery. Bairi et al. (2011, 475) also highlight that services should not be process oriented and to receive the best results, services should focus on people and relationships even in IT outsourcing.

Oliva and Kallenberg (2003, 168) present a matrix of a maintenance service base that displays the impact of different orientations to service offering. Although the matrix was created for services provided by manufacturing companies, it can also be applied for support and maintenance services and the modified matrix is presented in table 2. Based on the interview results, Company X currently provides *basic system services* but is moving towards *support and maintenance services* which is also what customers expect from the service. However, customers seemed to be hoping for *professional services*, but felt that these type of services are currently not provided by any service providers. *Operational services* where the customers operations are managed by the service provider was not discussed in the context of this research.

	Product-oriented services	End-user's process-oriented services
Transaction-based services	Basic system services Documentation System development and deployment Product-oriented training Help desk Support request handling Disruption handling System modification System updates	Professional services Process-oriented engineering (tests, optimization, simulation) Process-oriented R&D System modification and update management Process- and business-oriented training Process- and business oriented consulting
Relationship-based services	Support and maintenance services Preventive maintenance Condition monitoring System modification and update management Full maintenance contracts	Operational services Managing customer's support and maintenance functions Managing system operations

TABLE 2. Support and maintenance service space

It could be claimed that the technology and process-centric culture of Company X is causing most of the problems for support and maintenance services. During interviews it was stated that the top management does not value the support and maintenance customers, and seeks for growth through new customers and delivery projects. This could be seen as part of the technology oriented culture, as strategic management seems to have been more involved with systems delivered and delivery process rather than long term relationship management and customer satisfaction. The cultural orientation could explain the experienced problems and difficulties in identifying or addressing them.

The company is lacking metrics and measurement for service quality and services are not systematically improved. According to Antony, Antony and Kumar (2005, 295, 306) this is a common challenge for service businesses as data can be more difficult to collect and human behaviour is more difficult to measure. They also point out that in service industry, processes are not well understood as uncontrollable factors like human behaviour complicate the process, and defects that can be measured are difficult to identify. Additionally, analysing qualitative data is more challenging and laborious. (Antony et al. 2005, 295, 306.)

Company X could benefit from management methodologies that focus on reducing non-value activities, team collaboration, culture of quality, and customer satisfaction. Lean management, a methodology that supports these aspects, is further discussed in chapter 4.2.3. Lean management and Kanban.

4.1.1 Customer-centricity and service orientation

Most companies have still today product-centric organizational structures even if customers are focusing more on relational processes with service providers. Product-centric companies' business units focus on different product groups, and services are associated with responding products. For these kind of companies service development is a sub-process of the product innovation process. Product-centric organizational structures that focus on product delivery do not actively support relational processes that focus on value creation and bundles of services. (Gebauer 2012, 527-528.)

In the case of Company X, observations and discussions made during the research support this argument. Company X is organized around different products focusing on project delivery, and organizational structures or processes do not actively guide towards or support collaboration between business units. Observations were made of a customer buying services from multiple business units, which all functioned very differently, and did not take into consideration each other's operations or how customer relationship was managed. However, this issue has been recognized by Company X and actions have been taken to increase communication and alignment of operations between different units.

In order to increase service orientation, management should emphasize the importance of services to support active sales, and pay more attention to employee behaviour, roles, and human resources. For services, recruiting, training, and incentives should focus on service skills and employee behaviour. Employees' customer-focused attitude enables better communication, and development of a shared learning relationship. Structural changes may be relatively quickly implemented compared to cultural changes. (Gebauer 2012, 535-536.)

The importance of customer orientation was also highlighted by an interviewee from another business unit who mentioned that new recruitments for the support and maintenance team in their unit were based on the service orientation more than technical skills.

A study made by Jeon and Choi (2012, 337) did not show that management emphasis towards service orientation and incentives would have an effect on employee or customer satisfaction. What the study did show was that in service sectors employees' cooperativeness and service orientation had a positive effect on both employee and customer satisfaction (Jean & Choi 2012, 337). Similar results were presented by Donovan, Brown & Mowen (2004, 142) showing that customer orientation of a service worker had positive effects on both employee and customer satisfaction, leading to the conclusion that customer orientation plays a significant role in a service organization and should be taken into account when recruiting or selecting the employees who are communicating directly to the customer.

4.1.2 Continual service improvement

Continual service improvement (CSI) is part of ITIL core along with service strategy and service lifecycle stages: service design, transition, and operation (figure 10). CSI focuses on continual review, analysis and improvement of services and service management. The CSI approach is summarized in six steps, starting from the vision and service strategy, then assessing the current situation, prioritizing needed improvement, creating a detailed plan to improve service quality, putting measurement and metrics in place, and finally ensuring that changes are adopted into the organizational culture, and that quality improvement is upheld. (Office of Government Commerce 2007a, 3-15.)

