

Improving IT Service Desk and Service Management Processes in Finnish Tax Administration: A Case Study on Service Engineering

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Abstract. Due to success of IT service management frameworks, the service desk function and the incident management process are improvement targets of high priority for many IT companies at the moment. The main goal of the incident management process is to restore normal service operation as quickly as possible. The research problem of this study is: How service engineering processes and service desk can be improved by using ITIL-based best practices? The main contribution of this paper is to 1) describe the phases of a study that focused on improving service desk and incident management process from IT service management perspective and 2) provide lessons learnt from the study. The case study was carried out with a single case: Finnish Tax Administration.

Keywords: IT service management, incident management, ITIL, process.

1 Introduction

A service desk is a very important function for IT service companies. It handles incidents (hardware and software failures), service requests, complaints, feedback and requests for change reported by customers and users. Therefore, the service desk is a crucial part of the IT service provider's customer interface. Many IT service provider organizations are using IT Infrastructure Library (ITIL) to increase the quality of IT service support and to improve the service engineering processes. ITIL is the most widely used IT service management framework. ITIL best practices are used by thousands of IT organizations worldwide [1].

IT service management can be defined as "implementation and management of quality IT services that meet the needs of the business" [2]. IT companies may provide various types of IT services, such as application services, server services, data center services, desk top services, help desk services, data network services, and hardware lifecycle services. IT service management is performed by IT service providers through an appropriate mix of people, process and information technology.

The ITIL framework consists of best practices and guidelines that can be used to improve IT service desk function and related processes. First, the goal is to establish a service desk that acts as a single point of contact by recording and classifying every support request from customers and users. These support requests are stored into a IT service management system. Second, the goal is to keep the customers and users informed. This means that they should receive incident confirmation receipts, enough information on the progress of incident resolutions and on services that are available for customers. Third, the goal is to establish clear escalation procedures that enable service desk workers to escalate and assign cases to other teams, such as second level support, field support teams or third-party service providers.

1.1 Related Work

Currently, there are many frameworks and standards that can be used to improve IT service management processes:

- IT Infrastructure Library version 2 [3], version 3 [1], edition 2011 [4]
- Control Objectives for IT and related Technology (COBIT) framework [5]
- Capability Maturity Model Integration (CMMI) for Services [6]
- IT Service Capability Maturity Model [7]
- ISO/IEC 20000-1:2005 Part 1: Specification for service management [8]
- ISO/IEC 20000-1:2005 Part 2: Code of practice for service management [9].
- ISO/IEC FDIS 20000-1:2010 Part 1: Service management system requirements [10]
- ISO/IEC TR 20000-3:2009 Part 3: Guidance for the scoping and applicability of ISO/IEC 20000-1 [11].

In this paper, we focus on the improvement of service desk function and the incident management process. Academic studies that deal with customer support can be classified into traditional customer support studies that use a term 'help desk' and service management studies that use a term 'service desk'. According to ITIL service support, the service desk extends the services that a traditional help desk provides [12]. Help desk studies have focused, for example, on examining the role of help desk in the strategic management of information systems [13], knowledge management-centric help desk [14], evolution of a knowledge management system in the help desk [15] and building IT help desk in the university environment [16].

The number of academic IT service management studies is rapidly increasing. Previous studies on IT service management have dealt with benefits of implementation of service-oriented IT management [17], creating taxonomy for ITIL processes [18], creating a maturity model for implementing ITIL v3 [19], and success factors in implementing IT service management [20,21]. Meziani and Saleh [22] have presented results of process maturity self-assessment in a government agency. Zhang et al. [23] have explored ITIL process integration architecture in the context of organization environment. Moreover, Iden and Eikebrokk [24]

have conducted a study on conceptualization and measurements of ITIL implementation project. There are also studies that are directly related to service management processes, such as improvement of incident management processes based on ITIL practices [25], creating a mature problem management process [26], service testing [27], service level management [28] and change and configuration management [29]. Surprisingly few of ITSM studies have provided details how ITIL-based process implementation has been done in government agencies or presented feedback on ITSM trainings.

