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IT SERVICE MANAGEMENT SYSTEM IMPLEMENTATION

Case Analysis in IT Service Provider Company

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ABSTRACT

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IT Service Provider companies are working in business environment where changes are inevitable to survive. Changes happen in the markets and it makes the companies trying to keep up with the speed of change. One of the major changes that companies execute is Information Technology Service Management implementation (ITSM). Companies might be changing their core processes significantly, in many cases to operate more according to Information Technology Infrastructure Library (ITIL) framework. Companies are occasionally focusing too much on technical implementation and often the human side might not be considered in the level that would be needed.

In this thesis several aspects were covered to make conclusions on how successful the implementation project was for case Company X, both from pure performance perspective and from human perspective. ITSM implementation project was examined from performance perspective by analyzing ITSM data from the old system and comparing the data to similar data set from new system, called ServiceNow. Personnel's perspective was considered by collecting survey responses from Company X's ITSM users globally. These survey responses were then replenished by interviewing selected ITSM users.

For Company X several interesting findings were found. The new ITSM was expected to be efficient and operations were assumed to have improved. It was found that due to ITSM configuration and company X's own setup, the number of created incidents increased more than what performance improved, which eventually resulted longer handling times in incidents and all service requests. ITSM implementation project could have been more successful with better communication and commitment from senior management. Personnel has understood the benefits of the new ITSM but several comments were also received about tooling inconsistencies.

Overall the new ITSM offers high reporting possibilities for customers, configuration possibilities to companies and to users. Additionally, management can leverage reporting capabilities to monitor and improve operations effectively.

Keywords: ITIL, ITSM, ServiceNow, project, incident, service request

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TIIVISTELMÄ

Vesa Salo: IT palvelunhallintajärjestelmän käyttöönotto, tapaustutkimus IT-palveluntarjoaja yrityksessä
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IT palveluntarjoajat toimivat liiketoimintaympäristössä, jossa muutos on selviytymisen kannalta pakollista. Markkinoilla tapahtuu muutoksia, joihin yritysten on vastattava sopeutumalla tehokkaasti muutoksiin. Yksi merkittävistä muutoksista, jonka avulla yritykset vastaavat muutoksiin on IT-palvelunhallintajärjestelmän käyttöönotto. Yritykset saattavat muuttaa ydinprosessejaan merkittävästi, usein ottamalla käyttöön ITIL-kehiksen eli Information Technology Infrastructure Libraryn. Yritykset saattavat kuitenkin keskittyä liikaa käyttöönoton tekniseen osa-alueeseen, jättäen inhimillisen osa-alueen liian vähäiselle huomiolle.

Tässä diplomityössä käsiteltiin tapaustutkimuksena useita näkökulmia yrityksen X palvelunhallintajärjestelmän käyttöönoton onnistumisesta. Tavoitteena on selvittää syitä palvelunhallintajärjestelmän onnistumiseen tai epäonnistumiseen. Kirjallisuustutkimusosassa kuvataan ITIL-kehiksen palvelun elinkaaren eri vaiheita sekä prosesseja ja organisaatioiden muutoksien teoriaa. Tutkimusosassa huomioidaan sekä puhtaasti tehokkuuden osa-alue että inhimillinen osa-alue. Palvelunhallintajärjestelmän käyttöönotto tutkittiin tehokkuuden osalta analysoimalla palvelunhallintajärjestelmän dataa vanhasta järjestelmästä ja vertaamalla sitä uuden järjestelmän vastaavaan dataan. Yritys X:n henkilöstön näkökulma huomioitiin teettämällä kansainvälinen kysely palvelunhallintajärjestelmän käyttäjille. Kyselyn tuloksia täydennettiin lisäksi valikoitujen käyttäjien erillisellä puolistrukturoidulla teemahaastattelulla.

Yrityksen X tapauksessa löydettiin useita huomionarvoisia tuloksia. Uusi palvelunhallintajärjestelmä vaikutti olevan tehokas, lisäävän automaation määrää ja operaatiot näyttivät parantuvan entisestään. Häiriöiden lukumäärä kuitenkin lisääntyi järjestelmän toiminnallisuuden takia enemmän kuin mitä toiminta tehostui, mikä tarkoitti pidempää käsittelyaikaa häiriöille sekä muille palvelupyynnöille. Yritys X:n tapauksessa palvelunhallintajärjestelmän käyttöönotossa olisi voitu onnistua paremmin ylemmän johdon sitoutumisella sekä sitä tukevalla kommunikaatiolla. Kyselyn sekä haastattelujen perusteella todettiin, että henkilöstö on oppinut kokonaisuudessaan arvostamaan uuden palvelunhallintajärjestelmän hyötyjä, vaikka kommentteja vastaanotettiin myös työkalun ristiriitaisuuksista.

Kokonaisuutena uusi palvelunhallintajärjestelmä tarjoaa paljon mahdollisuuksia operaatioiden raportointiin asiakkaille ja käyttäjille sekä yrityksille omien tarpeidensa mukaisten konfiguraatioiden tekemiseen. Lisäksi yrityksen johto voi tehokkaasti käyttää raportointi- sekä monitorointiominaisuuksia kehittääkseen operaatioita.

Avainsanat: ITIL, palvelunhallintajärjestelmä, ServiceNow, projekti, häiriö, palvelupyyntö

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PREFACE

This thesis work was a long journey with multiple obstacles and breaks in writing. In my mind I never gave up as it was always my plan to finish this work. That time is now.

I am forever grateful for my whole family, mom and dad for understanding and giving a lot of support throughout my prolonged studies and breaks, not questioning my decisions or asking for updates frequently. I received significant support from my big sister and her husband, already starting early on my studies. Not forgetting my better half who has been encouraging me and patiently waiting for me to get all things together for this. Thank you all!

Tampere, 13 February 2020

Vesa Salo

CONTENTS

1	INTRODUCTION	1
1.1	Thesis goals and restrictions	1
1.2	Related research	2
1.3	Structure	3
2	Supporting service delivery.....	4
2.1	Company X and service offerings.....	4
2.2	Support levels.....	5
2.3	Support processes in Company X	6
3	Organizational change.....	8
3.1	Change theories in organizations	8
3.2	Human and culture	10
3.3	Planning	11
4	ITIL Service lifecycle.....	13
4.1	Service Strategy	14
4.1.1	Strategy management for IT services	14
4.1.2	Service portfolio management	14
4.1.3	Financial management for IT services.....	15
4.1.4	Demand management	15
4.1.5	Business relationship management.....	15
4.2	Service Design	16
4.2.1	Service Design Coordination.....	17
4.2.2	Service Catalogue Management	17
4.2.3	Service level management	18
4.2.4	Availability management.....	19
4.2.5	Capacity management.....	20
4.2.6	IT Service continuity management.....	21
4.2.7	Information security management	22
4.2.8	Supplier management	22
4.3	Service Transition	23
4.3.1	Transition planning and support	24
4.3.2	Change management.....	24
4.3.3	Service asset and configuration management.....	26
4.3.4	Release and deployment management.....	26
4.3.5	Service validation and testing	27
4.3.6	Change evaluation.....	28
4.3.7	Knowledge management.....	28
4.4	Service Operation.....	29
4.4.1	Event management.....	29
4.4.2	Incident management.....	29
4.4.3	Request fulfillment	31

4.4.4	Problem management	31
4.4.5	Access management.....	33
4.5	Continual Service Improvement	33
4.5.1	The seven-step improvement process	34
5	implementing new ITSM system	35
5.1	Initial steps towards ServiceNow project.....	35
5.2	ServiceNow schedule, planning and implementation	35
5.3	Changes in Company X European services	39
5.4	Performance analysis	42
5.5	User experience.....	46
5.5.1	ServiceNow user survey results.....	46
5.5.2	ServiceNow user interviews	48
6	Conclusions	51
	references	53

LIST OF SYMBOLS AND ABBREVIATIONS

AMIS	Availability Management Information System, virtual location to store IT system availability.
BCM	Business Continuity Management, business process to manage risk that can have significant impact on business.
BIA	Business Impact Analysis, business process to analyze potential impact when uncontrolled event occurs.
CAB	Change Advisory Board, group of people advises change management to assess, prioritize and schedule all significant changes.
CFIA	Component Failure Impact Analysis, analyses the impact that failing component has for service.
CI	Configuration Item, any item that needs managing so that IT service can be provided.
CMIS	Capacity Management Information System, virtual repository to store all capacity management data.
CMS	Configuration Management System, tools and databases needed to manage all configuration data for service provider.
CSI	Continual Service Improvement, process to find improvement areas to services by measuring, collecting and analyzing data.
ECAB	Emergency Change Advisory Board, similar role compared to CAB to advice change management but is gathered only when change is defined as emergency and implantation schedule abnormal.
ERP	Enterprise Resource Planning, system supporting organizations core business processes.
FTA	Fault Tree Analysis, analysis of chain of events.
ISM	Information Security Management, process to ensure IT service providers' information confidentiality, integrity and availability.
ITIL	Information Technology Infrastructure Library, framework of best practices for delivering IT services.
ITSCM	IT Service Continuity Management, manages risks that can impact on IT services.
ITSM	Information Technology Service Management, full scope of activities and processes to manage IT services offered to customers.
KEDB	Known Error Database, unified location to store and maintain known errors happening in IT services.
OLA	Operational Level Agreement, IT Service providers' internal objectives to support activities consistent with SLA.
RFC	Request for Change, formal request for a change.
SACM	Service Asset and Configuration Management, process to maintain Configuration Items that are vital to deliver IT service.

SCMIS	Supplier and Contract Management Information System, system maintaining supplier contracts and information.
SDP	Service Design Package, contain service documentation that is embedded to Service Portfolio.
SIP	Service Improvement Plan, plan describing activities and priorities as well as risks to improve the service.
SKMS	Service Knowledge Management System, centralized system to collect data and information that are needed to manage the lifecycle of the service.
SLA	Service Level Agreement, contractual obligations that service provider agrees with customer about service levels.
SLM	Service Level Management, process to negotiate Service Level Agreements with the customer and manage service level accordingly.
SLR	Service Level Requirements, document containing requirements of the IT Service.
SPOC	Single Point of Contact, entity or a group managing all communication in Service desk in a coordinated manner.
SPOF	Single Point of Failure, configuration item that can cause an incident when it fails but does not have a countermeasure identified.
SVS	Service Value System
VBF	Vital Business Function, critical business element or process that is supported by IT service.

1 INTRODUCTION

It has been said that change is always ongoing in organizations. [1] Essential for organization is to empower employees to embrace the change. Empowering will minimize changes' risks and maximize the benefits. [2]

Company X is an IT Service provider offering cloud-based system integration services and data management. Integration platform services are offered to multiple different type of businesses, such as retailers, software development companies, industrial companies and finance service providers. By default, integration platform offers ways to integrate customers system with their partners system or integrating enterprise wide systems together where business transactions move seamless to the business user's hands.

Company X's operations have grown significantly in global scale, also by acquiring companies and over time this has resulted many operational and structural changes in the organization. Nowadays average customer has significantly bigger business or market potential. This has forced company X to change operations into more structured and process oriented ways of working.

IT Infrastructure Library (ITIL) is a powerful set of best practices that can be used as a toolset to build efficient IT service management processes. However, properly designed process itself does not guarantee results. Very often the human factor is forgotten in IT system and process implementation projects. ITIL practices provide a framework to carry out major changes successfully in organization without breaking work standards. Additionally to ITIL, organization should focus on planning the change according to their personnel's needs and requirements. In the end, the organization cannot exceed or even meet expectations if personnel are not changing simultaneously with the processes and system.

1.1 Thesis goals and restrictions

This thesis work covers ITIL as a core guiding framework, organizational change theories and factors to successful implementation of Information Technology Service Management system. ITSM implementation project is analyzed in case Company X from internal perspective and leaving external, customer's or third parties' perspective, out of scope. ITSM implementation project is analyzed based on the following criteria: system and process efficiency based on analyzed data, feedback from ITSM user survey, and feedback from user interviews and findings from project results.

The primary research question in this thesis is to analyze how ITSM implementation affected Company X's operations performance and how users feel about the operational and organizational changes. If operations work better after the change, what were the drivers that made it happen? When looking at raw data from ITSM

performance perspective, it is beneficial to mirror operational raw data to personnel's opinion. If the opinions are not aligned with the data, what are the reasons for it?

ITSM user survey was carried out from global perspective on how users feel about working with new ITSM called ServiceNow. Survey was designed to get user's feedback about the main applications that are available in ServiceNow. Survey was sent to all personnel who had active ServiceNow accounts in Company X.

User interviews were targeted to narrowed number of users, 5 to be exact, in Company X to replenish the feedback received from the ITSM user survey. Theme interviews [3] were used to give respondents more space to answer questions how they felt appropriate. Complex system implementations, such as ITSM, more flexibility given in the interview could produce more extensive and profound interview results.

In the center of this thesis work is the new IT Service Management tool, ServiceNow, which was implemented in May 2017. With ServiceNow as a new tool, moving towards more standardized way of following ITIL processes was seen as a huge improvement opportunity in fragmented organization. Company X was using multiple different ITSM tools, depending on supported service which was making the processes less standardized, uncoordinated and senior management did not have enough visibility to service operations in global or regional scale.

1.2 Related research

Available research was searched to find similar studies when completing this thesis work. Scientific publications were searched mainly from Tampere University library portal called Andor [4] which is connected to multiple broad scientific publication databases. Google Scholar [5] and IEEE Xplore [6] were used separately. Search words included "ITSM implementation project" and "ITIL project". Found case studies focus on ITIL process implementation but do not cover ITSM tool specifics and how the ITIL implementation scope and tool itself relate to successfulness of the implementation. IT project studies can be found but the difference between the IT infrastructures or IT system project is too significant when compared to ITIL driven ITSM project and therefore IT project studies were not useful in this research context.

Case studies emphasize few key aspects that specifically can have major impact on project successfulness. One of the most discussed topic is commitment of senior management. Several studies describe how important the commitment is from senior management and how they should monitor and support the project. If senior management is not committed and involved, it is more likely that ITSM project will have only small or short-term wins. [7] [8] [9]

Other people factors were emphasized on paper "Critical Success Factors in IT Service Management Implementation: People, Process and Technology Perspectives". [9] The study lists 12 critical success factors that were filtered out by ITSM project experts and 7 of these point out the importance of users. The factors are top management support, IT staff knowhow and capability to handle the project, IT staff's strong participation in

the project, that system's features are satisfying users, project managers have enough experience, software vendor provide effective communication and strong trainings and senior executives monitor the progress in positive manner. [9]

Relevant aspects for successful ITSM project are also that ITSM is implemented in stages, processes focus on IT services and business needs and not only to technology issues, documentation and archiving are done respectively and also continuous improvement on processes are in place. [9]

Case studies offer little quantitative results of ITSM project implementations and only few quantitative results are found. In Hong Kong university Campus area, the ITSM implementation project aimed to improve service performance and set standardized processes and measurement. With new ITSM, processes were measured against SLAs and KPIs. As a result, service level targets improved on average by 13,4 %. Also noticeable that service performance was fluctuating significantly between approximately 75-90% but after ITSM implementation the performance started to settle to over 95%. [10]

ITSM project successfulness is perceived very differently by customers compared to employees. Customers are generally rating the service based on communication or reporting they receive, which is often through incident management process. Customers notice organizational performance improvements when they experience less service defects and service requests are completed faster. These have impact to better reliance to service quality that customers experience. [8] In this thesis work the focus is on internal findings and performance is analyzed purely from internal perspective.