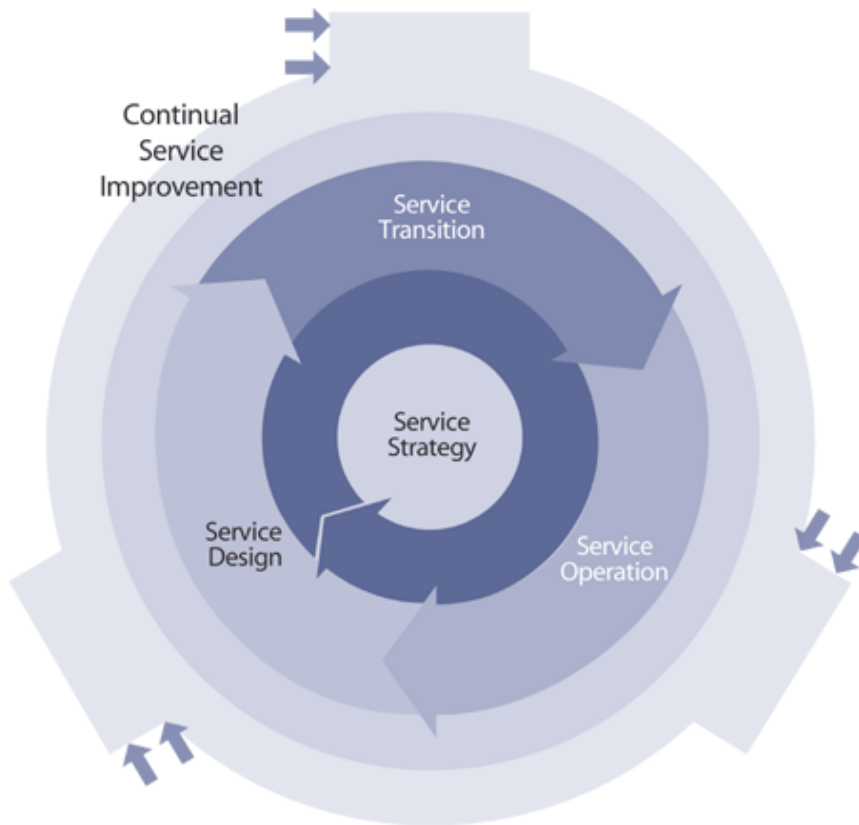


FIGURE 10. ITIL Core (Office of Government Commerce 2007a, 5)

CSI should not become a priority only when something has failed, and again forgotten when issues are resolved. To succeed, CSI needs to have clear goals, documented procedures, well defined roles and responsibilities, and ways to measure the change. (Office of Government Commerce 2007a, 3)

Developing and implementing metrics and measurement for services is often difficult as processes may not be very well planned, understood, or followed. In general, as services are produced by people, they are less precise, and have more uncontrollable factors and events. However, measuring services should not be labelled difficult or impossible because it is human-driven. In fact, simple tools like process mapping, cause and effect analysis or Pareto charts are more suitable and can be used to measure service processes. (Antony et al. 2005, 295-297.)

Some common challenges for service improvement as well as critical success factors for CSI are listed in the ITIL framework. The following challenges are presented by both Office of Government Commerce (2007a, 167) and interview results:

- Lack of management commitment
- Inadequate resources, budget and time
- Lack of mature service management processes
- Lack of information monitoring and measurements
- Lack of knowledge management
- Lack of knowledge and appreciation of business impacts and priorities
- Lack of tools, standards and skills
- Over commitment of resources with an associated inability to deliver

The critical success factors as presented by Office of Government Commerce (2007a, 167) are:

- Appointment of a CSI manager
- Adoption of CSI within the organization
- Management commitment – ongoing visible participation in CSI activities like vision, communication and decision making
- Defining clear criteria for prioritizing improvement projects
- Adoption of the service lifecycle approach
- Sufficient and ongoing funding for CSI activities
- Resource allocation – dedicated to the improvement effort
- Technology to support the CSI activities
- Adoption of processes – embracing service management processes instead of adapting it to suit personal needs or agenda

The key to measuring is repetition so that data can be compared, and changes to quality identified. This research can be seen as part of Company X's measuring activities, and it works as a maturity assessment that considers multiple aspects of the service environment including the people, process, culture, strategy, process governance, process metrics and decision making. However, as an individual activity with no further plans on how to benefit from the results, the research in itself cannot be considered as continual service improvement.

4.2 Service management

The ITIL framework defines service management as a set of specialized organizational capabilities for providing value to customers in the form of services. Organizational capabilities like capacity and competency are influenced by different kind of challenges.

The following challenges are typical for services:

- Difficulty to measure, control and validate because of the intangible nature of the services
- Service demand is linked to customer's assets
- Direct contact between service producers and service consumers
- Services are perishable by nature. Only continued service of consistent quality is valuable to customer and service provider needs to ensure a steady demand from customer.

(Office of Government Commerce 2007b, 11.)

Service management should operate on three different levels: the operational level, tactical level and strategic level (Office of Government Commerce 2007a, 32-33). Knowledge and information gathered during daily work can be used to plan the tactical level activities and information from tactical level can be used to make long-term strategic decisions to steer the service.

The service manager is a key role responsible for the various aspects of the service in all three managerial levels from operations to strategy. Service managers need to have an adequate level of product knowledge, understanding of the customers' business area, working knowledge of tools, agreements and subcontractor management, decision making skills, risk management skills and budgetary control. Most importantly, they need to have excellent negotiation and communication skills. (Office of Government Commerce 2007a, 133.)

Service managers are responsible for providing leadership for the support and maintenance services in all stages of the system lifecycle, cost management together with the customer and subcontractors, management of possibly conflicting objectives to achieve internal and external goals and commitments, and encouraging high performance and innovation in a changing environment. (Office of Government Commerce 2007a, 133.)

The importance of service manager’s role was highlighted in all interviews. Service manager needs to have enough authority to drive through the customer’s business needs e.g. resourcing needs. The competency of the service manager has a strong impact on the service quality, especially in the case of Company X, where most of the responsibility is on the service manager.

4.2.1 Service maturity

ITIL framework recommends using a maturity model for assessing a process’ maturity attributes (Office of Government Commerce 2007a, 97). Capability Maturity Model Integration (CMMI) is one of the most popular frameworks used (Office of Government Commerce 2007a, 37). A CMMI aligned model is presented in figure 11.