1.2 Our Contribution

This paper is related to IT service management research of the research project Keys to IT Service Management and Effective Transition of Services (KISMET). The main contribution of this paper is to

- describe the phases of a study that focused on improving service desk and incident management process from IT service management perspective and
- provide lessons learnt from the study regarding processes, tools and ITSM trainings.

Our research results might be useful for employees who are working for IT service desk improvement (service desk managers, incident managers and customer service managers) or overall service quality improvement (CSI managers).

The rest of the paper is organized as follows. In Section 2, the research problem and methods are described. In Section 3, we describe the process improvement phases. In Section 4, we provide the analysis of findings in the form of lessons learnt. The conclusions are given in Section 5.

2 Research Methods

In this study, the research problem is: How service engineering processes and service desk can be improved by using ITIL-based best practices? We used a case study research method to answer the research problem. The study was carried out with a single case organization, Finnish Tax Administration that is a member of the university's research project.

The case study approach was selected for the research method because it suits well for studying service engineering processes that are linked to a complex organizational context; a jungle of IT teams, software products, services and suppliers. A case study is "a research strategy which focuses on understanding the dynamics present with single settings" [30]. It can also be defined as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context" [31]. Research settings consists of three main elements: research problem, research methods and research data. Figure 1 describes the research settings of this case study.

The research problem was further divided into following research questions that provided a roadmap for the case study:

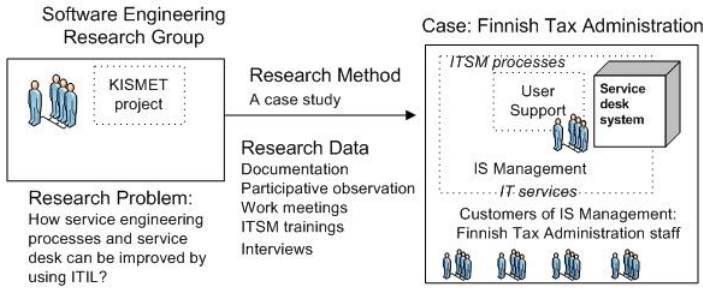


Fig. 1. The research settings of the case study

- What is the current status of the service desk tool and the incident management process?
- What types of challenges are related to service desk operations (Service desk and incident management)?
- How support requests should be classified and ITSM concepts integrated to the service desk?
- Which interfaces do service desk and incident management have?
- How IT service management trainings for service desk people should be conducted?
- What does Continual Service Improvement mean for service desk?

2.1 The Case Organization and Data Collection Methods

Our case organization is the Information System Management unit of Finnish Tax Administration that provides IT services (e.g. desktop services, service desk) to the tax administration staff. Regarding the case selection, Tax Administration was a representative case of a government agency with service desk tool development and ITIL-based process improvement. The organization had 5336 fulltime employees in 2010. The service desk improvement project had started in the organization in the end of 2010.

The user support services unit is responsible for the support services (use of the information technology and support services related to the management of production environment). User support services staff manages the support requests and service requests. User support services unit cooperates with other groups of the Information System Management, such as application support, infrastructure support and e-service support. Customers and users can use two main service channels (phone, service desk system) while submitting support requests to the service desk. User instruction documents are maintained in the intranet. Service desk is open for customers and users during the office hours (8.00-16.15). The following sources of evidence were used in data collection:

- Documentation (process descriptions, user support metrics, service desk system user manual, service descriptions, service area catalogue, event

management process description, error handling process description, change plan template)

- Archives and records (service categories, incident records, service request records, problem records, change records)
- Participative observation (weekly meetings, informal coffee table discussions, email discussions)
- ITSM trainings for user support staff (70 persons, September 2011)
- Physical artifacts (access to the organization's intranet and service desk system).

2.2 Data Analysis

Eisenhardt [30] reports that there are two main approaches that can be used to analyze the case study data: a case comparison analysis and a within-case analysis. The within case analysis focuses on examining cases carefully as stand-alone entities before making any generalizations. The purpose of the within-case analysis is to carry out a detailed level investigation in a case, for example, by creating a case study write-up that describes the behavior of the case. The cross-case analysis aims to search cross-case patterns and is suitable for multiple case studies.