1.3 Structure

This thesis work will represent Company X's business and the most relevant processes in second chapter. Third chapter will provide theoretical background on organizational change and relevant human factors. Fourth chapter is dedicated to ITIL framework and its processes. Fifth chapter will describe the ITSM system implementation project in Company X and analyze the performance compared to the old ITSM. The user experience from both survey and interview is added to study user's perspective. Other relevant observations are written as the last part of the fifth chapter. Finally, sixth chapter will conclude all the findings and results.

2 SUPPORTING SERVICE DELIVERY

Service delivery in this context is an entity, containing production and support organization, which guarantee that services are functioning as expected at any given time. If something unexpected happens, service desk is the single point of contact (SPOC) for all parties outside the organization.

2.1 Company X and service offerings

Company X has few hundred employees worldwide, approximately three quarters in the US and one quarter in Europe. Company X's European revenue was between 15-40 Million Euros.

Company X is offering system integrations as cloud based services. Traditionally these services are business-to-business (B2B) integrations between two companies. Services include Electronic Data Interchange (EDI) and electronic invoicing. In EDI landscape business documents are exchanged between partners. [11]

In Company X's services, a sender transfers data from system, such as ERP, to Company X's integration platform where the data is converted to file format a receiver can accept and delivered to receiver's system.

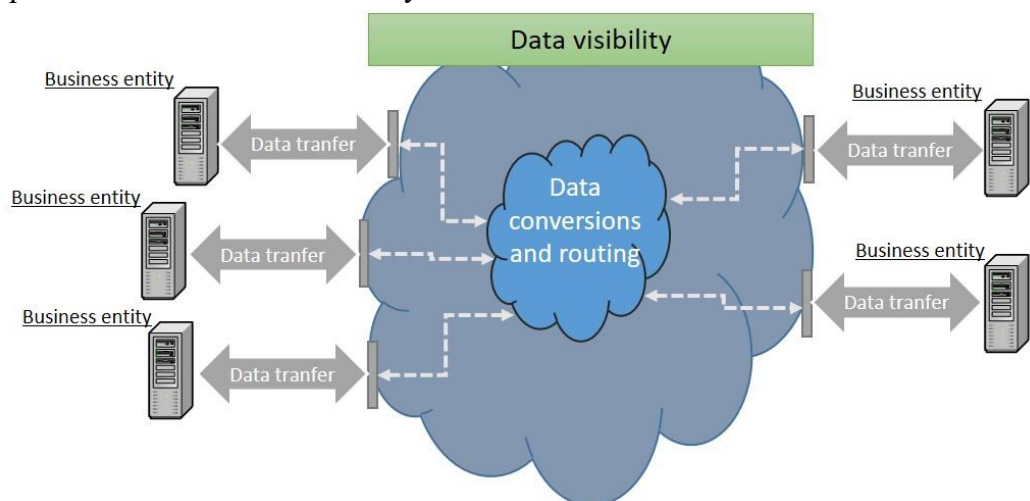


Figure 2.1. Integration platform (simplified).

Figure 2.1 illustrates the integration platform on a high level. The sender and the receiver, in this context business entity, have their own interface to the integration platform to send and receive transactions. Business entity can be a customer, customer's trading partner, other service provider or operator. If the business process requires, similar conversion and interfaces can exist to transfer data to the opposite direction. Ideally end

systems can process data without manual involvement. The business documents can be, for example, orders, order confirmation, dispatch advices, invoices, and warehouse data or logistics documents. One example of service provider interfacing with integration platform is electronic invoicing, where operators transfer invoice transactions on behalf of business entities.

Company X offers 8 separate integration platforms, the one illustrated in Figure 2.1 and discussed in this thesis work, being one of them. Some of these platforms are developed originally by other companies but because of company acquisitions, they are now maintained and supported by Company X.

Service offerings also include own software solutions, such as software for customers to develop and maintain integrations in-house. This software can be used by customers to create part or all of their integrations. Software can be used to transfer transactions with other business entities, such as customers, partners or service providers like Company X.

Other software include data mapping software, EDI transaction viewer and validator tool. Large part of the data conversion in Company X's integration platforms are done with Company's own mapping software.

2.2 Support levels

There is no standard way to organize support organization. Support levels are normally divided into two or three, or even four levels to handle different support work tasks. Levels can be called simply first, second and third level. The levels differ from organization to another but generally the resources increase when moving from first level to second and from second to third level and so on. In this context resources can mean time, knowledge, tools, human resources or any combination of these.

According to ITIL, the first level of support is the single point of contact (SPOC) for all customers. Customers should always contact service provider through well-known channels whether it is a call, email or service request made from external tool (e.g. Extranet). The first level should create records for all service requests, classify and prioritize separately incidents and communicate to customer appropriately. If service request handling is not possible in the first level, service request will be transferred to 2 level support. [12]

Second level of support is handling all service requests that couldn't be handled by first level and were therefore escalated to the second level. Second level personnel usually have more resources (time per service request) and deeper knowledge of the systems and underlying technologies.

Third level of support has more knowledge about core architectures and even more resources (technology and time) at use for solving the escalated service request. Third level could also be a third-party supplier, outside the company. [12]

2.3 Support processes in Company X

Company X's support processes have been developed over time because of increased revenue, service offerings and customer. There are three levels of support in Company X. 1st level of support receives all service requests. 1st level acts as a single point of contact (SPOC).

Company X's support service hours are depending on the contract made with the customer. Customers that need service 24/7 basis due to their business requirements, have a separate SLA with Company X to cover extended service hours for incidents.

Company X's support works according to internally designed request fulfilment process. This process covers all service requests that are created in IT service management system. All production related issues and communication are tracked in ITSM. Service requests are created by Company X's ITSM or created automatically from customers email or from external portal.

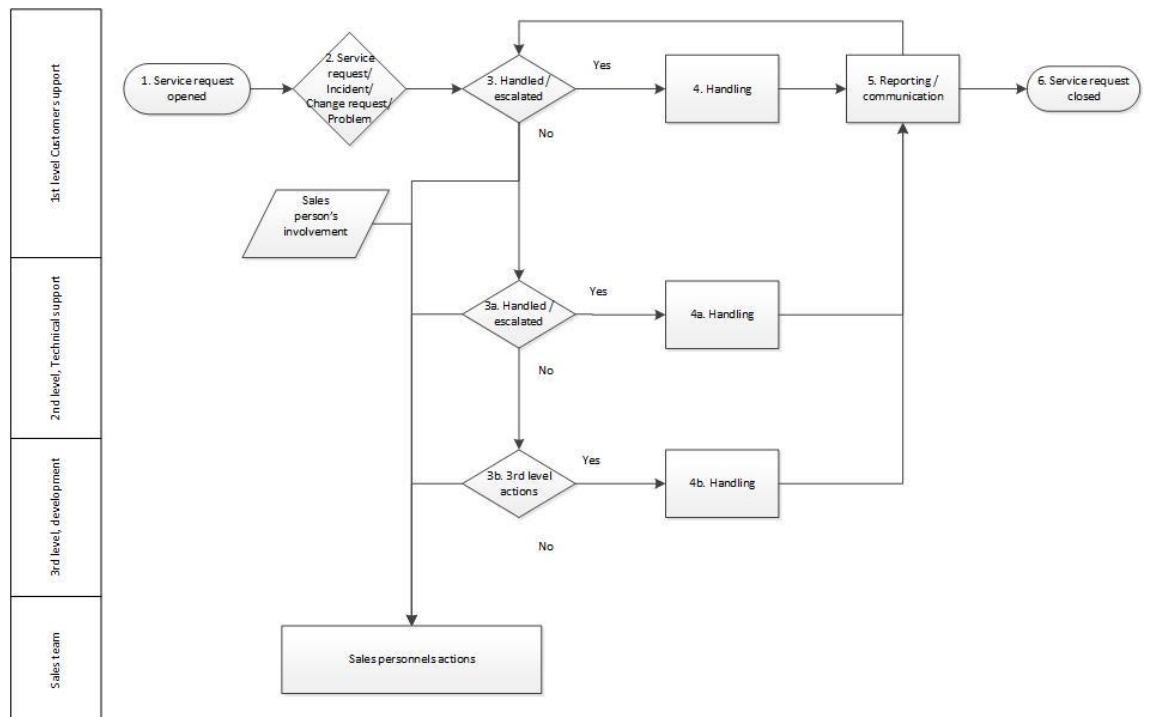


Figure 2.2. Support processes in Company X (simplified).

Support processes are illustrated in a simplified flow chart (Figure 2.2). First service request is created from monitoring event, transaction error or by customer itself (step 1). By default service requests have minor severity but customers can select it in external service portal.

In step two service request's category is selected. Main categories are service request, incident, change request and problem. Each of the categories follow its own process but are comparable to high level actions illustrated here. Company X's ITSM will create any platform events and transaction error incidents automatically in which case steps one and two happen automatically.

Handling decision is done in step three. Proper analysis is carried out. After analysis, escalation decision is made or more information is asked from customer. Escalation decision is based on the following details:

- service request requires deeper knowledge
- service request takes too much time to handle in current support level

In escalation, progress report is sent to customer and service request is assigned to 2nd level support. If escalation is not needed, handling (step 4) and reporting (step 5) are done and service request is closed.

Second level support makes similar escalation decision (step 3a.) after analyzing all service request information and internally provided details from 1st level. Second level operates with more resources. Once all actions are done, service request are often returned to 1st level for reporting and closing with customer's approval.

Third level analyzes the service request information in step 3b. Handling in third level could mean problem management.

Occasionally sales person's actions are needed, for example when customer's requirement needs to be fulfilled with a separate project. In Company X's default request fulfilment process sales organization is not needed.

3 ORGANIZATIONAL CHANGE

Organizational change is most commonly initiated by markets, society or technology [13, p. 2]. For organization to be successful and efficient it is important to be aware and prepared for changes. IT Service management and ITIL framework specifically aim to assure from process efficiency perspective that changes to services are assessed, approved, implemented and reviewed.

Major changes as in new or significantly changed services need all parties' involvement so that they can take new responsibilities, learn necessary new skills and adopt new behavior. It takes time for people to accept new roles and some preparations are necessary. Some of these activities are as follows [13] [14, pp. 138-140][9]:

1. Improve general awareness and justify the importance.
2. Encourage people to take part.
3. Provide necessary training and education so that people adopt new behavior and skills.

The key is to plan changes beforehand and take emotional responses under consideration. Emotions depend on the significance of the change and the impact that it might have. Often resistance is caused by people spreading second hand information and all the thoughts people might develop when thinking about their changing relationship to organization. [13]

People also have their own goals and objectives. Their personal preferences about careers (advance, retire, moving to another location) also contributes to their ability or desire to change. One additional contributing factor is the organization's culture about noticing advancements and how they are displayed in the organization. [13]

3.1 Change theories in organizations

Four basic theories is a framework that explains organizational change and development with separate theories called: life-cycle, evolution, dialectic and teleology. In real life, organizational changes are better suitable to be explained as combinations of 2 or more because single theory describes the change with narrow perspective. [15] Figure 3.1 illustrates the change theories and their dimensions.

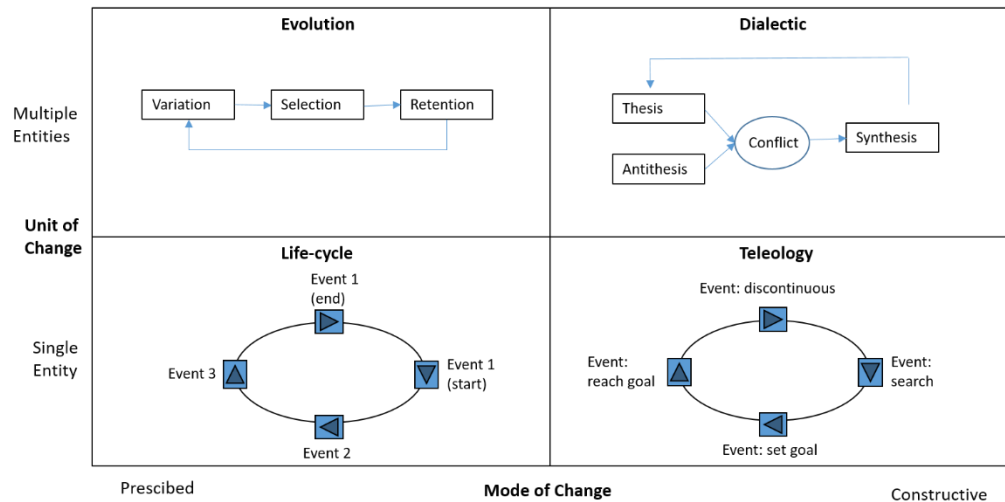


Figure 3.1. Four basic Organizational change theories. [15]

Life-cycle has similar aspects to human development and theory describes changes as a sequence of events where the final state is prefigured. During the life-cycle progression, each event contributes to the end state. In life-cycle theory the changing entity has the program and rules embedded within. Life-cycle theory is one of the most common ways to describe organizations and products but also development stages in individual careers, groups and organizations. [15, pp. 513-515]

Evolution change theory is a repetitive sequence of events: variation, selection and retention. Entities start to compete from scarce resources, natural selection happens and the best entity suitable for the resource base survives. Entity survival or defeat cannot be predicted but the population evolve over time because of entities' dynamics. [15, pp. 517-519]

Dialectical theory lean on conflicts between thesis and antithesis. The conflicts push the entity to change. Dialectical theory interprets the world as constantly colliding forces which compete for the domination and control. When opposing forces gain enough power, change occurs. [15, p.517]

In teleology theory, the entity sets a target state, goal, to move towards it. Entity is adaptive and can iteratively modify the actions to reach the goal. Teleology theory has events to reach end state but the sequence is not prescribed. Entity also has consciousness of its resources and environment to act accordingly. Once goal is reached, it does not mean permanent state as external environment can push the entity to another developmental path. [15, pp.515-517]

As illustrated in figure 3.1, the four basic theories have two distinguishing dimensions to describe them: unit of change and mode of change. Unit of change is separated to single entity and multiple entities. Mode of change is separating the change as prescribed or constructed.