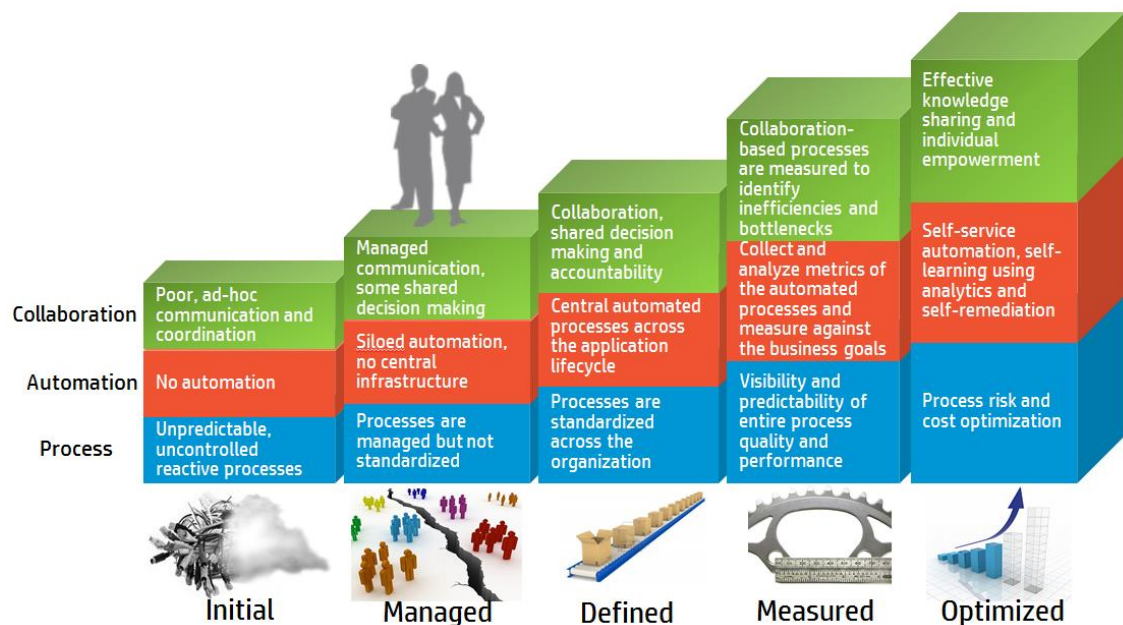


FIGURE 11. The five levels of maturity model (Hewlett-Packard Development Company 2015)

Based on the interviews, the maturity of support and maintenance services seems to be on a lower level compared to projects in Company X. The company does have company-wide processes but they are not followed, understood or enough precise to be of much

use in practice. Some decisions are shared, for example, operational managers discuss resourcing together, but shared decision making is limited to only few meetings and is not very well adopted to the organizational culture. Service managers do their best to follow a process that they've found most suitable through previous experience, but best practices are not actively shared and processes are not standardized. Depending on the service manager's skills and available time, service management can be unplanned and reactive, causing poor communication and coordination of work. Activities are often not documented so that they could be repeated later on, or in another customer case. Based on the maturity model, the level of service delivery process is close to initial and managed at its best. The quality of service delivery varies as tools and processes for service management, e.g. cost and schedule management, are insufficient..

Company X is currently searching for new ways to better manage operations and utilize new and existing tools to their fullest. As part of this, agile and lean management methods are being researched and new tools and functions are taken into use. Examples of a yearly service model, a year clock, for active and inactive support and maintenance customers were developed during this research. Templates for all needed documents for the suggested service model could be developed and similar service model could be utilized for all support and service customers to further standardize service management. Year clock is presented in Appendix 2.

4.2.2 Agile approach and Scrum

Agile approach is an iterative or incremental development methodology. By constantly reviewing plans, definitions, and implementation, the project can be better steered towards the right direction. Scrum is the most popular agile framework. Scrum focuses on empirical feedback, team self-management and building well tested product increments during short iterations. (Agile methodology 2015.)

A product backlog is a prioritized list of all the features to be developed for the product and constantly updated during the project. Work is performed in iterative sprints that usually have a duration of one week to one month. Sprints are timeboxed, meaning they have a fixed start and end date. Work is performed by a self-organizing team. Scrum team structure is further discussed in chapter 4.4.1. Scrum team. (Rubin 2013, 1, 18-20.)

Company X has received positive feedback for using agile methods in projects and is planning to introduce agile methods also to internal task management. However, Rubin (2013, 9) and Cottmeyer and Stevens (2012, 4) point out that Scrum is not very suitable for interrupt-driven work, like support and maintenance, where situation changes frequently and new critical support requests need to be handled as quickly as possible. This is where Kanban is a more suitable approach. Cottmeyer and Stevens (2012, 1) point out that Kanban can also be used along with Scrum or other agile methodologies and is even recommended as Kanban itself does not provide all the necessary components of a management framework, for example, organizational and team structure.

4.2.3 Lean management and Kanban

Lean management methods focus on reducing non-value added activities. The lean production quality system is based on the following principles:

- Specify value from the standpoint of the end customer by product family.
- Identify all the steps in the value stream for each product family, eliminating whenever possible those steps that do not create value.
- Make the value-creating steps occur in tight sequence so the product will flow smoothly toward the customer.
- As flow is introduced, let customers pull value from the next upstream activity.
- As value is specified, value streams are identified, wasted steps are removed, and flow and pull are introduced, begin the process again and continue it until a state of perfection is reached in which perfect value is created with no waste.

(Lean Enterprise Institute 2015.)

Kanban is a lean management method originally developed by Toyota in the late 1940s. The word “kanban” means “visual signal” or “card”. It aims for better communication and continuous process improvement using a visual control system. The method has been adopted to software development in the 2000s and it can be used as an overlay to complement the current methods and processes. Kanban is not a replacement for Scrum or any other management or development methodology. (Hefley 2014; Cottmeyer & Stevens 2012, 1- 5; Rubin 2013, 9-10.)

Kanban can be used together with Scrum and blending the two is encouraged. Kanban has many similarities to Scrum both being collaborative and self-managing, but the differences highlighted in table 4 show that these approaches are best used in different situations. (Cottmeyer & Stevens 2012, 1- 5; Rubin 2013, 9-10; VersionOne, Inc.)

TABLE 3. Differences between Kanban and Scrum (VersionOne, Inc.)

KANBAN	SCRUM
No prescribed roles	Pre-defined roles of Scrum master, Product owner and team member
Continuous Delivery	Timeboxed sprints
Work is “pulled” through the system (single piece flow)	Work is “pulled through the system in batches (the sprint backlog)
Changes can be made at any time	No changes allowed mid-sprint
Lead time (cycle time)	Velocity
More appropriate in operational environments with a high degree of variability in priority	More appropriate in situations where work can be prioritized in batches that can be left alone

The main three concepts of Kanban are (1) process visualization, (2) limitation of work in process and (3) measuring and optimizing work flow-through. Process is visualized using Kanban board, a tool that displays the various states during the process and the current state of each task. Possible process constraints are easily identified and can be addressed. This promotes communication and collaboration which creates shared understanding, and enables the team to learn to prevent bottlenecks and self-organize. (Cottmeyer & Stevens 2012, 2; Hefley 2014, 6; Rubin 2013, 10.)