In this study, a within-case analysis technique was used. Process improvement events were organized into chronological order according to the phases of KISMET model. Researcher triangulation (three researchers) was used both in data collection and in data analysis. Case study findings were validated in weekly meeting with the case organization's representatives. A summary report on the process improvement work was created and submitted to the case organization.

3 Improving Service Desk and Service Management Processes

The service desk process improvement with Finnish Tax Administration was based on KISMET (Keys to IT Service Management Excellence Technique) model. The model consists of the following seven phases: 1) Create a process improvement infrastructure, 2) Perform a process assessment, 3) Plan process improvement actions 4) Improve/Implement the process based on ITSM practices, 5) Deploy and introduce the process, 6) Evaluate process improvement and 7) Continuous process/service improvement.

3.1 Create a Process Improvement Infrastructure

Create a process improvement infrastructure phase includes the following steps: motivate the business decision makers to ITSM, define business goals for ITSM process improvement, select an improvement target and identify stakeholders that participate in the process improvement.

The goals for the improvement were discussed in the meeting of March 2011 between the research team and a service manager of the case organization. The goals were discussed again in August 2011. The first goal was to improve the service desk tool to match the IT service management requirements. To achieve this goal, the plan of KISMET research team was to carry out reviews for service categories, data fields, incident and problem records. The aim was to find out whether employees use the properties of IT service management tool effectively. The second goal was to improve and optimize the service support processes (incident and problem management). Especially, the interface between incident management, problem management and change management needed clarification. The third goal was to explore continual service improvement activities and organize a CSI workshop.

NDA's were signed, as usually, in industrial cases by research team members and access to the case organization's facilities was granted to two researchers. Researchers received a PC that enabled access to the organization's intranet, email and office applications. Additionally, researchers had access to the IT service management tool.

Stakeholders that would participate in the process improvement from the case organization's side were partly familiar to the research team, mainly service managers representing various IT services of the organization. We were also told that we could participate an informal Friday morning coffee table meetings with user support service staff.

3.2 Identify the Current State of the Processes

The *Perform a process assessment* phase includes steps, such as perform a process assessment for a selected ITSM process, document the challenges and difficulties in the current state of the process, identify the key concepts regarding the process, study how tools support the process and benchmark the process with ITIL best practices and ISO 20 000 requirements. This phase was carried out by multiple researchers and using various types of data sources, such as participative observation, organization's internal documentation, intranet, service desk records, and discussions with service managers and user support team members both in process improvement meetings and in coffee table.

The following strengths were observed during the phase. First, the selected service desk tool seemed to support well the IT service management and ITIL-based process improvement. Second, the case organization had put a lot of efforts on automatization of service requests. There were many electronic service request forms in daily use. The forms were connected to the service management system. Third, we observed that service desk roles and responsibilities had been well described and implemented in practise. Fourth, incident management activities had been described in the incident management process description and they seemed to match IT service management concepts. Fifth, service desk as a single point of contact seemed to be a common and a clear goal in the organization. Finally, the tool improvement team seemed to have a good knowhow how to

configure the service desk system. This observation was based on the discussions with a member of the tool team.

The following improvement targets were observed during the phase. The list is not exhaustive.

- Classification of support requests in the service desk requires clarification (both from customer's and service desk worker's viewpoint).
- Identification of repeating incidents from the service desk system.
- Employees have problems to understand differences between ITIL concepts.
- The interface between incident management and problem management.
- Improvement ideas regarding IT services and processes should be recorded systematically into the service desk system.

3.3 Plan Process Improvement Actions

The *Plan process improvement actions* phase includes the following steps: Analyze the identified challenges, plan improvement actions, and validate the challenges and improvement actions. This phase focused on defining the process improvement actions based on the identified challenges and bottlenecks. For each improvement target, we documented the solution and the business benefit why it is important to resolve challenge.