Evolutionary and dialectical theories only occur with multiple entities influencing to results. Evolution mean competing from resources with another entity and dialectic needs at least thesis and antithesis for collision to happen. Life-cycle and teleology

theories describe change happening from single entity and although external environment can affect, it is secondary to either entity evolving itself according to “program” or entity setting goals as in teleology theory. [15]

Life-cycle and evolutionary have steps that are followed in prescribed manner. Life-cycle model normally has less radical changes due to the predefined change in the program and logic within the entity. Similarly evolutionary steps are in micro-level, slowly changing the population. Dialectical and teleology are unpredictable as the goal can change suddenly or be modified (constructed) within the entity. [15]

3.2 Human and culture

Several human and culture peculiarities influence on the way people deal with changes. People are often scared of changes or they just might be looking for stability in their jobs. That is true in all organization levels. Most likely people do not even admit to being scared, even if they identify it themselves. [16, p.11]

Behavior of human can be studied from culture perspective. Generally continents like Europe, Asia or North America all have distinctive features that influence how people lead and adapt to changes. In Asian countries like China or Japan, changes are implemented slowly with long time perspective and company leaders have strong authority and employees listen to leaders and agree. People follow leaders faithfully and not necessarily participate in planning. As of in United States, changes happen rapidly and people are more individuals with own perspectives and they need strong authority to push changes successfully forward. North European countries have many similarities to United States except that cooperation is downplayed in the USA comparing to countries like Sweden or Finland. Cultural peculiarities need to be recognized by managers and set to correct organization change context in order to achieve target state for organization. [17]

Personnel experience self-doubt during changes. In an organization that is changing, learning is needed about new processes and procedures. People might wonder what will happen if they make a mistake or if they become less effective in their jobs. Feeling less effective could often be resolved with adequate training and providing improved performance metrics. Organizations should also celebrate change related successes whenever available. Senior leaders should also be participating as their sincere acknowledgement could have strong influence on sense of ownership and therefore employee motivation. But when negative attitude is experienced towards new tasks, necessary actions need to be taken so that attitude does not spread and affect team spirit. [13][16, pp.11-14]

It should be realized that organizational changes often mean increasing workload for individuals. The increased workload might cause stress and also feeling unable to participate to the change. [16]

Visible accountability is needed for changes to be more than partially successful. Organizations should find a way to foster visible accountability which will turn into

learning from various experiences. Learning is critical part of accountability. While it might be easy to analyze the problem in detail and find out who participated to the failed task, we should alternatively ask how we contributed to the problem. The conversation should be changed from blaming each other to finding places of improvement. “Why”, is a powerful word to ask repeatedly in these situations to learn and adjust behavior as organization evolves. [16, pp.75-76]

Personnel seeking for stability might interfere or delay organizational change. In those cases, the risks of consequences if not changing should be proven and shown to be higher than the risk of changing. [13]

Information sharing routinely and training can prevent the mentioned affects. The information source can be a general talk, newsletter, email or learn session. It is also good to give multiple sources of information and several chances to ask questions. Sometimes leaders planning a change forget that even if the change seems minor to person making plans, it may be major for the person responsible of the result. [16, p.12]

It is beneficial to plan the change in the short term as well as in the long term. People might adapt new roles and job descriptions in short a period but after the change is made, if a real cultural change inside the organization has not happened, any changes could be lost over time. [18]

3.3 Planning

Planning is essential part of completing changes within the organization. Three important plans should be prepared for IT service management project. First the project plan should always exist to clarify, define and track the progress of the project. Secondly organizational change plan is an input to project plan. Thirdly vital for succeeding is the communication plan which is an input to both project plan and organizational change plan. [16, p.83]

Organizational change plan can be a short and simplified plan but might take time to set it up. The first step is to determine the desired state that should be achieved. It is important to analyze how to move from current state to the desired state. There are analyzing methods for this, one of them being gap analysis. Gap analysis can be a simple five column table describing areas to explore. Key areas in the table are: objectives associated with the change, the desired state, the gaps between current and desired states, tasks needed to move from current state to desired state and also measurement of success. [16, p.84]

Creating the organizational change plan requires attention to scope of the change. If only one ITIL process is being implemented, the organizational change plan is simple and fast to complete. When a bigger part of ITIL is being implemented, the organizational change has to be considered for every process individually. [16, p.84]

Communication plan emphasizes the importance of all the communication needed to reach planned targets according to organizational change plan. The whole project team is best to get involved in communication planning to make sure that all are working

towards the same targets. The communication cannot be focused on pushing information on affected parties. Information availability is needed to consider as well so that affected parties can reach information whenever it is needed. For information to be shared effectively during the project, it is preferable to deliver information to affected parties in different states of the project. Many changes might occur at the same time and information flow can be overwhelming. Options should be provided to individuals to access information when it is necessary and suitable for them. [16, p.88]

Audience and their special requirements for information need to be considered at the very beginning. In ITIL implementation the audience might be a long list of individuals with different roles in processes. Wider perspective for audience consideration and transparency lead to better success than trying to minimize the group to whom different information is provided. Minimizing might be experienced as withholding of information. Communication plan is created to a project benefits for affected parties, key message and information channels are well planned. Communication plan can then be added to project plan for execution. [16, p.89]

When information flow for different audience is planned, the next task is to determine how each employee's job is impacted. Work management's communication needs are very different than the employee who is completing individual job task. Also management might need different communication frequency than the person handling process activities day by day. Most likely several different methods are needed when changes are communicated. For some just a report email might be sufficient but for some a combination of email, face-to-face meeting and informative Intranet webpage are all necessary. All is depending on the key message being delivered. With key message the timing of communication is planned to make sure that audience is engaged the right time taking project plan into account. [16, pp. 90-93]

Any relevant change communication is sensible to handle by the project team. Senior leaders can be used for in case of emphasizing the importance of the message even though they might not be engaged to day-to-day activities. [16, p.93]

Communication plan should contain description how the effectiveness is measured. All the communication items might not be necessary to measure but at least intervals of measurement should be planned. Adjustments can be made according to these measurement results. Measurement results should help to improve results when a project is progressing and when planning future projects. [16, p.93][13, pp.228-231]

4 ITIL SERVICE LIFECYCLE

Information Technology Infrastructure Library, ITIL for short, is the most recognized best practice framework for IT Service management (ITSM). ITIL provides a holistic set of tools for service providers to plan and implement their processes, functions and supporting activities successfully. ITIL is not a standard but it can be used to create significant value to the service provider and its customers.

The core of ITIL publications is the IT services' lifecycle, shown in Figure 4.1. The lifecycle's origin is in the service strategy. Starting from Service strategy the next stages follow the cycle in order of service design, service transition, service operation and continual service improvement. The different stages in the lifecycle provide inputs and interfaces to each other. Even though service is in live operation, aka service operation phase, it doesn't mean that inputs are unnecessary from other service lifecycle stages. Business encounters changes which can affect service in any stage in service's lifecycle. [19]

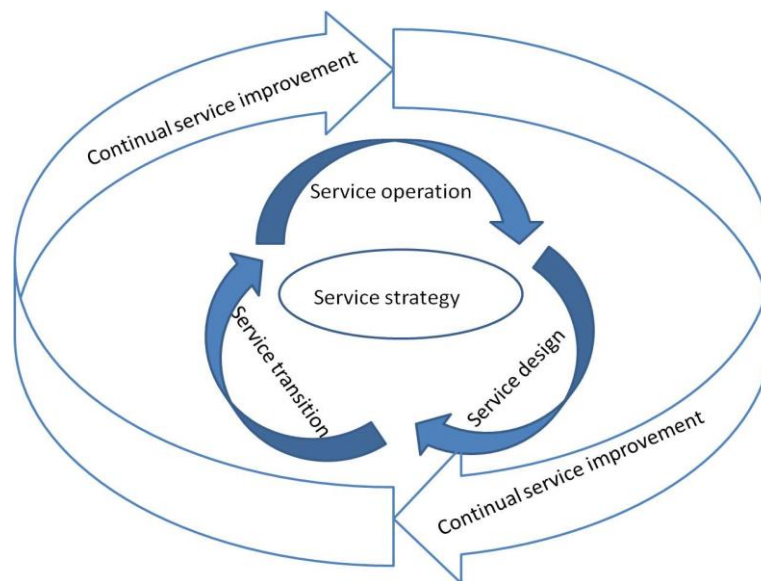


Figure 4.1. Service lifecycle. [19]

4.1 Service Strategy

Service Strategy is the starting point in Service's lifecycle. Organization needs to define capabilities and targets and compare them to customer requirements. With appropriate planning of resources (people, products and processes), value can be created to customer and at the same time opportunities can be prioritized. This all happens in line with cost and risk evaluations. [20]

At the core of service strategy, the Mintzberg's theory of four Ps can be used as a starting point. The four Ps are perspective, positions, plans and patterns [19, pp. 39-41]:

- Perspective is the vision and direction of the strategy. Perspective defines the business and how services or products are delivered to customers. Beliefs, values and purpose are all part of the context of perspective.
- Positions imply to the markets and how company is positioning itself to them. Every service provider has attributes and capabilities to use for specialization and gaining market share. The most important aspect is the distinctiveness customer is experiencing.
- Plans are the most concrete of the strategy forms presented. Plans describe the transition from current position to the target position. Organization might have several strategies for different business scenarios which lead to multiple strategy plans.
- Patterns, is describing the hierarchies, processes, collaboration and services that organization defines to achieve its objectives. Patterns are repeatable and ongoing.

ITIL Service strategy defines five distinctive key processes to create a framework for service ITIL Service Design stage. Processes are also used constantly in service's lifecycle but are key inputs for service design.

4.1.1 Strategy management for IT services

Strategy management defines parameters for assembling service portfolio. Service portfolio stores information about all the services and products organization is offering. Strategy management makes sure that customers' business requirements are understood and heard to make valid strategy decisions. [19, p.136]

Part of strategy management for IT services is to create strategic and tactical plans. Policies need to be in place for plans to be efficiently executed. Policies also define requirements how services should be designed, transitioned and operated. [19, p.166]

4.1.2 Service portfolio management

Service portfolio consists of three parts: service pipeline, service catalogue and retired services. Pipeline focuses on services under consideration or development. Service catalogue lists all services in live operation or under deployment. Retired services keep

list of services not used anymore. [19, pp. 172-173] Details about the service catalogue are provided in chapter 4.2 Service design.

The service portfolio management makes sure that all services are up to date in all stages of services lifecycle. Responsibilities include acting as a guard to check which services are allowed to service portfolio so that they create real business value. Business value can be compared to the investment for strategic considerations and decisions. [19, pp.170-171]

Service portfolio management presents up to date information about all the services and creates reports about them. Change proposals are managed in portfolio management but they will also need activities from change management process. [19, p.197]

4.1.3 Financial management for IT services

Budgeting, accounting and charging requirements are responsibilities of financial management. Financial management for IT services calculates and reports services value to organization. The information about current funding for designing, developing and delivering services is provided by the process. Values offered by financial management are tools for senior executives to plan strategies. [19, pp.200-202]

4.1.4 Demand management

Customer's current requirements need understanding. Effectively working organization can also influence to customers' requirements. Additionally, understanding anticipated demand, all three aspects are the basic purpose of demand management. [19, pp.244-245]

Demand management can use pattern analysis for understanding different user profiles and current and future demand of customers. Working with capacity management the adequate resources are ensured. Excessive capacity increases costs to business and inadequate capacity will potentially lead to losing customers. [19, p.245]

4.1.5 Business relationship management

Business relationship management focuses on two aspects between customer and the service provider. Firstly, the process ensures that cooperative relationship is created between service provider and the customer to understand customer's business needs. Secondly business relationship management makes sure that customer's requirements can be filled now and in the future through changing business environment. [19, p.256]

Major outputs from the process are the defined business outcomes, customer portfolio, service requirements, customer satisfaction analyses and reports about performance experienced by customers. [19, p.278]

4.2 Service Design

Service design stage in service's lifecycle should be considered as a holistic operation. In that way all service design areas can be considered to ensure full integration across the entire IT technology. [21, p.36] Service design takes outputs from service strategy. The designed solution should be consistent with company's strategy.

Design activities are triggered by new or changed business requirements. Service design takes the business requirements and uses five major design aspects to create services and their supporting practices. Five service design aspects are:

1. Service solutions for new or changed services
2. Management information systems and tools
3. Technology architectures and management systems
4. The required processes
5. Measurement methods and metrics

Core design aspect is the service solutions for new or changed service. Service solutions are extracted from service portfolio and analyzed to make sure that service is in line with other existing services. The management information systems and tools as well as technology architectures and management systems need to be reviewed before new or changed service can be introduced to live environment. They must be capable to support, operate and maintain the new or changed service. The processes need to be reviewed so that roles, responsibilities and skills are in necessary level to support, operate and maintain the new or changed service. Finally proper measurement methods and metrics need to be in place to provide needed data in live environment.

There are eight key processes supporting service design which are introduced in the following sub-chapters. Figure 4.1 shows the eight key processes in ITIL Service Design as well as how it interfaces with next lifecycle phase, Service Transition.

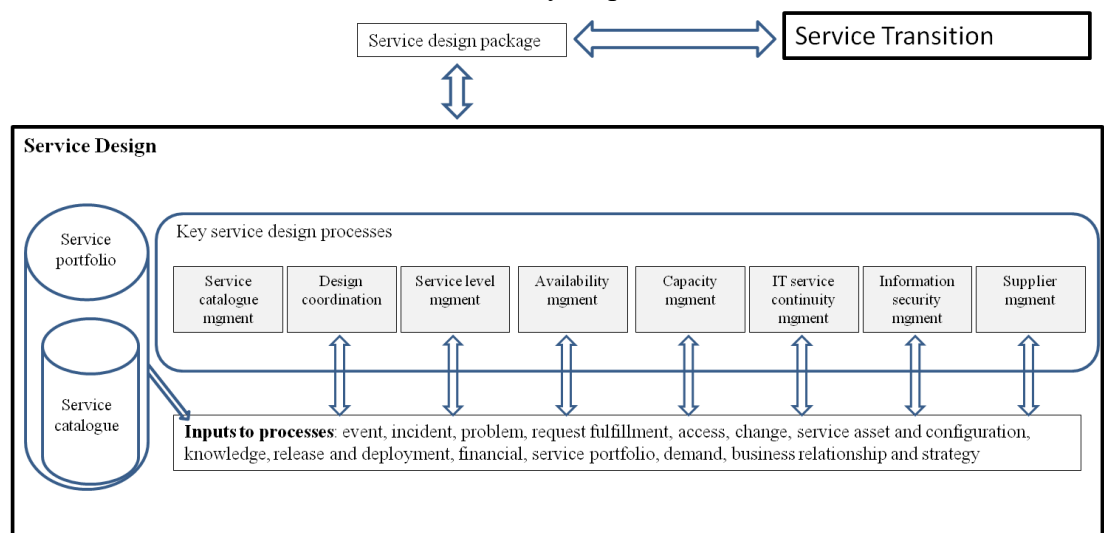


Figure 4.1. Service Design processes and connection to Service Transition. [21, p.85]

All the inputs are considered and referenced automatically in service design key processes. Service design package is the main deliverable of service design and is handed

over to service transition phase. The key Service Design processes are service catalogue management, service design coordination, service level management, availability management, capacity management, IT service continuity management, information security management and supplier management. The key processes are next introduced individually in chapters 4.2.1-4.2.8. SDP is produced for each new service, major change or even service removal. SDP is then handed over to service transition phase to prepare for operational environment. [21, pp.85-86]

4.2.1 Service Design Coordination

Design coordination process ensures that shared goals and objectives are in place to coordinate all in a single point. All design activities on new or changed service that are transferred to service transition stage and to live environment (or retirement), are part of service design coordination. Small changes can have so little affect that service design coordination process or individuals actions are not even needed. Usually design coordination process is needed when the change is major but if found beneficial, also small changes can be part of the process. Service design coordination aims to end results where there is more effective changes and fewer disruptions to business operations. [21, p.86]

4.2.2 Service Catalogue Management

Service catalogue is a source of information, in most cases a database. The service catalogue consists of structured documents, the only documents from service portfolio that are also published for customers. Deliverables, prices, contact points, ordering and request process, are included to service catalogue. [21, p.98]

The service catalogue management process maintains accurate service catalogue. Service catalogue holds details about services in live environment or services that are being transitioned to live. It also makes sure that all information is widely available to those authorized to access it. [21, pp.97-99]

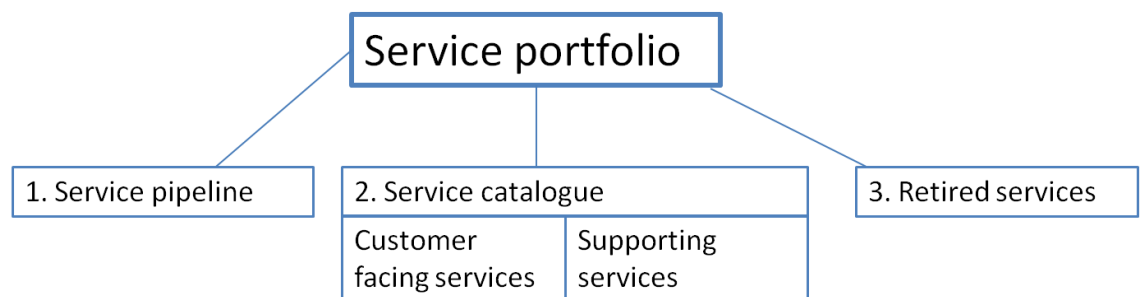


Figure 4.2. Categories of service portfolio. [21, p.24]

Figure 4.2 illustrates how service catalogue is a part of service portfolio. Service portfolio holds the complete set of services for their whole lifecycle. Service pipeline is a database or document listing services that are developed or under consideration.