Work in process (WIP) limits for process states are set by the team. By limiting the amount of active tasks, the team is directed towards completing tasks before taking on a new task. The WIP limits ensure that the amount of work corresponds to work capacity. When a task is completed in one phase of the process and moved to the next phase it frees capacity in the current phase. This causes a new task to be pulled from the previous stage creating a pull mechanism where completion of a task pulls more work to the process. Unlike a push system where amount of work is based on the demand, a pull system cannot

be overloaded as amount of work is based on capacity. (Cottmeyer & Stevens 2012, 1-2; Hefley 2014, 6.)

Cottmeyer and Stevens (2012, 3) point out that WIP limits bring out possible constraints and forces the whole team to fix the problem. WIP limits also help the team to finish more work in a shorter amount of time. By limiting the amount of active tasks in the process the team is guided towards getting tasks fully done and avoiding unnecessary task switching. Lead time, the average time to complete a task, can be reduced by reducing the amount of WIP. (Cottmeyer & Stevens 2012, 2; Hefley 2014, 18.)

Kanban aims to continuously improve the process for example by tracking total WIP, constraints, throughput and lead time (Hefley 2014, 21). Kanban can increase quality as defects impact the lead time. Visualized work flow improves predictability which helps setting up a regular release schedule and creates consistency and helps to build trust. (Cottmeyer & Stevens 2012, 2-3).

Lean management methods and focus on reducing non-value adding activities and increasing work flow could prove to be useful for the support and maintenance services in Company X. The advantages and disadvantages of quality measurement systems and lean and agile management could be further investigated. Kanban may not bring any significant benefits in itself especially if it's used for only some of the support and maintenance customers and deploying Kanban for all customers may not be possible. Reasons for this are the use of different tools for different customer and no support for Kanban in some of the tools used as well as significant process variations between different customers.

For Company X to be able to fully benefit from the use of Kanban the service delivery process would need to be further aligned between different customers and service desk system used needs to fully support Kanban. Lean management practices could still be integrated in the strategy and process even if no additional tools would be used to support lean methodology. However, a visual tool could make it easier to get the whole team adopt the new methods. An example of a Kanban board for Company X is presented in appendix 3.

Interestingly, it was claimed during one of the interviews that another business unit was successfully using Kanban for maintenance service management. However, after further

investigation it turned out there was no visual board used, but rather the team was using some lean and agile management methods. Differences between customers made it difficult to use any specific tools, but ideology was integrated to the service management thinking.

4.3 Resourcing

Resourcing in the business unit is done from one resource pool that is common to all delivery projects and support and maintenance. Resourcing is done on a monthly basis in a bi-weekly project managers' meeting. Resourcing and tasks are discussed within the teams in the beginning of each week, with the team manager leading the conversation. When conflicts appear, they are discussed and solved either with employees or project managers directly or negotiated together with the team manager if needed.

Resourcing was pointed out to be one of the key issues in both customer and internal interviews. Observations of different kinds of resourcing related issues were made during the research as well and support the interview results.

A study by Engwall and Jerbrant (2003) focuses on resourcing challenges in a multi-project environment and highlights many of the issues also observed in Company X that go beyond project planning. In a multi-project environment where resources are drawn from a common resource pool project interdependencies cause problems as any changes in scheduling have a direct effect to other projects and create a need for resource redistribution. Free resources are usually not available as there are usually more projects than what is the existing level of resources. Delays and disturbances in one project usually have negative effects on many other projects. These negative effects cannot always be predicted. (Engwall & Jerbrant 2003, 406-407.)

According to Engwall and Jerbrant (2003, 406) too much of manager's time is spent on priority setting and resource re-allocation. They found that project managers were competing against each other trying to get available resources and certain individuals. Project managers tried to ensure access to resources and best experts by getting a high priority status from top management or pushing the project to crisis to get a high priority status. When resources and individuals had been gained, in risk of not gaining access again if

needed project managers held on to resources even if they were not fully used. Portfolio managers were overloaded with solving continuous resourcing conflicts by prioritizing, resource redistribution and searching for free resources. This led to constantly solving short term problems instead of focusing on process improvements or knowledge development. (Engwall & Jerbrant 2003, 406-409.)

The importance of precise planning and scheduling is well acknowledged in literature and highlighted also by Engwall and Jerbrant (2003, 407). However, as with all complex information systems, scheduling in detailed level is very challenging and some changes will occur during the project. In support and maintenance services scheduling can be even more difficult as peaks in needed support are often difficult to predict. Having multiple customers might even out these peaks as support is needed at different times but this would need to be further examined.

As Engwall and Jerbrant (2003, 409) point out, it should be noted that more detailed planning and scheduling might not solve the problems as other organizational issues from incentives structures to culture can play a bigger role.

According to observations, informal discussions and interviews, Company X experiences similar problems with resourcing. Resource allocation is not always fair but based on company politics and personal influence. Project managers tend to protect their resources and pursue high priority categorization for their project as this is needed to ensure required resources. Changes in resourcing are daily, even hourly and much of the management time goes to solving changes and conflicts in resourcing. Resourcing problems are also visible to customers who pointed out that service level cannot always be guaranteed as resources are simply not available.

4.4 Maintenance team

A typical support and maintenance team in Company X is formed by a service manager, a systems architect, one or two consultants, and one or two developers. Other employees outside the core maintenance team are used if needed, for example, if special skills are required to complete a task or if additional work force is required to handle more service requests. Account managers and customer specific salespersons participate in internal and

customer communication whenever needed and are usually contacted by the service manager or directly by the customer.

Service control meetings with the customer are typically organized once a month between the service manager and the customer team. Regular internal meetings are arranged only for larger customers and may be between the account manager and service managers of different business units or between service manager and the maintenance team. However, meeting arrangements and cycles can vary greatly and there is no standardized way to communicate.