- **Challenge:** Classification of support requests requires clarification. **Solution:** Clarify the options in 'Reason for Contact Request' field of the incident record. Make the difference between service requests and incidents visible. Service area and the type of support requests should be different fields. Remove the classification option from customers and simplify the submission of support requests. **Business benefit:** Handling of the support request shall be faster. Service area can be used also in the problem records and incident records. Submitting support requests becomes easier for customers and users. The number of phone calls from customers and users shall decrease as they use the service desk system to report support requests.
- **Challenge:** It is difficult to identify repeating incidents from the service desk system. **Solution:** Mark the repeating incidents (for example, create an additional 'check box' type data field to an incident record: Repeating incident = x). Use the 'Relate Cases' function to establish relationships between similar cases. Create a problem record based on a repeating incident. **Business benefit:** Identification and reporting of repeating incidents shall be easier. Finding the root cause and solution for repeating incidents shall decrease the support request volume.
- **Challenge:** Employees do not understand differences between some ITIL terms. **Solution:** Collect 10 examples of each term. The service desk should separate service requests from incidents. **Business benefit:** Service requests are routine requests and handling of them is easier and faster than handling of incidents. In the future, there might be different SLAs for incidents and service requests.

- **Challenge:** Interface between incident and problem management should be defined. **Solution:** Create and use a problem record. Establish a simple problem management procedure. **Business benefit:** Recording systematic incidents as problem records provides a way to identify the root cause of incidents. Proactive problem management enables monitoring trends (which services or products have caused the most incidents)
- **Challenge:** Improvement ideas regarding IT services and processes should be recorded systematically into the service desk system. **Solution:** Create a CSI model. Assign improvement suggestions to change management. **Business benefit:** Management of improvement suggestions shall become more systematic. This ensures that each suggestion receives attention and review.

3.4 Improve/Implement the Process Based on ITSM Practices

The *Improve/Implement the process based on ITSM practices* phase includes for example, the following steps: Define and document a) the process goals, b) benefits that a process provides customers and IT organization's business, c) key concepts, d) roles and responsibilities, e) actions, f) metrics and g) relationships to other ITSM processes; improve tools that are used in the process and establish a process manager role if it does not exist yet.

The case organization already had a good description of the incident management process. Thus, improvement of the support processes was started from classification. There was a dropdown menu field *Reason for the service desk contact* in the incident record. We divided the contact categories according to ITIL concepts: incident (error and failure reports), service request (request for user rights, request for advice, request for reporting, request for examining, request for update, order, other service request), feedback, improvement suggestion and formal complaint. A member of the service desk tool improvement team told us that they removed 'problem' from the list of contact reasons because some service desk workers started to log incidents as problems.

We continued the improvement of classification by proposing a new service area classification that could be used in the classification of incidents, service requests, problems and requests for change. The new, proposed service area was presented to the case organization's representatives that reviewed service areas and created a new version of service areas. In order to show differences between ITIL concepts (incidents, service requests, problems, requests for change), we collected ten examples of each concept. That was a really good exercise because researchers learned a lot of provided services and found good material for IT service management trainings.

While examining the interface between incident and problem management, the research team started to develop a simple model for problem management. For example, the following guidelines were created for opening and creating a problem record: A problem record can be opened by using two different ways: a) Select from the menu *Create problem* b) Create a problem based on an existing incident record by clicking the link *Create problem* in the incident record. Thus, incident basic information shall be transferred to the problem record. One should

not define a *customer* field as a mandatory field because a service desk specialist must be able to record the problem without a customer's incident report.

Regarding problem management, the representative of the tool improvement team reported that they had to remove terms 'problem' and 'request for change' from the categories of the service desk case because service desk workers had logged incidents as problems. Additionally, the following questions were posed for the researchers that acted as ITIL consultants: what is the difference between a support request and a problem in practice, how a problem should be recorded in the system, how configuration items should be categorized and how a service desk worker can convert the incident to the RFC? The final improvement target was continual service improvement. The research team organized a CSI workshop where a CSI process model was presented to the case organization. We shall discuss the model more detailed in our further paper.

3.5 Deploy and Introduce Processes

This phase includes the following steps: Deploy an ITSM process with a pilot group, create work instructions how to perform the process in practice, motivate the workers to ITSM, increase the ITSM awareness in the organization through training, organize ITSM workshops to clarify ITSM process interfaces. In this phase, the representatives of case organization asked whether the research team could organize ITSM trainings for Tax Administration employees. Instead of one large training event, the research team organized seven small ITSM awareness events (1 hour, 6-10 user support service workers in each event) and Basics of IT service Support (3 hour each event).