Investment possibilities that need to be analyzed are in service pipeline. Services in pipeline are not yet available for customers. [21, p.24] Service catalogue can be split into two sub-categories: Customer facing services and supporting services. Customer facing services are simply the IT services that support customer's business and are directly seen by customer as an outcome of acquired services from service provider. Supporting services are the IT services that are not seen by customer but are supporting customer facing services in the background. Third part of service portfolio, retired services, keeps list of retired services or phased out services which are not available for new customers, unless of special contracts. [21, p.99]

Service catalogue management process includes several activities. First the service definition needs to be established to make sure company agrees on what really is a service. There needs to be an interface between service portfolio and service catalogue to agree both contents. Service catalogue management both produces and maintains accurate service catalogue. Several other interfaces are set in service catalogue management so that service catalogue serves support teams, suppliers and service asset and configuration management. [21, p.103]

4.2.3 Service level management

Service level management (SLM) is a cycle of actions that repeatedly follow each other. These actions are negotiating, agreeing, monitoring, reporting and reviewing. This all aims to ensure that all current and planned services are delivered as set on targets. Service level targets and responsibilities are placed in Service level management's outputs Service level agreement (SLA) and Service level requirements (SLR). SLA sets targets for every operational service which are reported to customer, SLR for each presented new or changed service and OLA for every internal support team. SLM is responsible for designing and creating document templates for SLAs, SLRs, operational level agreements (OLAs). Also underpinning contracts with third party suppliers are under SLM's responsibility.

SLM is very dependent on the accuracy of service portfolio and service catalogue. When SLM process is working effectively any corrective actions can be instigated as soon as monitoring, measuring report or other SLM sub-process is showing ineffectiveness or a problem. [21, p.106]

Service level management process is responsible of creating Service improvement plan (SIP), a plan which describes actions and priorities to all improvements. In SIP, also the impacts and risks are evaluated. Adjacent to SIP, there is a service quality plan for overall improvement of service quality. Improvement opportunities should be identified in SLM activities. All these activities aim to reach higher customer satisfaction.

SLR negotiations, documenting and agreements are one of the key activities of SLM. SLR documents influence in time directly to customer SLA's. Already operational services are monitored, measured and reported against SLA targets. [21, p.109]

Cooperating with business relationship management allows logging acknowledgements and finding negative service quality. SLM process provides information to assist better service performance. [21, p.109]

Service level management provides reliable and trusted communication channels between customers and business representatives. It supplies agreed service targets to business and has the information to make sure targets are met. [22, p.61]

4.2.4 Availability management

In modern IT service management, service level targets and availability should be agreed internally and with the customer. Targets should be achieved as cost-effective as possible and in a timely manner. For that to be possible, availability management is necessary. Availability management defines, analyses, plans, measures and improves all areas of availability in IT services. [21, p.125] Business needs to be translated into service requirements. [22, p.70]

Availability management monitors, measures and analyzes results. End deliveries, reports, combine five aspects:

1. Availability. Services', components' or configuration item's (CI) ability to perform any needed function in a given time. If function can't be performed, it's considered down time. The availability or down time is usually measured as a percentage.
2. Reliability. The time service, component or CI can perform its functions without interruptions.
3. Maintainability. Measuring how quickly a service, component or CI can be restored to working status after a failure.
4. Serviceability. Third-party supplier's ability to meet the terms of its contract. Contract should include availability, reliability and maintainability.
5. Vital business function (VBF). Process that is identified to be critical to the success of the business. VBF should be identified so that resources and attention can be pointed to correct directions. [21, pp.128-129]

Two key elements are associated with availability management: reactive activities and proactive activities. Reactive activities consist of monitoring, measuring, analyzing and managing incidents, problems that are involved in service unavailability. Proactive is aiming to plan, design and improve availability of service. [21, p.126] Proactive activities guarantee agreed levels of availability to new and or changed services. These can be recommendations, plans and documents on design guidelines and criteria.

Availability management provides several different analysis methods:

- Unavailability analysis. Investigation of all events and incidents causing service outages.
- Service failure analysis. The cause of service outages.
- With identified VBFs, functions need to be designed to ensure availability and recovery.

- Component failure impact analysis (CFIA). Evaluating component failure impact on service.
- Single point of failure (SPOF). All SPOFs need to be identified with cost-effective counter measures designed.
- Fault tree analysis (FTA). Analyzing chain of events that can lead to service unavailability.

Availability management has several outputs, for example Availability Management Information System (AMIS), availability plan for proactive improvements, service availability, reliability and maintainability reports against targets, the planned maintenance schedules and improvements included to the SIP. [21, p.154]

Availability management also interfaces with many other processes in ITIL. Service level management process relies on availability management to provide information about targets and investigate any breaches occurring. Incident and problem management processes are assisted by availability management in the resolution where applicable. Capacity management is providing capacity so that resilience and overall service availability can be achieved. Change management process might require service outage which in turn affects availability. IT service continuity management is dealing extraordinary interruptions of service, whereas availability management is focusing on normal business operation. Information security management defines security measures and policies that are included in the service design for availability. [21, p.155]

4.2.5 Capacity management

Capacity should already be planned in design stage to avoid time and resource consuming problems in later stages of services lifecycle, such as service operation. Capacity management covers all resources related to delivering service, with also plans for short-, medium and long-term business requirements. Capacity management also covers both hardware and software capacities with all components and environments in mind. The lack of human resources can lead to SLA or OLA breaches and in that sense capacity management activities can be applied to human side as well. [21, pp.157-158]

Sub-processes of Capacity management include business capacity management, service capacity management and component capacity management. Business capacity is related to understanding future business requirements for new or changed services. Necessary capacity is acquired as planned and in a timely manner. The main source of information should be the analysis of business patterns, demand management. Business management is assisting SLM process so that customer's capacity and performance requirements are understood. Also created SLAs have performance requirement to which capacity management can provide feedback. Capacity management makes hardware and software recommendations for designing new or changed services. Service capacity management identifies IT services' use of resources, including patterns, peaks and throughputs to make sure services meet their SLAs. Component capacity management

focuses on individual components to identify and understand the performance, capacity and utilization. [21, pp.161-166]

Capacity management process is initiated by any trigger that relates to capacity. Trigger can be for example a new or changed service that needs capacity considerations, capacity related service breach, exception report or periodic revision of current capacity. Trending and modeling are applied to point out capacity issues. The revision of service designs and strategies, SLAs, OLAs or contracts could also trigger capacity management. [21, p.174]

The capacity management should provide many outputs used by other processes. Capacity related documents are usually electronic reports held in different databases. The goal should be to maintain only one place for these documents. Most important collection is Capacity management information system (CMIS) which holds all monitored data from service and component capacity management. All this information can be used by business capacity management. Also important output of capacity management is a capacity plan. The current usage of service and components are stored in capacity plan to help senior executives planning for future capacity. Other outputs from capacity management are service performance information to help analyzing needs for new components. Workload analysis and reports help to schedule effective use of resources. Ad hoc capacity and performance reports give valuable information about any service or performance issues in real time. Forecast and prediction reports provide information about possible business and IT scenarios. Alerts and events provide information about current statistics or issues. The final output of capacity management is the improvement actions that are included in Service improvement plan. [21, p.175]

4.2.6 IT Service continuity management

Technology is a vital part of most business processes and any disaster affecting to the technology being used, could have critical impact on the survival of the business. For that reason there needs to be plan for these situations, introduced in IT service continuity management (ITSCM). This process is about risk reduction measures and recovery options. [21, p.179]

ITSCM support Business continuity management process by assuring that minimal service level can be offered. The ITSCM process includes the following:

- Business impact analysis (BIA)
- Risk assessment and management
- ITSCM strategy and plan
- Testing of the plans
- Ongoing operation and maintenance of the plans

Business impact analysis quantifies losses to business in case of disaster and all risks related to this are identified and the likelihood is calculated. Following the BIA, ITSCM strategy and plan can be created which is integrated to Business continuity

management (BCM) strategy. All plans need also to be tested, validated and updated periodically. [21, p.180]

4.2.7 Information security management

Information security management (ISM) provides framework for security objectives and the means to reach them. It makes sure that security risks related to information are managed appropriately. [21, p.196] ISM needs to be aware of the whole IT and business environment. Environment consists of business security policy and plans, current and future business operation and security needs, legal needs and obligations in regard of information security in SLAs. [21, p.197]

Information security management creates overall information security management policy and related security policies. ISM is responsible of security controls, security audits and reports, security tests and schedules. All security breaches and incidents are analyzed in ISM. Also security policies affecting suppliers and partners are managed by ISM. [21, p.204]

Successful information security policy requires efficient service management processes and effective interfaces with them. For example, SLM needs input from ISM to determine any security requirements and to investigate any service and component security breaches. Access management applies rules and policies received from ISM, all included in service design by availability management. ISM assists change management to see whether the change has impact on security. Incident and problem management processes involve ISM to provide security analysis in resolutions and to possible fixes. Also ITSCM collaborates with ISM because security is a major aspect in continuity and recovery issues. Availability management relies on ISM for information to be available and with proper integrity. Capacity management applies new components to business environment and the security aspects might need to be analyzed. Supplier management also has interface with ISM to provide necessary access to supplier with any security policies and conditions written to contracts. Finally, financial management provides necessary funds to information security management. [21, pp.204-205]

4.2.8 Supplier management

Supplier is a third party delivering services or goods that are necessary to provide IT services. Supplier can be a software or hardware vendor, other IT service provider or outsourced service provider. [22, p.82] Supplier management activities should be consistent with supplier strategy that is part of Service strategy stage of service's lifecycle. [21, p.209]

Supplier management aims to get value for money from suppliers with the same time ensuring that contracts are aligned with business requirements set in SLRs and SLAs. Supplier relations need managing to keep service delivering effective. Managing means periodical contract negotiations and for example SLA measurement. [21, pp.207-208]

Several supplier management activities need to be in place for successful supplier performance. Contract requirements need to be designed with plans to evaluate them periodically. Changing business environment can initiate new contract negotiations. [21, pp.212-213]

Suppliers need to be categorized based on importance to organization's business. Categorization is designed in ITIL based on analyzed risk and impact using the supplier and also calculating the value and importance the supplier has to the business. Based on the category, the time and effort managing the supplier can be determined. Supplier and contract management information system (SCMIS) holds data about suppliers and related contracts. SCMIS needs to be updated regularly and all data should be saved during service transition phase. [21, pp.212-216]

Suppliers should be chosen based on well-defined criteria. A comparative analysis can be used in the process of choosing suppliers. ITIL defines recommendations which can be used as a starting point creating demands and processes for supplier. First the requirements need defining which are in line with strategy and company policies. Based on the requirements the business preparations and example business case can be done. Secondly the suppliers can be chosen based on which are the closest match to set requirements. Thirdly the performance of the supplier can be managed and contracts updated. Fourthly categorization of suppliers is important so that resources are used properly to correct strategically important suppliers. Last the end requests need defining and specifications need to be set to contracts. [23]

Supplier's regular performance monitoring, reporting and reviewing are needed to further improve supplier's performance. Monitoring could point out occurring failures, problems and the need to changes. Supplier reviews should happen regularly and in line with the categorization. [21, pp.212-213]

Supplier management process produces important information and reports that other processes and departments in organization can use. Addition to SCMIS, reports about supplier performance, contract reviews and supplier surveys can give valuable information. [21, p.223]

4.3 Service Transition

Service transition takes service design package as an input from service design phase. The main objective is to make sure that new or changed services meet expectations and requirements that service strategy and service design stage have set out. Service transition handles also retirement of services. [24]

All the main processes in service transition are introduced in this chapter. Processes address necessary activities all the way from planning and support, service asset and configuration, release and deployment to service validation and testing. Additionally change management requires change evaluation that is involved in many phases of service transition. All the way in service transition data, information and knowledge is extracted

from people, systems and processes and for that service transition is completed with knowledge management process. [24]

4.3.1 Transition planning and support

Planning and coordination of resources is completed as transition planning and support processes' activities. The main activity is to define strategy, budget and policies for service transition with necessary responsibilities and roles in place. Transition planning and support checks that inputs from service design (SDP) are ready for deployment and request for changes if needed. Also progress of transition is monitored with support, advice and administration provided, where needed. [24, p.91]

When all parties are operating in the framework of set processes, transition planning and support can make sure that processes and supporting systems are re-usable and standardized. [24, p.90]

4.3.2 Change management

The purpose of change management is to make sure that all changes are made with proper coordination and control. Changes need to be recorded, evaluated, authorized, prioritized, planned, tested and implemented with necessary documentation. [24, p.92] Changes are implemented through single point in organization which should reduce the conflicting changes as much as possible. Potential conflicts are analyzed by human and therefore the bigger the organization, the more prone to errors in the process. [25] There are three types of changes: standard change, emergency change and normal change. Standard change is defined to be a common change, pre-authorized and has low risk. Emergency change is one that has to be implemented as soon as possible to ensure or restore normal service operation. Normal change is one that is not standard or emergency change. [22, p.65]

Change should also be categorized as major, significant or minor. Specific category is chosen based on the risks that are involved with change and the level of costs. [24, p.65] Risk assessment is usually made by human with intuition. In large scale organizations comprehensive and standardized RFC records help to compare proposed RFC to already completed ones. [26]

Normal process of change management is simplified to table 4.1. Throughout all of the procedures, information is gathered and saved to Service knowledge management system (SKMS) and recorded to Configuration management system (CMS).