Support and maintenance team is not currently separated from the development, and all employees work on both delivery projects as well as continuous services. Usually the delivery team continues to handle the support requests after project is closed and that way becomes the support team for that client. Most project managers have a double role of both project and service manager. As maintenance team is not separated from project delivery team, resourcing has been very challenging especially for the support and maintenance services as delivery projects have been prioritized.

The fact that the delivery team continues to work as the maintenance team also has made the transition from project to continuous service easy both internally and for the customer. New members for the maintenance team are introduced gradually and efficient knowledge transfer methods have not been needed. This has been an advantage as there is no knowledge gaps caused by the transfer. However, this causes personification and risks related to losing team members grow as knowledge is not as actively shared. Customers are well aware of this, and although they emphasized the importance of having access to all knowledge and information gained during the project, they felt the risks related to certain individuals e.g. architects were very high. Also employees feel they are tied to certain customers and that they have no backup.

Company X feels that the maintenance team needs to be separated from the development but find the current size and structure of the business unit is problematic in regards to maintenance team structure. Teams are divided between two product lines (chapter 2.1.1. Company X, figure 1) and highly specialized. The specialization makes forming one, centralized maintenance team for the business unit less optimal as it is important for the team to have specific knowledge of the system in use. However, forming decentralized

maintenance teams for each product line would make the team fairly small and not able to scale to changes in demand. More importantly, employees have not wanted to focus on maintenance work only as they find projects more interesting. It was suggested in one of the interviews that this is a cultural problem specific to this business unit. This could be partly caused by the unstructured way of working and received customer complaints. Another reason could be roles and the way the responsibility is distributed in the maintenance team. The role of service manager is emphasized and team members are not very committed to the support and maintenance customer as they can be working for multiple projects and services at the same time. This has occasionally caused some quality issues as employees do not have enough time to concentrate on the given tasks.

The double role of the service manager working also as a project manager is especially challenging as service managers are personally responsible for the request response times and assigning the requests to correct team members. This causes needless lag and bottlenecks to the process. Additionally, project managers can be engaged by full day workshops and unable to monitor the service. However, the service level agreement obligates the service requests to be handled in a certain timeframe. The dependency on individual service managers in the studied business unit was seen as a major problem by the representative of another unit interviewed for this research.

In the other business unit the maintenance team has been separated from development, the service requests are directed to a shared mailbox, there are several named employees responsible for monitoring the service, and the monitoring shift is cycled between maintenance team members on a regular basis. This has ensured continuous service and forces the team to actively share knowledge. Also the service managers have more time to evaluate and control the service delivery, and concentrate on strategic and tactical levels of the service as the daily operation of request handling is done independently by the team. The other business unit has also developed more standardized processes and tools for service management and delivery which further improve the service quality.

Theoretical team structures were studied during this research and some optional structures are presented in the following chapters.

4.4.1 Scrum team

A Scrum team has three roles: product owner, ScrumMaster and the development team (figure 12). The product owner is in charge of selecting, prioritizing and communicating the work to be implemented. Product owner is responsible for the overall success of the project and needs to be available to the team to quickly answer to any questions. (Rubin 2013, 14-16.)

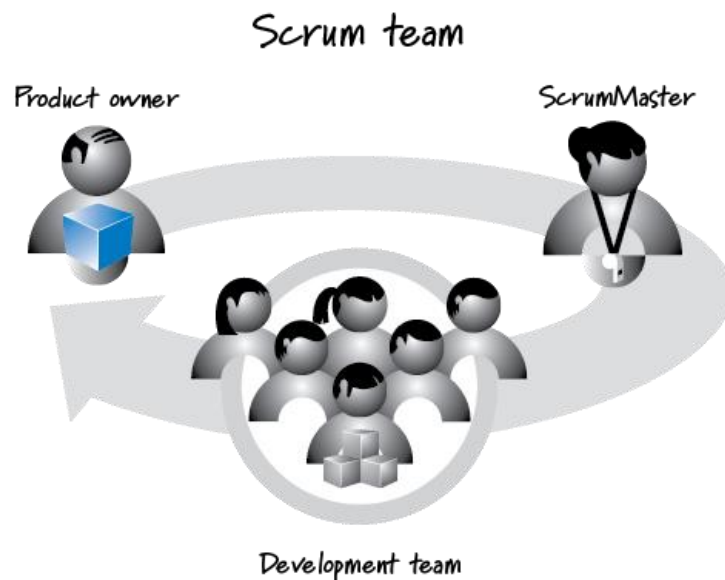


FIGURE 12. Scrum roles (Rubin 2013, 15)

The ScrumMaster acts as a coach to the development team helping to form an adapted Scrum process developed for the needs of the team, and making sure that the agreed process is followed through. ScrumMaster works as a facilitator enabling the team to solve problems more efficiently, protects the team from any distractions and removes any obstacles preventing the team to work as efficiently as possible. (Rubin 2013, 16, 185-187.)

The development team is comprised of five to nine team members with various skills who do not have any more specific roles but are collectively responsible for the implementation. The self-organizing development team needs to have all the skills needed for implementing the project and is responsible for planning, implementing and testing the given tasks. (Rubin 2013, 16, 196-198.)

The other business unit of Company X where support and maintenance services have been more successfully organized uses the Scrum team structure. In the other business unit

developers are in charge of handling support requests and have other roles like product owner and service manager supporting them and handling the prioritization, administrative work, longer term planning and customer relationship management.

Introducing the Scrum roles to the studied organization would be a fairly big change as the responsibility would be more evenly divided to different roles instead of being concentrated on the service manager. However, if Company X is moving towards agile methods in general, using Scrum team structure also for the maintenance team is logical as there is no reason why Scrum team structure could not be used. For the team structure to be adopted and practiced most efficiently, the employees need to be trained to use Scrum and adapted processes, e.g. for communication, need to be developed for support and maintenance services' needs. Scrum team's strengths are its focus on team work and getting things done.