3.6 Evaluate Process Improvement

This phase involves collecting feedback regarding an improved process, tools and training, conducting fine-tuning if necessary, and deployment the processes to other organizational units or services. Regarding ITSM trainings, the research team collected the following comments:

- English ITIL terms seemed to be weird many years, now they look clearer
- Service desk workers should see the big picture behind the things; whether a single ticket is related to a large group of incidents.
- Until these days, we have thought that these improvement frameworks are only for managers.
- How other organizations use ITIL?
- We should start thinking about the ITSM certification courses.
- ITIL framework looks very complicated, like a blueprint of a nuclear plant.
- All support groups do not use automatic alert function that submits an email message when a new ticket has arrived.
- It would be nice if user support staff could send information on repeating incidents to process managers.
- The large number of support groups is a problem.

- Is it possible to conduct parallel handling for the tasks of an incident?
- Who is responsible for change management in the IS management unit?

In the feedback form, we asked how useful employees considered the ITSM awareness training by using 1 to 5 scale (1 =completely useless, 5= very valuable for daily work). We received 28/70 responses. The average score was 3.46. We also received free form feedback from participants that indicated that training had included concrete examples, participants had liked the face-to-face training, employees were interested in getting more training, and the timing for training had been good. In the end of the evaluation phase, we organized an end meeting of the study where the case organization gave feedback for the whole process improvement. They mentioned that the study helped the organization especially identifying connections between processes and increase the employee's awareness of ITSM processes and concepts.

3.7 Continuous Process/Service Improvement

Continuous process improvement phase includes, for example, the following steps: Conduct process reviews frequently, identify and report process improvement ideas or process-related problems to a process manager or the Continuous Service Improvement process and plan and implement improvement actions.

The interface between CSI and service desk means in practice monitoring, measurement and reporting capabilities for service desk function and incident management process. Additionally, CSI organizes reviews for the service desk service, systems and processes and analyzes improvement suggestions. According to our findings, the service desk and incident management metrics included incident throughput time, speed of ticket creation, ticket volume, average ticket resolution time, tickets by service channel(phone, email), and customer satisfaction.

4 Analysis

In the analysis phase of this study, we summarized case study findings in the form of lesson learned. A source for each lesson is presented in parentheses (AR= Archives and records, D= Documentation, ID= Interviews and discussions, O= Observation, PA= physical artefacts, ST= Seminars and trainings organized by the research group).

Lesson 1: Reserve time for informal discussions between ITIL consults and employees (Phase 1: ID, O). Informal discussions with user support team members turned out to be very valuable data collection method during the study. The reseach team participated, for example, in weekly coffee table meetings. These discussions worked as ice-breaking sessions and resulted in important information about the current state of the tools and processes. Discussions revealed that some of the workers were afraid of learning ITIL best practices. This observation put us to make big changes in ITSM training material.

Lesson 2: The classification of service desk cases is one of the key challenges in service desk (Phase 2: AR, PA, ID). The classification activity of the incident management has been a bottleneck or a challenge for many IT service provider companies. We started the improvement of classification by exploring service areas and ensuring that a service desk can create service requests, incidents, problems and RFCs and relate these to service areas. We observed that a service request term had been used in a different meaning than in ITIL and there were many request types that were clearly subcategories of service requests. Therefore, we proposed that incidents and service requests would be visible in the *Reason for contact* field's categories, for example, Order - Service request.

Lesson 3: Define clear escalation rules for the service desk (Phase 2: O, ID, DO). We observed that one should clarify the rules of escalating cases to other support levels. The application support team is responsible for handling application-related support cases and providing advice on applications. They had reported that they receive incidents and service requests that would be possible to solve on the first level support (service desk). The hardware technology group had reported the same issue that the service desk assigns the cases too easily for them. One had suggested that a case should be assigned to the hardware technology group not until one has identified that the case is a problem (according to ITIL).