Table 4.1 Normal procedure of change management.

Activity	Procedure
Create Request for change (RFC)	Created by initiator, logging starts.

Review RFC	Information reviewed to see change if impractical or repeating RFC.
Assess and evaluate change	Risks and benefits are analyzed, proper authorization received and priorities set up. Also plans and schedule created.
Authorizing build and test	Formal authorization.
Coordinating change build and test	Overseeing to ensure all changes are tested. If part of a release, coordination handed over to release and deployment management process.
Authorizing change deployment	Design, build and test evaluated, results passed to change authority to formal authorize. Change can be returned for iterative designing or new deployment scheduling.
Coordinating change deployment	Oversee that change deployed as scheduled and remediation procedure is in place. Shared activity with release and deployment process.
Review and close change record	Evaluation that changes performance is acceptable with no significant risks found. Initiator and stakeholder agree success. Change is reviewed after some time.

If change is not standard, authorization is likely needed from change authority. Change authority can be Change Advisory Board (CAB) or Emergency CAB (ECAB) or other change authority such as the service owner in some cases. The change authority needs to consider many elements, such as the impact the change might have on customer's business, related changes, effect on service's infrastructure or customer service, impact on other services, effect if the change is not made and additional resources needed. CAB is also there for assisting change management in prioritization, assessment and scheduling. CAB can potentially consist of customer(s), user manager(s), representatives, business relationship managers, service owners, specialists and consultants, contractors and service operations staff. The CAB can be in different form depending on the change and who are the stakeholders. [24, pp.80-81]

There are four basic changes that could trigger the change management process. Firstly, strategic changes when service strategies need a change to achieve set targets and in same time minimize costs and risks. Strategic changes could be initiated because of organizational change, legal change, policy or standard change, business analysis results, update to service or customer portfolio or technology innovation. Secondly changes to one or more services will be handled by change management. These triggers include service catalogue and package, release package, capacity and resource requirements, warranties, organizational design and measurement system to name few examples. Thirdly operational change. Operational change here implies to corrective and preventative changes via normal change management process. Fourthly change to deliver continual improvement can be initiated by CSI. [24, pp.84-85]

Change management processes outputs include besides the actual change, also many records which can be later reviewed. Process outputs are:

- Rejected and cancelled RFCs
- Authorized changes and change proposals
- Change to the services or infrastructure
- New, changed or removed CIs
- Revised change schedule
- Revised Projected service outage
- Authorized change plans
- Change decisions and actions, documents and records
- Change management records [24, p.85]

Many challenges and risks are involved in change management process and the effectiveness of it. The process needs to be seen in the company as a way to facilitate change, rather than introducing delays, bureaucracy and time wasting. [24, p.89]

4.3.3 Service asset and configuration management

Service asset and configuration management (SACM) aims to manage and coordinate all assets that are vital for organization's success. Service asset that need managing are configuration items (CI). By basic rule if a service asset can't be managed individually, it is not a CI. A server is an asset and a CI but for example knowledge used by service desk person to handle an incident is an asset but not a CI. Service asset and configuration management (SACM) is active during the whole lifecycle of a CI. [24, pp.90-92]

Configuration management system (CMS) is responsible of holding all information about CI's and their relations. CMS can also hold information about incidents, problems, known errors, changes and releases that are related to specific service component. [24, pp.92-94]

SACM is responsible of new and updated configuration record, up to date asset information and information about relations between CIs. Relationships of specific CIs are particularly important for many service management processes status reports, configuration information reports and audit reports that are also created by service asset and configuration management. [24, p.112]

4.3.4 Release and deployment management

The main purpose of release and deployment process is to deliver a release to live environment with all specified features designed in SDP available. Proper testing is verified but actual testing is carried out in service validation and testing process. In different stages of release deployment, changes might be needed which requires change management process' authority and involvement. [24, p.115]

During release and deployment management related records are created and updated. CIs are transferred to live environment and CMS is updated accordingly. Related information examples are:

- New, changed or removed CIs
- Relationships of test cases to requirements
- Status updates of the CI
- Ownership changes of a certain CI
- License holding

Other information is recorded in a wider context. That information is saved to SKMS. Information consists of plans: installation and build, validation, test and delivery. Also deployment information is stored, such as access levels and rules and known errors. In this context known errors are identified during the process but were accepted as minor enough for live environment. [24, pp.147-148]

The main outputs of release and deployment management are new, changed or retired services. Addition to that, many reports and other updates are created. For example, new services need release and deployment plan which is created within the process. When new live services are created, management documentation of those services should be produced. SLAs, related OLAs and contracts might need updating during the process lifecycle. [24, p.147]

4.3.5 Service validation and testing

Quality assurance is the main reason and purpose for service validation and testing. Testing is a vital area of service management. Insufficient testing can lead to incidents related to failures in services and higher support requirements when service is not functioning as expected. Testing insufficiencies lead to higher costs. [24, p.150]

The main source of information to service validation and testing is the service design package. SDP defines service requirements including utility and warranty, service provider interfaces with processes, operation models including support, escalation and critical issues handling processes. SDP also introduces boundaries for capacity and resources, cost models, test conditions and expected results, release and deployment plans and acceptance criteria for the testing. [24, pp.171-172]

The output of service validation and testing is the main input of change evaluation process. Output includes information about tests that were carried out with information about constraints set and encountered. Additionally test results are analyzed and presented. The test results can be compared to expected results. Also after some time of service usage the service's capabilities are analyzed to see whether actual performance is in line with predicted performance. If performance is as it was predicted to be, an evaluation report will be sent to change management for service promoting to normal operational use. [24, p.172]

Also other information is received as a process output. Errors, incidents and problems are recorded with workarounds from testing. Information is updated to knowledge management system. Testing might also point out improvement opportunities for the process or documentation. These are saved to CSI register.

Noteworthy pointing out that testing does not give guarantees of the service's quality but provides measured degree of confidence about the service. Required confidence depends on business requirements. [24, p.151]

4.3.6 Change evaluation

Change evaluation process provides valuable information to change management process. The changes performance is compared to the predicted performance. Change evaluation is a catalyst to change management to work effectively in decision making. [24, p.175]

Change management works as a trigger for change evaluation process and will provide RFC as an input. Other inputs are SDP from service design and test plan with results from service validation and testing. When the change management goes forward, another interim evaluation report is requested as the actual performance needs evaluation. At this point risks are analyzed and performance can be compared to acceptance criteria. The evaluation report can reject changes and it's up to change management to decide next steps, if any. [24, pp.177-178]

The change evaluation process provides help to change management process in decision making. Help is provided with interim evaluation reports to compare predicted performance to customer requirements. With evaluation report comparison necessary constraints, test results and risks to achieved benefits can be done. [24, p.180]

4.3.7 Knowledge management

In ITIL publication, the knowledge management is introduced several times. That is because the knowledge management is present actively during service's whole lifecycle. The main purpose is to provide current data, information and knowledge to the people that need it and when they need. Information needs to be provided through secure channels. Relevant knowledge is also essential to service transition phase to successfully deliver services to live environment. [24, p.182]

A proper knowledge-sharing should be valued across the company. Service provider is encouraged to establish service knowledge management system (SKMS). Efficient SKMS will reduce costs of maintaining and managing services. Some examples of the many triggers knowledge management have are updates to service catalogue, service portfolio or SDP, creation of new and updated capacity plan or any updates to the CSI register. [24, pp.192-193]

Service operation and transition staff are particularly important in capturing information from usage across the IT service provider. Incident management is a service operation activity, carried out on first and second level support. Incident management process collects much of the service management data. This data needs be turned into widely re-usable knowledge. Transition staff encounters relevant data all the way in service lifecycle and they need to be aware of this to collect information to help out subsequent transitions. [24, p.193]

4.4 Service Operation

Service operations' main responsibility is to coordinate, deliver and manage services. Also the technology that is used to deliver services is under service operations management. Effective processes is key for service operation to be successful and supporting tools must provide overall view of the services.

4.4.1 Event management

Event is an abnormal change of state which has an effect to IT service or configuration item (CI). Events are discovered when notification is created by IT service, CI or monitoring tool. [27, p.58] Event management is normally the entry point for many processes and can be the basis to automate routine operations. [22, p.125]

Service operation is depending on knowing the status of infrastructure and service. Event management is needed to detect changes which are relevant to management of IT service or CI. When any changes are detected, the appropriate actions can be taken and operating performance can be compared to defined standards and agreed SLAs with customers. [27, p.58]

There are three types of events: informational events, warning events and exception events. Informational event is reporting something about the service, for example that a scheduled task is completed. Informational events don't typically require further actions. Warning event tries to be preventive and could report that specified transaction exceeded its threshold. Warning events report that closer monitoring might be necessary. Exception events report that unusual situation has already happened and necessary analysis and investigation is needed. [27, pp.60-66]

Event monitoring should be adjusted to particular organization's needs. Monitoring is based on event thresholds that trigger warnings. Analyzing the warnings might provide insight to events that need more attention. These analyzes might be something like ratio of events compared to number of incidents, number and percentage of events that needed actions from the personnel, number or percentage of incidents solved without any impact on business, number of events that triggered incidents or change or number of events that were caused by existing problems. [27, pp.71-72]

It is important for successful service management that new services are designed with event management capabilities and limitations in mind. Event management should be well integrated with other service management processes. [22, p.125]

4.4.2 Incident management

Incident management process handles unplanned IT service interruptions, reduction to service quality and CI failures. Incident management covers the whole lifecycle of incidents. Incidents can be recognized by technical staff, by monitoring tools, event management or reports from service user to service desk The purpose of incident management's is to restore normal operation state as quickly as possible and minimize

any affect the incident might have on production environment. [27, pp.72-73] Incident management as a process is more reactive than proactive by nature. [28, p. 57]

Incident management should ensure that standard process is activated in case of an incident. Main focus is to get each incident prioritized according to urgency and impact. All the incident related events should be detected and logged as well as compared to known problems. [28, p. 57] Standard objectives are also to increase incident's visibility across the business and support personnel.

Incident management process should be developed with some important basic aspects in mind. Timescales should be agreed so that with particular priority level and SLA, the incident is escalated based on set rules. Standard incident models are many times efficient to use as incidents are rarely new. Incident model might include necessary steps to use for handling, responsibilities that define tasks, precautions such as making backups, timescales defining completion of tasks and escalation rules that define who should be contacted and when. [27, pp.74-75] Major incidents should be taken into consideration in incident management process.

Major incidents have different rules like shorter timescales and greater urgency. A definition of a major incident needs to be determined and agreed so that a separate major incident procedure can be applied. It's important to recognize if the cause of incident, a potential problem, should be investigated at the same time which would mean that problem manager is involved as well. Still the service restoration and underlying cause should be kept separate. [27, p.75]

The following list provides relevant information that should be logged to each incident [28, p.76]: Unique reference

- Categorization
- Urgency
- Impact
- Prioritization
- Date/time
- Person initiating incident
- Notification method
- Involved user's information
- Call-back method
- Symptoms
- Incident status
- Related CI
- Allocated person(s)
- Related problem or known error
- Activities made to resolve
- Resolution time/date
- Closure category and time/date

Incident's information is important for historical reference and for incident handling so that other groups that might be involved in handling have all information available in one location. Solutions can also be faster achieved when incidents are categorized to groups and valid links to related problem or known error are recorded. [27, p.76]

Based on logged information in incidents, a measurement system can be established. Process managers can use data and measurement tooling to derive conclusions about effectiveness of incident management. Measurement system can display the data in a suitable level without specific details about all of the incidents. [29]

Successful ITIL incident management reduces downtimes and sustains service accessibility that has been promised to customers or agreed by contract in SLA. Effectively working incident management will improve customer satisfaction. [28, pp.57-58]

4.4.3 Request fulfillment

Many user demands are low-risk by nature, very frequent and therefore could be handled more effectively by a separate process, in ITIL it is request fulfillment. Organizations could use incident management with the risk of managing simple activities with too complex processes. Request fulfillment process needs to work efficiently so that user satisfaction can be maintained at a high level. [27, p.86-87]

Every organization needs to plan their request fulfillment process carefully with predefined process flow. The process starts from request initiated by service desk, RFC, web interface, phone call or email. In the beginning the request is analyzed to see whether incident management process should be used instead. Logging of the request has started and full information is recorded for future need of historical data. Logged data includes unique identifier, checked urgency, impact and priority of the services request, date/time recorded and description for the service request. The next step is to fulfill the request with proper activities and if standard process flow can be used, document it for future use. Information is stored to SKMS database. If any CIs are changed in the process, change management process is involved. After the request is fulfilled, it is closed with necessary financial management taken into consideration, meaning decision if the work is billable or not. [27, pp.90-94]

Request fulfillment process is a pretty straightforward by nature but the effectiveness is vital to reach high customer satisfaction. The process outputs include fulfilled service requests but also rerouted incidents, RFCs, CI updates and authorized/rejected service request and also cancelled and closed service requests. [27, p.94]

4.4.4 Problem management

Problems are the root cause of incidents. Problem management deals with problems during their whole time of existence. The objective of problem management is to prevent

any problem and the resulting incident from ever happening, remove any repeating incidents and minimizing any affects that incidents have. Problem management is important in order to keep quality of service at a high level and to ensure service availability. Effective problem management also reduces the number of incidents and the effort needed to resolve them. In all, efficient problem management can be very cost effective for organization. [27, p.97] [28, pp.146-147]

Problem management activities include analyzing the cause of an incident and to provide the resolution to them. Problem management also makes sure that any changes are made through coordinated change management process. It is important that problem management logs information, workarounds and resolutions for problems. That way number and impact of incidents can be reduced. Problem management has a strong link to known error database (KEDB). [27, p.97]

There are 10 important activities in problem management.

1. Problem detection. Reactive triggers include service desk's detection or technical support's analysis that incidents might be caused by a problem. Infrastructure faults might be detected automatically or supplier might inform about existing problem. Proactive triggers can be for example that a problem is raised after analyzing incidents after closure. Historical records and trends can show a pattern in incidents that would disappear if the underlying problem is solved.
2. Problem logging. Full history data and timestamps are necessary for suitable controlling and escalation. All details about actions and diagnostics made to recover service are included.
3. Problem categorization. Categorization should be made in the same way as in incident records.
4. Problem prioritization. Prioritization should be made in the same way as in incident management but with frequency and impact of related incidents considered. The severity is needed to consider from customer and service's perspective. Estimation of resources and time needed to fix should be provided.
5. Problem investigation and diagnosis. The root cause should be investigated using sufficient resources according to problem category and priority. Exact failure source is pointed and KEDB is used to see if the problem has existed before.
6. Workarounds. Workaround is a temporary fix for the problem. Logged workarounds can reduce the downtime when possible incident is seen caused by a known problem.
7. Raising a known error record. Known error is defined as a problem with workaround and documented root cause. Known error record is stored in KEDB and contains all actions taken to resolve the problem.
8. Problem resolution. Root cause to problem has been found and resolution has been developed. If functionality is changed in the process, a RFC has been created. There are cases where emergency RFC is applied. Sometimes in strictly businesses point of view the resolution is so expensive to apply that the problem record is left open with current details and workaround.