4.4.2 Surgical team

Brooks (1995, 32) introduces a surgical team structure and proposes this team structure for large projects with even hundreds of developers (figure 13). Dividing the team into smaller surgical teams, efficiency and design integrity is enforced, and communication can be done between team surgeons, not the entire project team. The most capable team members lead the work but have a group of people supporting them. (Brooks 1995, 30-32.)

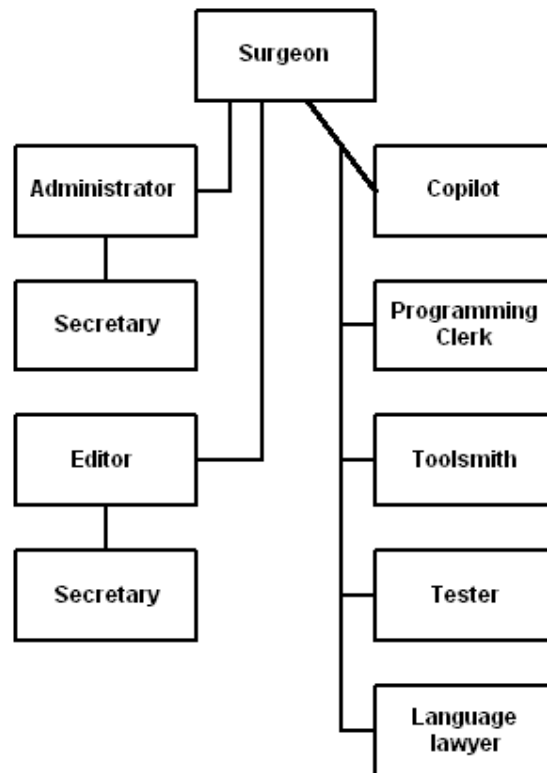


FIGURE 13. Communication patterns in 10-man programming teams (Brooks 1995, 36)

In the surgical team surgeon defines the specifications, works as the chief programmer and has extensive experience. Surgeon is also responsible for documentation. Co-pilot has less experience but has the same skills as surgeon and is able to cover for him. Surgeon and co-pilot work as a pair, discussing and reflecting ideas with each other. Administrator does all the compulsory arrangements e.g. handling money and people. One administrator can serve one or two teams. Editor supports surgeon with documentation reviewing and formalizing the documentation. If needed, administrator and editor can have secretaries to support their roles. Programming clerk is responsible for logs and records any changes and controls integrity of the product. Toolsmith makes sure the basic services needed by the surgeon are maintained and upgraded and provides specialized tools e.g. macros for the surgeon. Tester plans and implements testing. Language lawyer makes sure that the used programming language is the best possible and can serve two or three surgeons. (Brooks 1995, 32-35.)

The ideology of the surgical team could be adapted to maintenance work for the studied business unit as shown in figure 14.

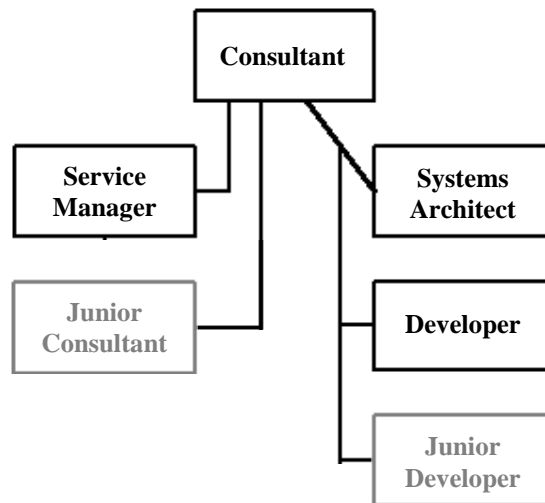


FIGURE 14. Adapted communication pattern in 4-6 man programming teams

The strength of this team structure is a clear leading role that can more efficiently handle the received support requests and assign the tasks to the technical experts when needed. Compared to current situation, having a consultant leading the support and maintenance operations, service manager would have more time to concentrate on monitoring service quality and managing customer relations.

4.4.3 Crew model

Ross (2015) presents a crew model developed for manufacturing maintenance (table 4). In his crew model, different types of tasks are allocated to hit crew, line crew, or preventive maintenance crew, based on the urgency and priority of the task.

TABLE 4. Support and maintenance team task division

	Priority 1 (Emergency)	Priority 2 (Support & maintenance)	Priority 3 (Small scale development)	Preventive maintenance
Hit crew	X		X	
Line crew		X	X	
Preventive maintenance crew				X

Ross (2015) describes in his article that the crew model enable the maintenance team to become more proactive as the emergencies did not stop the normal maintenance work.

Emergencies were handled efficiently by knowledgeable team, a hit crew that was prepared for quickly solving any disruptions. In between emergencies, the hit crew worked on pending lower priority tasks. (Ross 2015)

The line crew focused on the regular support and maintenance tasks ensuring that the level of service was constant and reliable. Preventive maintenance crew made sure that the service was not only reactive but would proactively try to ensure continuous functionality and prevent any future emergencies. (Ross 2015)

The crew model could easily be adopted for software maintenance as well having the same benefits of ensuring service responsiveness and reliability.

4.5 Tools

Office of Government Commerce (2007a, 167) highlights the importance of adequate tools for service monitoring, data collection and data analysis. Importance of easy to use tools was also brought up by customers. The use of Jira for issue tracking and monitoring was found to be effective and even better utilized than with competitors. On the other hand, the interview results showed that the current service desk system does not support internal or customer needs and was not used at all by the other business unit because of this.

The service desk system should fit the needs of both service provider and the customer and support the everyday work of developers, consultants, service managers, portfolio managers and customers alike providing tools for short and long term service and system development. As a new service desk system is planned to be taken into use in Company X in the near future, the role of tools was not included in this research. The use of the new service desk system should be evaluated and its use improved as needed to best support the service requirements and service process. The role of service desk system in continual service improvement should not be underestimated as it should be the main system for collecting and analyzing data.

4.6 Delivery projects and service transition

Defects occurred during the delivery project can have a negative impact on the customer satisfaction only later on. Defects in system design can cause problems during support and maintenance as pointed out by Brooks (1995, 122) and Office of Government Commerce (2007a, 7). However, the success of delivery project was not found to have a strong relation to the success of support and maintenance (Kumar et al. 2011, 336-337). Interviews conducted for this research indicated similar results as delivery projects were seen as moderately or highly successful.

This could be explained by the different attributes considered when evaluating the success of a project vs. the success of a service. Also the defects in the system design and implementation may not actualize during the delivery project but surface during the support and maintenance service affecting the customer's perception of the service rather than the project. In the case of Company X, a more likely reason for customer dissatisfaction for support and maintenance services is simply the lowered level of service due to lack of resources that was caused by the lower prioritization of support and maintenance customers.

Successful transition to a new business-as-usual state should be considered just as important as delivering of the system, as benefits from the delivered system cannot be realized without a successful transition (Pyne 2013, 4). Successful transition paves the way for continuous services like support and maintenance which can often form a considerable part of a business and contribute to delivery projects by offering more stable income and a more permanent customer relationship (Artto, Martinsuo & Kujala 2011, 36, 41). It is important for any company to ensure that customers are satisfied to the level and quality of the service throughout the service lifecycle and any misunderstanding or dissatisfaction leads to increased risk of losing sales opportunities or even the customer.

Based on interviews, support for transition from system implementation to system operation was found sufficient by customers. Transition from delivery project to support and maintenance was not considered problematic internally or externally as the change happened mostly on paper and did not bring any significant changes to the team or way of working.

For larger customers, additional support for the transition from project to maintenance could be considered. Increased demand for support and maintenance services immediately after transition is a known trend that needs to be taken into account in service management. For small to medium customers, this heightened need could be managed as part of the normal support and maintenance services. The customer interview results support this idea as the medium sized customers felt that any additional support would be excessive. For larger customers however, a better defined support period could be beneficial for both the customer and Company X. The support period could improve cost estimation, resourcing, responsiveness, proactive system monitoring and measuring as the process and required activities can be easier to plan and communicate for a short period of time.

Peslak, Subramanian and Clayton (2008, 27) divided EIS implementation and maintenance into four phases as shown in figure 15. In their research they studied how the success of each phase affected the preferred EIS use. They found out that the transition and maintenance phases did not significantly affect the preferred EIS. The preparation and training phase, and the performance and usefulness phases directly affected the customer's opinion about the preferred EIS. (Peslak et al. 2008, 31.)

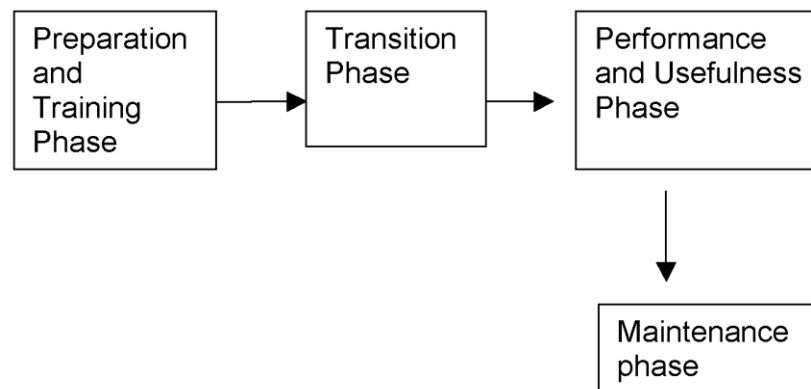


FIGURE 15. The four EIS implementation and maintenance phases (Peslak et al. 2008, 27)

For Company X to be able to focus its efforts on the critical areas of the service lifecycle, this information about which phases are most relevant to customers and their future preferences when choosing the next system and service provider could be used. Based on the research by Peslak et al. the most critical phases of the service lifecycle in Company X

are the final phases of the delivery project where training is done, and the beginning of the support and maintenance phase before operations are back to BAU state.

4.7 EIS maintenance

From a technical viewpoint, system maintenance is mainly fixing of design defects. Changes can include new functions and are usually visible to end users. Most of the bugs are observed after a new release. New releases may introduce old bugs already fixed in previous versions in addition to new bugs related to changes in functionalities. The bugs are fixed and maintenance goes smoothly for a while. However the amount of bugs starts to increase later on possibly due to end user's increased knowledge and use of new functionalities of the release (figure 16). (Brooks 1995, 121.)

According to Brooks (1995, 122), fixing a defect has a 20 to 50 per cent chance of introducing another. One explanation offered for this is that the observed defect is only part of a much wider problem in the system and the effort of fixing the problem with minimum amount of work may repair the observed defect but more far-reaching effects are not even investigated. The person performing the maintenance is usually not the person who originally wrote the code and can also be a junior programmer or even a trainee. (Brooks 1995, 122.)

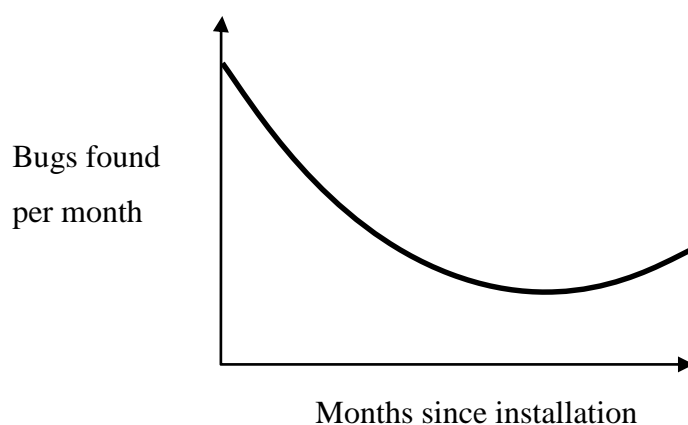


FIGURE 16. Amount of bugs since system release (Brooks 1995,121)

Maintenance requires even more testing than development of a new system. Extensive test cases and regression testing should be performed to ensure no new bugs could be

found. However, this is very costly. To reduce maintenance costs, dependencies in the system design should be clearly documented and eliminated when possible. A simple design developed by fewer people that has fewer interfaces also has fewer bugs. (Brooks 1995, 122.)