9. Problem closure. Final resolution is in place and problem is formally closed with all related open incidents. Full historical description is documented.
10. Major problem review. The review is about learning. Reviews can be used to train support personnel so that they can act as a source of proactive problem management. [27, pp.103-105]

There are many triggers to problem management and the majority of problem records are raised as a reaction to one or many incidents. Other triggers can be suppliers' notifications about faults and also found problems in testing. Proactive triggers to problems are trends and patterns found from incidents. [27, p.106]

There are many sources of information that problem management uses. Configuration management system (CMS) holds data about the IT infrastructure and the relationship between components. The CMS has data for problem diagnosis and evaluating impact of a particular problem. Known error database stores the knowledge of incidents and problems in the past and also the details how they were solved. Records in KEDB hold details and symptoms of the fault. Incident count is valuable for frequency evaluation. Information to KEDB is stored only by problem manager to avoid duplicate entries and also keep the database clean. Only one KEDB should exist whatever the size of the organization might have. The KEDB is used in the resolution process of incidents and problems. [27, pp.108-109]

4.4.5 Access management

Granting and revoking user rights is the purpose of access management. Access management also prevents non-authorized access and rejects user right requests. In most recent ITIL versions a link between event management and access management was established to highlight the event management's capabilities to discover unauthorized access attempts. [12] Access management is normally initiated by activities carried out in request fulfillment, mainly service request or RFC but also human resource request or application request. Access management is usually part of another process such as technical and application management. Single point of coordination is one the characteristics of access management. [27, pp.110-112]

Information security policies described in Service design phase strongly affect the flow of access management. The process outputs are provision of access but also the recording history records of granted and rejected access. [27, p.115]

4.5 Continual Service Improvement

Like all service lifecycle stages, also service improvement is a continual activity through the entire service lifecycle. Improving the service aims maximizing effectiveness and optimizing the cost for providing the service including the IT service management processes. [30, p.35]

4.5.1 The seven-step improvement process

Continual service improvement relies on the seven-step improvement process to find improvement opportunities using measurement and data gathering. [30]

Step 1, identify the strategy. First, the overall business plans and strategies with any policies and regulations need to be analyzed to decide measurement focus. The goal should not be technical improvements but the services improvement as a whole. [30, pp.50-51]

Step 2, define what to measure. Basically, critical success factors, key performance indicators and metrics are the three basic concepts used as a basis [29]. Strategic decisions have been made in step one, so it should be clear what will be measured. Business requirements and targets with service level requirements are also used to point correct direction. There are loads of measurable activities but organizations should focus on activities that matter the most. [30, pp.50-52]

Step 3, gather the data. Monitoring tools, manual procedures and activities are in place to gather needed data. Not only exceptions are interesting, also lower cost opportunities and better performance. Three metrics are needed to collect data: technology metrics (component and application), process metrics (service management) and service metrics (end-to-end service). [30, p.53]

Step 4, process the data. All gathered data need processing to convert it to suitable format for the audience. Data is processed into information using logical grouping. Processing will provide vital help to next stage which is actual analyzing. [30, pp.55-56]

Step 5, analyze the information and data. Objective is to transform the information to knowledge by comparing the information and data against any goals and requirements that were set for the service. Everything is compared to past information to also find trending or other peculiarities. [30, p.58]

Step 6, Present and use the information. At this point knowledge that was achieved from previous step should be presented to different audiences in a way that is helpful and clear. The group making strategic and tactical decisions needs analyses in understandable form. Reporting usually focuses on areas that are not doing well but also achievement should be visible as they are good for marketing purposes. [30, pp.60-61]

Step 7, implement improvement. In this step the knowledge should be in use to make needed decisions about improvements. Often several improvement opportunities are found but organizations can't afford it or the cost is simply too high compared to achievable improvement. Prioritizing is made for all improvements. Naturally service lifecycle continues after improvement implementation. Service strategy might be updated, service design has built the changes, service transition phase has implemented changes to production and service operation phase is monitoring the live operation. In every lifecycle phase, the continual service improvement cycle is actively seeking improvements. [30, pp.62-63]

5 IMPLEMENTING NEW ITSM SYSTEM

IT service provider companies implement and go through multiple major changes during their lifecycle. From service operations' perspective, customers' service experience should not deteriorate during or after changes but should actually improve. When service levels weaken, it generally has negative impact to company's reputation. New ITSM system implementation in Company X needed careful preparation and planning so that the expected results could be achieved in the long term.

5.1 Initial steps towards ServiceNow project

Different tools and service offerings in Europe and in the US have kept Global Company X fragmented. European operations' intranet, Confluence, is a separate instance even though US operations are using the same tool. European Operations have designed and implemented platform management console software in-house with embedded IT service management system tool. Operational data was collected to database but there were no real reporting capabilities in the tool. Over time the tool has become less scalable, outdated and insufficient for a global service management purposes. ITSM tool also continued to become slower when new features and capabilities were developed. With current and increasingly global customers' it became hard to meet customer's requirements.

After careful preparation, a global project was initiated to implement ServiceNow. Globally Company X was seeking many improvements to current tooling. Some of the improvements are listed here:

1. Achieve global tool for Service Level Management in all platforms, which offers visibility across the organization.
2. Build automatization features for tasks that are recurring and need manual actions.
3. Develop better internal and external reporting from Services, including events and alarms from Company X integration platforms.
4. Plan and build global process control and coordination, for example, in incident management, problem management and change management.
5. Build shared database for documenting, for example, service catalogue.
6. Enable easier, agile and faster implementation of new features to ITSM tooling based on requirements, which can be utilized globally.

5.2 ServiceNow schedule, planning and implementation

Director of Customer Support in Europe was both the driving force to get project funding and also later the project manager in ServiceNow global implementation project.

ServiceNow consulting firm was used to help design and implement complex additions on top of ServiceNow. Most of these important additions can be found from Table 5.1 below. Design decisions and in-house build features were coordinated by project manager.

Before ServiceNow global implementation project started, US Operations had been using ServiceNow Express version in some of their service management processes. ServiceNow Express version offers limited features and the abilities to make changes in the system are limited. ServiceNow Express is geared to smaller organizations where simple “out-of-the-box” ITIL type features are sufficient or when company’s budget for Service Management tool is limited. [31]

Company X management’s approval for ServiceNow Enterprise implementation project cost came early March 2016. The global project was initially planned to be completed in November 2016. During the nine month project period, all Company X integration platforms were be integrated to ServiceNow so that operations would be able to monitor all errors and alarms in ServiceNow. Project plan seemed very ambitious considering the need to migrate multiple integration platforms, the amount of complex logics needed and that 100-200 users needed to be trained to use the new system. Internal processes needed to support the new service management tool. Additionally several new ServiceNow features have high dependency level to each other which means that delay implementing one would likely cause delays in the next one. Many internal system integrations were assigned to Company X project personnel who have tightly scheduled customer projects to complete. Finally summer vacations in Europe generally can have significant impact on project progress at a critical time.

The schedule and preparation was technically driven for the most part. Information was shared infrequently when progress was made. Official announcement about ServiceNow implementation was given in bi-Monthly Townhall meeting 6 Months after the project plan was created. Townhall is generally used for sharing internal information from all departments when appropriate, announcing important news and also providing sales results to personnel. Only other official announcements were made when users were requested to close their unnecessary service requests from old service management system.

Part of sharing knowledge internally, small part of management users we given access by request to ServiceNow development environment to play around, see what was coming and try out features. However, there was no formal introduction to ServiceNow and specifically to development environment available for the users.

There had been a lot of conversations throughout the organization and it was common knowledge that ServiceNow was going to be implemented. From that perspective the official announcement was made too late and second hand information was already shared in unofficial forums. Also once information was announced, there was not much additional information sources available. Change importance was informed but due to not creating a communication plan, the information was not available in an efficient way.

The most important phases in initial project plan, planned implementation dates and actual realized dates are listed in Table 5.1. Delays in project delivery can be seen when looking at the planned and actual dates in the project schedule. Because of the dependencies, ServiceNow could not be introduced to any Company X's integration platform before all platform dependent features were ready. After ServiceNow Enterprise version update, transaction error handling module was delayed more than 6 Months. Transaction error handling module automatically impacted to all platforms' transaction error integrations. Therefore Company X's new platforms' transaction error integration was implemented with 6 Months after planned date and current EU platform 4 Months after planned date.

Service request invoicing also had dependent modules, such as separate OpenAir and NetSuite systems. These systems were dependent to each other and related integrations were completed close to each other, resulting 7-9 Months delay. European platforms' service management processes need the invoicing modules for example for change management invoicing and service request invoicing. Service request invoicing implementation delay postponed ServiceNow production implementation.

EU operations were planned to start using ServiceNow in full scale September 2016, right after summer vacations. Due to listed delays and many other organizational scheduling issues, the actual go-live date was 8th of May 2017 when all mandatory phases were completed. Since ServiceNow additions needed input from many departments, there was very little flexibility in the schedule. As a fast growing company, departments in Company X had increasing amount of scheduling issues and could not bend enough to ServiceNow implementation scheduling changes.

Some integration were also put on hold, for example the EU platform monitoring system because monitoring was still possible to handle in old ITSM. This resulted to activity where service desk needed to use old ITSM separately to monitoring activities.

Table 5.1 ServiceNow project plan schedule and actual.

Project phase	Planned	Actual
Project Schedule and plan	03/2016	03/2016
Project Start	03/2016	03/2016
Update to ServiceNow Enterprise version	04/2016	04/2016
General service request categories + subcategories	04/2016	04/2016
Transaction error handling module	05/2016	12/2016
Service request invoicing module	06/2016	03/2017
Transaction error integration, US platform 1	06/2016	01/2019
Transaction error integration, New platform	06/2016	12/2016
Service Level Management (SLAs)	06/2016	05/2016
Transaction error integration, US platform 2	08/2016	05/2018
NetSuite/OpenAir project/contract integration to ServiceNow	08/2016	03/2017
Service request invoicing integration ServiceNow to OpenAir	08/2016	03/2017
Service Level reporting integration (EU)	08/2016	03/2017

Transaction Error integration, EU platform	08/2016	12/2016
Monitoring system integrations to ServiceNow, EU platform	08/2016	Not done
Known error database and knowledge management	09/2016	12/2016
EU platform service request handling migration to ServiceNow	09/2016	05/2017
Problem management	10/2016	10/2017
Operational Level Agreement management features	10/2016	05/2016
Change management v.2.0	10/2016	Not done
Availability incident handling and customer crisis communications	11/2016	12/2017
Self-Service Portal SSO with G2	H1 / 2017	Not done

Some project phases listed in table 5.1 don't have a date in Actual column because the phase has not been completed due to various reasons. US platforms' transaction error integrations were postponed and put on hold although US operations were using ServiceNow to handle all service requests for the platforms. In two US platforms, monitoring was handled by setting up separate email notifications. Two high volume US platforms were integrated to ServiceNow 2-2,5 years later than originally planned. US operations were postponed to fully integrate ServiceNow in their processes. ServiceNow implementation was not prioritized high enough by senior management in US operations. Additionally US organization had no accountable person to push the ServiceNow changes into use.

ITIL compliant change management version 2.0 was planned to be completed also in 2016. Change management and coordination has gradually been moving to ServiceNow but there is no end date to implement v.2.0.

The final phase listed is the Self-Service Portal Single Sign-On (SSO). Global Company X offers several tools for customers so that they can view, edit and create own service requests and monitor own traffic in Company X's platforms but due to scheduling and internal priorities, there has not been efforts to complete the SSO phase. The phase was put on hold.

Trainings was needed for getting users ready for ServiceNow in Europe. US operations had introduced the ServiceNow Express version many Months ago, so they had basic knowledge. One person from European operation went through three day commercial ServiceNow administration course in January 2017. This course was to give enough information to develop internal user trainings, instructions and give overall perspective from the system. ServiceNow project manager was equipped with deep knowledge being worked with the system and project for more than a year already.

The trainings were initially planned to be two phased. First ServiceNow training would be held approximately 2-4 weeks before starting production use. Trainings were announced by sending open calendar invitations to users and writing details to Intranet. First ServiceNow training was planned to cover very basic service request handling activities, ServiceNow navigation, filtering data and searching from the system.

Important item in trainings was also to provide information sources and focal point for comments and questions. Channel for discussion in group communication tool called Slack was opened for this purpose. Plan was that people would share information about usage ad-hoc. Training was offered as a recorded video and a short user guide was made available in Intranet. Given that ServiceNow was not used in Europe in production at the time of trainings, the material was difficult to make accurate for European operations. All users were grouped together, which made all management and other personnel together in the same training session. It was apparent that management expected more information about reporting features and other high level additions which were not part of the planned trainings. Eventually the second planned ServiceNow training did not get proper priority and was cancelled.

The final step before starting to use ServiceNow was the transfer of needed service request data from the old system. Old ITSM was planned to stay accessible to search service request data. It was decided to transfer one Month worth of service request data to ServiceNow additionally to all the open service requests.

Old ITSM service request handling was switched off 8th of May 2017 and all EU operations were made active in ServiceNow after approximately 1 hour downtime in between.

5.3 Changes in Company X European services

European Support have multiple customers to service according to 24/7 SLA. SLA metrics and results are visible for customers in ServiceNow customer portal. SLA results are also reported monthly and internal reviews are completed based on the data to improve operations performance.

Considering daily work in Company X European operations, ServiceNow implementation was a major change, both to work according to applied ITIL framework processes and also to get personnel to use ServiceNow and its capabilities in full. For support, incident management is the most important ITIL process. High data volumes that customers transfer through different services, initiate thousands of incidents every Month.

Support personnel is recording their whole working time to ITSM system. In old ITSM, marking the time was totally manual and users were estimating their time in each step or work they did with service requests. The work that was not specifically for customer, was marked in separate service request that was created for this purpose. ServiceNow offers more accurate way to mark time. Time is marked similarly to service requests but the time is automatically calculated and only needs to be saved in the system. Additionally users are using internal tasks for work that is not specifically for customer. The non-customer work can be for example trainings, personal development and meetings. In this context ITSM plays an important role in global and local resource planning.

Before ServiceNow, all opened service requests were assigned and coordinated by single individual, called Customer supervisor. Customer supervisor role was always

selected in old ITSM and assignment happened automatically to this person. In ServiceNow, new service requests can be reviewed and assigned or updated by anyone. This provides more flexibility for the customer supervisor role but also needs more coordination to make sure there are no gaps in responsibilities. Plans need to make sure request fulfillment and especially incident management processes are following ITIL framework and the SLAs. ServiceNow has tools to easily change this type of supervisor's work distribution or create totally new process flows. During last phases of the project, the whole work coordination was in the table to be reviewed and improved. Company X's grown European operations had eventually caused some roles in support organization to have heavy work load. These roles were Customer supervisor, 24/7 Transaction error supervisor and Transaction error supervisor.

Customer supervisor received all service requests and customer specific platform alarms with the exception of 24/7 customer's transaction error incidents. In customer supervisor role person views the service requests, updates information, sets correct priority and depending on operational situation at any given time, someone else can take over the service request. Most of the time supervisor person has overwhelming job to keep up with new coming service requests without help from other members from the team. High priority service requests or incidents are typically not shared within the team. Same applies to 24/7 transaction error supervisor who receives all new transaction error incidents and even though incident volumes got much higher, still one person at a time is handling all incidents with little or no help from others from the team. It appears to be linked to organization's work culture and old ways of working are continuing.

Transaction error supervisor role was also a single person job in old ITSM for a good reason. There was a risk of handling same transaction errors with some other person at the same time, reporting same errors twice or transmitting data two times to recipient system and therefore potentially causing confusion and problems to customers' business.

Distributing of work in incident management model was re-designed and analyzed before ServiceNow go-live date. It was decided not to make changes to supervisor roles too much because it might cause gaps in incident management process. Biggest role based ITSM change was the automated incident creation for all customer's transaction errors. With new system, a human was not collecting transaction errors together to create an incident but system creates the incidents automatically. The downside was that if new transaction errors kept occurring continuously, system would generate new incident every 15 minutes. The positive side was that supervisor's time was not consumed on browsing and collecting errors manually.

One of the biggest quality and performance gaps in old ITSM was the level of reporting. There were no reporting tools built but in fact all reporting was done by making SQL queries to databases and running analysis manually to retrieved data. With ServiceNow, reporting capabilities improved significantly for all management level but also to individual users. ServiceNow offers out-of-the-box reporting for all the collected data including change management, incident management and problem management. Additionally dashboards can be built to show any filtered data in real time.

All service desk users can follow their own performance and work tasks easily at all times. With dashboard features users have the ability to, for example, check their own and groups' active service requests, total calculated time work last week and current week. Figure 5.1 is a sample of this data. Dashboards are always interactive and users can click any data element to see more detailed information.

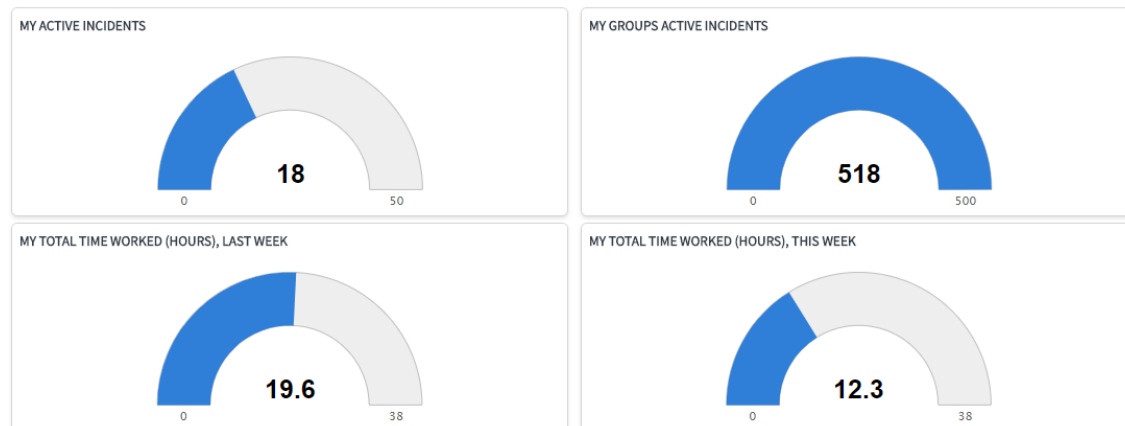


Figure 5.1. ServiceNow service desk view to current workload.

In manager level, reporting and metrics are more important than in user level. Support managers need to monitor for example the current SLAs status in incidents, workload, and service request statuses and set work priorities within the team. When planning resourcing, reporting needs to offer data that can be presented to senior or top management. ServiceNow offers view on performance metrics such as how many service requests employees worked on during the last 30 days, how many open service requests remain in the team and in which incident categories. Dashboard increase ability to prioritize team's work efforts towards certain type of service requests or customers. Time calculation for each user is visible so that it can be analyzed which customers or service request types take the most time. The used time can be, for example, used to calculate profit per customer. Additionally, managers see average handling time of service requests and could indicate training needs for certain services where service request's handling time is high.

Average handling time, like seen in figure 5.2, could show resourcing gaps on certain Months. Just by looking at handling time from December 2017 to February 2018, average handling time increased with almost 2 days. There could be number of reasons for this. For example sick leaves in service desk, vacations or high volume of customer service requests that increased average handling time. If customer service requests were created as seasonal business driven, there could be a need to allocate more resources yearly on January. Average handling time has been relatively linear from Month to the next. When ServiceNow usage started on 8th of May 2017, the first Month was not full and with history data transferred to ServiceNow it distorted the data before May. From June to November some fluctuations where seen but during December and January average handling started to increase rapidly.

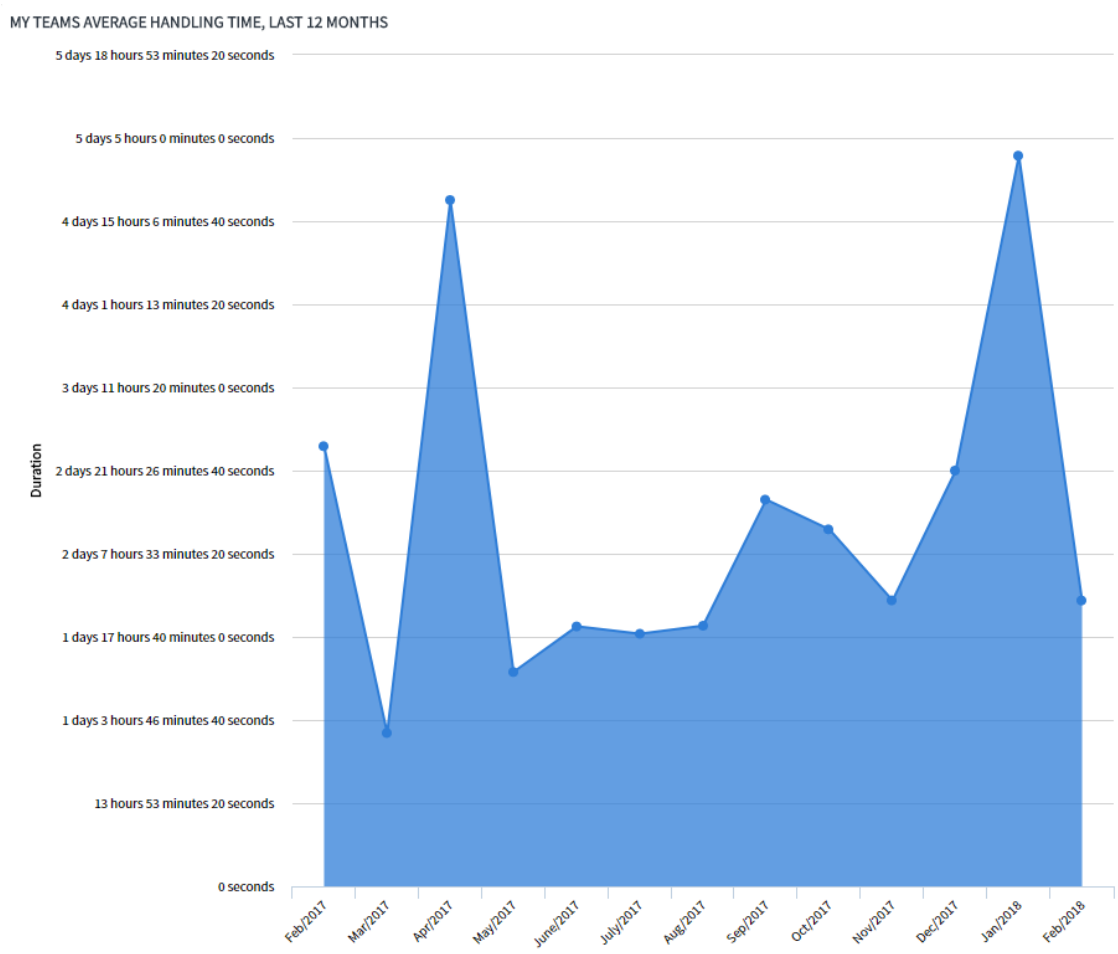


Figure 5.2. Manager view on average handling on service request by Month.

Service manager's that are focusing certain customers have reporting needs that are different compared to service desk manager's needs. Service managers are responsible of one to many customer's request fulfillment, incident management and change management. Service managers also follow SLA results in operational level. Service manager generally have more experience on customers' business and they coordinate resources to fulfill needs where appropriate. Respectively, the reporting concentrates to service manager's own customers change requests, incidents and service requests.

From manager level to top management level, the reporting needs to change to even broader perspective. Top management is looking at overall service performance with current resources, customer satisfaction and percentage of professional work invoiced from customer. Also depending on role, SLA performance, problem management reporting or change management reporting might be important sources of information.

5.4 Performance analysis

Service operation performance analysis was completed running series of service request data analysis from old service management system and comparing the data to data downloaded from ServiceNow. Also shift planning system called Työvuorovelho was

used to download working hour data for relevant employees. Old ITSM's data consisted of period between 1.10.2016-31.3.2017 and ServiceNow data was between 1.10.2017-31.3.2018. Since ServiceNow implementation did not migrate monitoring tool's service requests (initiated by alarms from platform), ServiceNow data needed to cover also old ITSM monitoring alarms from latter period. Service request volumes and Company X's customer's businesses have some peculiarities according to time of the year, for example because of holiday periods and therefore using exactly the same timeframe minimized the differences in the results from seasonal perspective. After the change of ITSM on May 2017 there was a steep learning curve with ServiceNow and some system bugs were fixed. Using the timeframe starting over 4 Months after the 8th of May start date was considered to make the results more consistent from user's knowledge and tooling stability perspective.

The relevant service request data and working hour data that was used for analysis can be found from table 5.2 below. In the 6 Month comparison period, old ITSM system had 20104 transaction error incidents out of 35674 service requests in total, making it 56,35 % of all service requests. In ServiceNow, 41349 out of 56146 in total were transaction error incidents, 73,65 % of all service requests. ServiceNow has increased transaction error incident amount significantly, adding manual work at the same time since the service requests need actions in service desk. In fact, service request amount increased 57,39 % and transaction error incidents increased by 21245 in total, which is 106 % more, when ServiceNow was introduced.

Table 5.2. Service request data and working hours from the old and new ITSM systems.

	Old ITSM	New ITSM + monitoring data (old ITSM)
Period	1.10.2016-31.3.2017	1.10.2017-31.3.2018
Total service request amount	35674	56146
Transaction error incidents	20104	41349
Transaction error incidents (% of all)	56,35	73,65
Working hours	15047	14983
Comparing old ITSM to new ITSM		
Service request amount change		20472
Service request amount change %		57,39
Transaction error incident amount change		21245
Transaction error incident amount change %		106

Expected difference in the service request data was the amount of service requests created in the new ITSM compared to the old ITSM. The old ITSM searched and combined similar transaction errors to incidents for customers with 24/7 SLA every 15 minutes. If a new transaction error was received over 15 minutes after the first one, new incident was created. Customers that did not have 24/7 SLA, transaction error incidents were created manually to ITSM by person monitoring the transaction errors. The person monitoring the error list was also able to attach new transactions to incidents as long as incidents were not closed yet. This manual process was slow and error prone since incorrect transactions were possible to attach to incidents.

ServiceNow was designed to start collecting similar transaction errors to incidents and the collecting period lasted for 15 minute period. The key difference with the old system was that transaction errors were collected for all customers the same way, no matter whether they had 24/7 SLA or not. Since there was no manual involvement to combine transaction errors together, more incidents were created for the same transaction error volume. In the old ITSM person monitoring the errors could be combined errors together manually for the same customer for a long time, even the whole day if it made sense. Of course, this monitoring work consumed resources that was only used for limited extent to actually closing service requests.

For other than transaction error incidents, the old and the new system are operating very similarly. Service requests are opened by email, from customer portals and by Company X personnel manually when needed.

Table 5.3. Performance comparison results.

	Old ITSM	New ITSM + monitoring data (old ITSM)
SRs handled per working hour	2,37	3,75
SRs handled per working hour increase		1,38
SRs handled per working hour increase %		58,07
Average SR handling time (h)	52:52:47	69:20:22
Average SR handling time increase (h)		16:27:35
Average SRs handling time increase %		31,13
SRs handled in 1st line support	34290	53030
SRs handled by 2nd line or manager	1384	3116
SRs handled in 1st line support %	96,12	94,45
SRs handled in 2nd line or managers %	3,88	5,55

With ServiceNow transaction error list monitoring is not needed because system collects the transactions to incidents automatically. It could be estimated that one full time employee was used for this monitoring work. In reality that person was handling cases and the monitoring was not full time work, also monitoring was done less frequently during evening and night time. But if we estimate 50% of one person's working time to be used to monitoring the transaction error list that sums up to 357 working hours for this 6 Month period (using 50% of working time for the average employee). This calculation means that 2,4 % of all working hours were saved with new system but the same time

57,39 % more service requests and work was received. Of course, this calculation simplifies since it does not take into account how much ServiceNow improved service request handling performance.

When looking at comparison data from table 5.3 to understand how many service requests were closed per working hour, somewhat expected increase was found. In old ITSM, 2,37 service requests were handled per working hour. The same number in new ITSM time is 3,75 which makes 58,07 % increase on performance in terms of closed service request per working hour. There are several reasons for this. First, ServiceNow creates significantly more transaction error incidents due to the automatic creation. If there is a connectivity issue with some customer or partner, it causes transactions to fail constantly and issue also creates new incidents. During old ITSM these type of situations were handled by simply attaching similar transactions to one incident making the incident number lower. When connectivity issue happens and is later resolved, there is a high number of incidents that need to be closed additionally to the data that is transmitted forward. Similar behavior happens if the platform running the services has a malfunction, it can cause high amount of incidents, a much higher amount than in old ITSM. In both scenarios incidents can be closed with very little handling time by the service desk.

When looking more at employee performance, we see that average service request handling time was 52 hours 52 minutes and 47 seconds in old ITSM and in new ITSM the same time was 69 hours 20 minutes and 22 seconds. Average service request handling time has increased 31,13 % in total. Service requests are now open over half a day more on average. It also means that 58,07 % increase in service requests handled per working hour was not increasing incident handling performance enough. This finding is significant because one of the main reasons for ITSM implementation are the operations performance and customer service. Increased handling time of service requests indicates less operational performance from both perspectives. This is an opposite finding what was described in Hong Kong Campus ITSM implementation. Increased handling time in all service requests does not result to SLA target being missed but it increases the occurrence possibility.

Employee performance can be analyzed by understanding how much of incoming work is completed in first line meaning that no escalation was needed. Analysis shows in table 5.3 that in old ITSM, 96,12 % of all service requests closed by 1st line. The same percentage in new ITSM is 94,45 %. After introducing ServiceNow it appears that 1st line capabilities to solve service requests have reduced by 1,67 percentage points. This number is relevant from resource perspective as it means 937 service requests more in a year for 2nd line. Escalation to 2nd line team also increases the service request handling time. It also has be stated that closing service request have some differences in the systems and in old ITSM some portion of the cases closed by 1st line might appear that way although actually handled and closed originally by 2nd line. Nevertheless this indicates some support performance decrease. All service requests that need several team's effort, is a loss in resources from performance perspective.