Salmeron and Lopez (2012, 439) point out that there is little research on what attributes form a successful EIS maintenance, how maintenance should be managed or what risks should be addressed and how. They note that EIS maintenance is ambiguous as the goals of the service are not clear and the complex systems can suffer from a wide range of issues due to system size, complexity, high number of integrations and the large number of external and internal actors involved. In addition, standards and methodologies for EIS maintenance are lacking and there is no best practices to manage the process. (Salmeron & Lopez 2012, 439.)

EIS maintenance is critical to maximize the EIS value and for efficient EIS utilization. EIS maintenance improves system stability, capability and performance, information quality, organizational processes, system fit to business strategies, and effectiveness of system users. This enables the customer organization to obtain a return on investment in a short time. If the service provider fails to deliver the agreed maintenance, the EIS will not fit the needs of the customer and can considerably slow business activities or even impact the stability of the customer organization. (Salmeron & Lopez 2012, 440.)

In their study Salmeron and Lopez (2012, 447) divided the identified risks into two groups of less controllable and controllable risks as perceived by the service managers. They found out that poorly controllable or uncontrollable risks, like changes in customer organization or processes, and lacking support of customer management or employees, had a stronger impact on maintenance goals than risks that can be controlled by the service manager. User satisfaction was most affected by the studied risks. The less controllable risks also had a stronger impact on maintenance costs. System volatility however was considerably less affected by any of the risks. The level of documentation, quality of code, evaluation and prioritization of requirements, and employee knowledge of the required maintenance suffer the most whenever risks actualize. (Salmeron & Lopez 2012, 447-449.)

All interviewed customers said that the system had been modified to fit the customer process more than what was absolutely necessary making the system more complex. One of the customers clearly pointed out the connection between system complexity, increased costs and difficulties in maintenance. In tailored systems, there is an increased risk that changes made cause unexpected problems. Customers were hoping that their requests for system modifications would be challenged more strongly and instead the customer processes would be adapted to fit the system. However, the employees at Company X feel that challenging the customer to adjust the processes usually makes no difference and that the customers insist on modifying the system.

One explanation for these conflicting views could be the fact that the people participating in functional design may not be as familiar with systems design and focus on financial management processes and therefore favour modifying the system as it seems easier for them. The interviewed customer personnel were all technology orientated. This alone does not explain the difference between customer and Company X's view, as both financial and technology experts participate in the systems design. Another explanation could be the change in perspective from when the system is being designed to when system is already in use and maintained.

Another point of view brought out in one of the internal interviews was the fact that Company X is not usually hired to design the customers' financial processes but to build a system that fits the already designed processes. However, as all customers felt that too many modifications had been made, it can be seen as an opportunity to improve the functional design process during the delivery project.

For customers the projects are unique and previous experience is usually lacking. It should be further discussed if sales, project communication or design process could somehow be developed to better answer to this need. The maintenance goals and risks presented in Salmeron & Lopez's (2012, 447-449) study could also be used as a starting point to further develop support and maintenance services and prepare for possible risks.

4.7.1 Preventive maintenance

Proactive monitoring should be done regularly to prevent possible failures before they occur. Monitoring system capacity, performance and current utilization helps to identify trends and potential problems. (Office of Government Commerce 2007b, 73, 240.)

System capacity management should be an integrated part of the service and its management activities. Currently capacity management is not actively practiced.

Some optimization services like performance tuning and data management are included in the product specific third party process. However, the definition of the optimization services in the third party process is on a very general level and Company X should create a more detailed description of what activities should be included to be performed regularly as part of preventive maintenance. Similar activities can be performed to most of the support and maintenance customers and could be more easily communicated to the customer if a standardized process for monitoring and optimization existed.

5 CONCLUSIONS AND DISCUSSION

This thesis was set out to study what problems occur in EIS support and maintenance services, what is causing these problems, how are they related to each other and how support and maintenance services could possibly be improved. The study results highlight the complexity of the social, organizational and technical environment and their close linkage to each other. The results also show the influence of top management focus and prioritization, which has been lacking in the case of support and maintenance services in Company X.

Many changes have been made in Company X since this research was started. A new manager was hired to lead the studied business unit, new service desk system has been taken into use, updates for other tools are coming soon, focus has shifted more on support and maintenance services and a new team structure and more standardized service model has been planned.

The service quality gap analysis suggested that many of the experienced problems in service delivery and customer satisfaction were originated from the lack of commitment from top management and too generic processes. The team in itself was doing its best but the circumstances were causing the service to seem unreliable and unresponsive.

The role of the service manager is problematic, currently focusing mainly on operational request handling rather than managing and monitoring the service quality. Complying with SLA seems to be the responsibility of individual service managers who quickly become bottlenecks. The planned changes aim to clarify different roles in the team, help employees recognize their responsibilities, and enable employees to focus on activities that create value.

The planned changes are addressing the problems identified in this research. Driving a change from theory to practice is always a challenge. The organizational orientation towards technology can make the change even harder as the underlying culture and way of thinking may not support the planned changes. Finding the customer service oriented employees plays a key role in building a culture of quality and matching the services to customer expectations.

The people driving the change need to have enough resources to focus on improving the way of working and top management needs to have a long term interest in measuring and further developing the support and maintenance services. Measurement and improvements should focus on quality as perceived by the customer and reducing non-value activities.

ITIL framework provides tools and ideas for continual service improvement that could be integrated into processes and taken into use. Service quality gap model or other service focused analysis tools could be used to complement the activities proposed by ITIL. Employees have a good understanding of the situation and could be of great value in planning and improving the quality of service delivery. Company X has the needed information and know-how to make significant improvements. What it has been missing is resources and dedication to develop the provided services.

As the competition and financial situation in the market has become tougher, the role of services has become increasingly important. The increasing role of services has been a global trend and will most likely continue to grow in Company X. However, this is not self-evident and some doubts have been casted on the sustainability of the planned changes. If the situation in the market would change and there would be more than enough project work, would the management again prioritize projects over support and maintenance services?

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