5.5 User experience

User experience was determined with ServiceNow online user survey and theme interviews with selected individuals. Individuals were chosen according to their role as an employee so that they were frequently using ServiceNow and that they had enough experience with the tool.

5.5.1 ServiceNow user survey results

ServiceNow user survey was introduced to the personnel that had ServiceNow user account. Users were encouraged to give feedback about ServiceNow and the changes it has made. Survey was open to answers for 6 weeks, during June and July 2018. Survey received 40 answers, 22 answers (55 %) from EU and 18 answers (45 %) from the US. User survey was tested and discussed with two potential respondents to clarify unclear questions in the survey and to correct any questions that might be interpreted incorrectly. Survey followed Likert Scaling with 5 options where possible answers were: strongly agree, agree, neutral, disagree and strongly disagree. Similarly questions with comparison, the Likert scaling with 5 options was: much better, better, same, worse or much worse.

Survey was answered anonymous but collected user information about which continent user worked on, US or EU and department information. The user information was collected for possibility to see if different continents or departments in the organization would show different answering patterns.

Survey had 6 question categories:

1. ServiceNow user training and help
2. Case management (aka incident management)
3. Change management
4. ServiceNow reports and dashboards
5. Customer Service Portal
6. Comparison and general comments.

ServiceNow training, user guide and user help category covered global user help for ServiceNow, trainings for users in general and help that users have received from administrators. In general, trainings that might have happened in US organization could not be evaluated. First topic in survey covered if global user guide contains enough information to handle cases. Answers revealed that over half of users did not have opinion about global user guide's information since 24 out of 40 answered neutral, 8 agreed, 6 disagreed, 1 strongly agreed and also 1 strongly disagreed. Seems that global user guide was not taken into use by users. Second question asked about if received training had been adequate. The topic was divided users as 13 agreed, 12 were neutral, 9 disagreed, 4 strongly agreed and 2 strongly disagreed. Help that users receive from administrators when needed was considered to be enough, 6 strongly agreed, 14 agreed, 13 were neutral and 7 disagreed.

Second category, case management, covered one of the main features of ServiceNow, incident management. 2 respondents answered that they are not using the feature, so total of 38 answers were received to this category. First question asked whether case management is easy to use, 2 respondent strongly agreed, 19 agreed, 10 were neutral, 2 disagreed and 1 strongly disagreed. Second category question asked if customer communication function (sending emails) is easy to use, 1 strongly agreed, 17 agreed, 13 were neutral, 6 disagreed and 1 strongly disagreed. Third question asked if the notification and report emails sent to customers are clear, 2 strongly agreed, 12 agreed, 14 were neutral, 9 disagreed and 1 strongly disagreed. ServiceNow sending email function was not efficient for Company X's usage and caused a lot of discussion in the beginning. The function was improved and answers show that users were quite happy about the end result.

Change management category had less coverage of respondents because it was recognized that only some of the users use the feature. 23 out of 40 respondents answered to use change management in ServiceNow. When asked if the application is easy to use, 1 strongly agreed, 11 agreed, 7 were neutral, 2 disagreed and 1 strongly disagreed. Respondents had similar answers in the second question, standard change templates in ServiceNow, 1 strongly agreed, 11 agreed and 9 were neutral, 1 disagreed. Standard templates add content to change management form and can guide user to correct and complete selections. Change management category reflects how much ServiceNow users don't use the feature at all. The ServiceNow feature itself might be pretty intuitive but incidents have change request category in them and when process is not seen as strictly, the proper ITIL based change management is easily ignored. Additionally change management is not officially introduced and trained in the Company X.

ServiceNow reports and dashboards were used by 24 respondents which reduced the category coverage. For first question whether general reports and dashboards are useful, 2 strongly agreed, 15 agreed, 3 were neutral, 1 disagreed and 2 strongly disagreed. Second question was determining if reporting capabilities are adequate for user's purposes. 1 strongly agreed, 8 agreed, 10 were neutral and 5 disagreed. Results clarifies that the reporting and dashboard tool is one of the most features that give a lot possibilities for users. The reporting capabilities left the users a bit more without opinion, probably because users were not aware all of the features in ServiceNow.

Customer service portal was the least known category and customer service portal was introduced to limited number of customers. 13 out of 40 respondent answered that they have experience with the application. 7 agreed that the portal is easy to use, 3 were neutral, 2 disagreed and 1 strongly disagreed. Similarly when asked about whether the customer service portal has professional layout, 8 agreed, 1 was neutral, 1 disagreed and 3 strongly disagreed.

Last category in the survey was ITSM tool comparison and general comments. Most users had experience with other similar tools such ServiceNow Express version (22 respondents. 11 had used Salesforce, 11 RemedyForce, 4 Desktop and 19 old Company X's ITSM and others non-listed tools (8 in total). Comparing ServiceNow to other used tools ServiceNow was rated to be much better by 4, better by 19, same by 7, worse by 3

and much worse by 1 respondent. This shows how users see the potential and the positive sides of ServiceNow, even though there might be features that users don't feel comfortable with. User experience in ServiceNow was rated very good by 1, good by 23, fair by 11 and bad by 5 users.

Respondents were also asked to give their opinion how customer service has developed after introduction of ServiceNow. 1 respondent rated it to be much better, 24 as better, 13 as same and 2 as worse. Ratings were positive as most saw ServiceNow as an improvement to customer service and only the small portion saw ServiceNow as a negative.

Users also gave feedback about ServiceNow enhancements. 8 saw the development as very good, 19 as good, 11 as fair and 2 respondents as bad.

Two free form questions about ServiceNow were also optionally available for enhancement or optimization ideas and other comments. Enhancements and development ideas covered many features starting from customer communication tooling to change management features to US organization's own applications. Similar individual comments were received in other comments section. No generalization could be made from the comments received.

In overall users were rating ServiceNow applications relatively positive. Case management is the main tool that has the most impact on operation performance due to high volume of cases each day. Approximately 55 % of users saw case management as positive tool and if neutral answers are calculated, the percentage is 81. Similar results were received from customer communication function, 47 % saw it in positive light and when counting the neutral answers the percentage is 82. Seems like specific questions about features were not clear enough and this resulted in more neutral answers.

5.5.2 ServiceNow user interviews

User interviews carried out as theme interviews to five manually selected persons who had experience from old ITSM and were working in service desk function. People were given room to answer the interview's questions how they felt appropriate. User interviews covered user experience with ServiceNow, implementation successfulness, trainings and instructions, comparison between old ITSM and the new ITSM, development needs to the new ITSM and how customer service has changed. Respondents answered 7 questions in the interview:

1. How do you feel working with ServiceNow now?
2. How was the implementation handled and coordinated?
3. Were there enough trainings and instructions to use ServiceNow in the beginning?
4. What is better now in ServiceNow compared to old ITSM?
5. What is worse now in ServiceNow compared to old ITSM?
6. What needs more development in ServiceNow?
 - a. What kind of development?
7. How has ServiceNow implementation affected customer service in Company X?

Generally users experienced ServiceNow positively as it covers more services in the global service landscape, such as all Company X's integration platforms and customers, better general tracking of service requests, global reporting capabilities and ServiceNow also works effectively as a centralized knowledge base. Some functionalities needed fixes and updates in the beginning which might have caused some user acceptance delay. Many currently existing features in ServiceNow were not available in the old ITSM. Still respondents felt that there are also features that worked better in old ITSM or features are totally missing from ServiceNow. As ServiceNow is commercial tool and not part of the management console software like old ITSM was, systems need to interface with each other and there are some inconveniences and technical challenges related to it.

Implementation and coordination received mostly positive but only few comments about project information sharing. Information was shared about some main features such as problem management and change management. At the same time information was on high level only and specifics were left unclear.

Question about trainings and instructions divided the respondents and differed from respondent to another. Some respondents felt that there could have been more trainings and instructions to use ServiceNow. Others commented that users learn best by doing and the basic training was sufficient. Comments were also received that trainings with examples would have helped in the beginning. Since ServiceNow offers much more than just service requests, some respondents felt that ServiceNow trainings would still be needed 1,5 years after the go live.

Respondents saw multiple enhancements that ServiceNow has introduced. ServiceNow has better time tracking for users with running clock automatically calculating time, efficient knowledge base tooling and automatic repeating email inquiries that can be run in the background, improved customer communication features, customer connectivity outage tooling and better way to link connect incidents to each other with parent-child feature. Global way of working with ServiceNow helps to coordinate and assign work to other teams. As an enhancement it was mentioned that transaction error list does not need manual monitoring anymore. General opinion was that ServiceNow ITSM is working smoother.

Some weaknesses were found from ServiceNow compared to old ITSM system. Old ITSM contained separate internal solution field that was not published for customers. The feature is not available in ServiceNow and separate internal comments are used for this purpose. Since comments can be written during the lifecycle of the service request, the final internal solution might not be clear or it's missing. Attachment handling is more difficult in ServiceNow. If service request contains multiple attachments, there is no easy way to separate old and new attachments. This is especially true when there are attachments with the same filename. Also, ServiceNow is built to send too much notifications and because of too many emails, they are easily missed by users. The opening transactions button which interfaces with old management console is sometimes not working. There was also discussion about complexity of ServiceNow since old ITSM contained much less features, it was generally more straightforward to use.

Similar transaction error incidents are harder to find from ServiceNow. Since the production data is updated via integration to ServiceNow, it was thought there might be gaps in the integration making the data sometimes outdated or missing in ServiceNow.

Searching service requests in both ITSM tools separated opinions. One commented about effectiveness of old ITSM search capabilities. Opposite opinion was strongly praising ServiceNow and how flexibly users can search with any keyword and the search function is also working fast.

The development areas from users followed the answers which were received for comparing the two systems. Reliability would need improvement so that integration and interfacing with management console would work more efficient. Users would need better dashboard solution to track their working time for different areas of work. Filtering the items in incident page was mentioned so that users could read only needed information and not every update made to incident including sent and received emails. Respondents reported that too much emails were sent by ServiceNow and were also requesting more development on notifications about due dates on service requests. Due dates are used for change requests that customers have opened. The parent-child incident link was described as an enhancement but it was also reported as a development topic. There is a logical bug that can happen when the parent has also parent which creates a tree of incidents. This tree is possible to break from the middle without users realizing it. As a result incidents can be left open from the top or bottom of the multilevel parent-child tree.

Respondents felt that ServiceNow offers more professional sense on customer communication but might also send too much notifications to them causing annoyed customers. Also the email content is seen too complex and contains too much information and customers might miss the resolution or other relevant information. At the beginning customer service probably deteriorated temporarily but is better currently. Respondents were asking question whether the service request handling has actually accelerated or has it gotten slower after ServiceNow was introduced. When service request handling takes more time, it makes customers anxious about their received service.

During the interviews most of the respondents seemed to have more positive thoughts about ServiceNow. ServiceNow as ITSM tool offers wider set of tools according to respondents. Then again the interviewed respondents were working in service desk function and they felt that there might be more features in ServiceNow that could help their daily work. Trainings gave only basic knowledge about ServiceNow and it might have left some aspects to respondents as undiscovered. It is also probable that as trainings does not cover more features, some users are using much more advanced ServiceNow features than others.

Although respondents mentioned the automatization that ServiceNow offers as a positive feature, they were also questioning how much accelerating of service request handling has happened after ServiceNow was introduced.

6 CONCLUSIONS

The purpose of this thesis was to evaluate ITSM system implementation project in Company X. ITSM implementation was analyzed using project results, service request data, user survey responses and interviews. Findings in this thesis work were analyzed mirroring them to best practices of ITIL v3.

The ITSM implementation in Company X was technical driven for the most part. The project schedule was ambitious, considering mainly technical implementation topics and not taking into account potential internal delays. Considering that customer project department's employees were working to build integrations with ServiceNow and also that there were Company X's EU and US operations individual requirements to fulfill, the schedule had too much variables and complexities to be achievable. Like most significant changes in organizations, also Company X's changes encountered internal resistance. Internal resistance might be the reason why US platform's transaction integration implementations were postponed up to 2,5 years from original planned date. As a result it was determined that with better commitment and communication from senior management, the project delays could have been reduced.

ITSM implementation caused several changes in service operation. Performance analysis results show that new logic in the new ITSM created more human work than it increased operational performance. Average service request handling time increased by 31,13 %. From ITIL incident management's perspective service request handling time should actually decrease. The finding is significant because one of the main reason for ITSM implementation is the achievable operational performance.

ServiceNow features need further development in Company X so that automatic service request handling could resolve more service requests without service desk's involvement. The potential automatization in ServiceNow is one of the key features that Company X would need to utilize in the future.

Looking at user experience based on survey and interviews, many key results were found to be positive in thesis. The most used ServiceNow application, incident management, received positive user survey results. Respondents also perceived that ServiceNow had improved customer service. ServiceNow was seen as a positive tooling change. Main discomfort was related to email notifications from ServiceNow and also the lack of interfacing with platform management tool used.

ServiceNow provides opportunity for Company X to improve both internal and external reporting and service performance to higher level. Also, old ITSM did not have change management capabilities or problem management which are core ITIL processes for modern IT service provider company. There are very potential areas to study how standardized ServiceNow problem management and change management tools affect to overall service quality and restoration.

ITIL version 3 was used as a reference in this thesis. New, ITIL version 4, is planned to be published late 2019. When this thesis work is being finished, ITIL Foundation book for version 4 has just been published. There are terminology and framework changes happening in ITIL. The ITIL Service Lifecycle terminology has been replaced with service value system (SVS). Service value system offers new high level view to service delivery. Value is the end result of SVS and opportunity or demand is the start. Service value chain is guided by practices, governance and guiding principles and the system will deliver value to customer in the end. In ITIL version 4, term process has been replaced by practices. Even though there are new elements promised in ITIL v4 such as agile development, project management and some of the processes were combined together or divided into two, the fundamental framework is similar.

Customer experience was not part of this thesis even though it was a minor topic in the user survey. It needs to be emphasized that customer experience could be the only factor that determines whether ITSM implementation is successful. ITSM is generally implemented to serve different stakeholders needs but in the end customers decide whether they receive value from service, where ITSM plays a part. ITSM changes can cause service delays, rigid processes and other negative changes that are not tolerated by customers.

User's perspective is one of the limitations in this study. Only five users were interviewed and 40 responses were received to survey. More user interviews and survey responses would have increased the coverage. The survey could have been advertised better internally, potentially through users' manager.

When thesis analyzes were completed, Company X was acquired by a large IT service provider. After acquisition, the future of ServiceNow has been discussed. Company X's processes and tools have received positive feedback and ServiceNow future is looking positive with more integrations being added.

After taking into account the project schedule, users and achieved performance, this thesis determined ITSM implementation to be successful for Company X. Users provided positive survey results and feedback about new ITSM. Users were also satisfied in the level of communication and training during the project. In the end personnel need to embrace the change because otherwise service quality and performance will likely decrease. Service request handling performance increased significantly in service desk but average service request handling time increased. ServiceNow configuration changes could help with decreasing the service request handling time. The standard reporting tools in ServiceNow are something that were not existing in the old ITSM but are expected from modern IT service Provider Company.

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