Lesson 4: Identification of repeating incidents creates a natural bridge between incident management and problem management (Phase 3 and 4: O, ID). The interface between incident management and problem management has been among the most discussed challenges in ITIL implementation projects. Incident management and problem management have completely different goals. The main objective of incident management is to resolve incidents (unplanned interruptions to IT services) reported by customers and users as soon as possible while problem management aims to find a root cause for incidents. Thus, the speed of problem solving is not the issue in problem management. After employees have understood the basic meaning of incidents and problems, it is easy to train them that repeating incidents (also called systematic incidents) are potential problems.

Lesson 5: Create a problem management culture to the service desk (Phase 4: ID, ST). Based on the discussions between user support service workers and the member of the tool improvement team, we observed that the employees are not familiar with the problem management process that aims to create proactive customer support. We decided to create a draft problem record for trainings in order to show that there is a place for problem records and a simple instructions how to create them.

Lesson 6: Do not forget event management while improving service desk (Phase 4: O, ID, D, AR). Events are automatic alerts caused by the IT infrastructure. Event Management provides mechanisms for early detection of incidents [32]. The event management process includes the filtering step where a support engineer decides whether to assign the event to an ITSM tool or to

ignore it. We almost forgot to define the interface between incident management and event management. We received very good and tough questions from event management people.

Lesson 7: IT service management trainings should be tailored by using practical examples (Phase 5: ST, O). Before this study, we had always started trainings with the same old picture of ITIL framework. After some informal discussions with user support staff, we decided to hide the ITIL framework from our slides and started training by explaining what are the services and motivating why IT service management is a good thing both from an organization's and employee's career perspective. We felt that this was a good solution. Additionally, we added a lot of organization-related examples to the training material instead of classic ITIL training examples. Finally, we removed all the ITIL abbreviations and translated the English terms in Finnish.

Lesson 8: Conduct ITSM trainings in small groups (Phase 5 and 6: ST). The research team considered important that trainings are organized in small groups and a trainer has a face-to-face contact to audience in awareness level trainings. Thus, employees feel more comfortable to ask questions. However, this required a lot of travelling in our case but we received good feedback. The trainer also decided not to sit in the front of the class but in the same row with audience to create a feeling that a trainer is a part of the group.

Lesson 9: Use CSFs, KPIs and metrics as a basis of a process measurement program (Phase 4 and 7: D, ID, ST). Regarding Continual Service Improvement, we observed that critical success factors, key performance indicators and metrics provide a good basis to establish process measurement program. The case organization had defined several service desk metrics and created reports based on metrics. However, these metrics needed to be linked to critical success factors and key performance indicators. Defining these three elements creates the bridge between business goals and operational measurements.

Lesson 10: Define the interface between Continual Service Improvement and service desk and incident management (Phase 4 and 7: ST, D, ID). The interface between Continual Service Improvement and service desk and incident management means in practice that a service desk collects improvement suggestions from customers, creates improvement suggestions regarding the service desk and the incident management process, tools and people. CSI is also responsible for reviewing service desk as a service.

Both the case organization and the research team were satisfied with the case study results. This paper enables the research team to share ITSM process improvement experiences with other companies.

5 Conclusions

The research problem in this study was: How service engineering processes and service desk can be improved by using ITIL-based best practices? The main

contribution of this study was to describe the phases of a study that focused on improving service desk and incident management process from IT service management perspective and provide lessons learnt from the study regarding processes, tools and people. The unit of analysis in the case study was a government agency, an IS management unit of the Finnish Tax Administration.

We used a phased approach (KISMET technique) with seven phases for IT service process improvement. The improvement focused on 1) classification of customer support requests 2) clarifying the interfaces of the incident management process, especially with problem, change, and event management, 3) increasing the employee's awareness of ITSM concepts and processes and 4) exploring CSI activities and organizing a CSI workshop.

This study included the following limitations. First, we used a single case structure in our study. Thus, the generalization of the results might be weaker compared to multiple case studies and quantitative studies. In order to increase the quality of the case study, we used the principles of data collection presented by Yin [31]: 1) using multiple sources of evidence, 2) creating a case study database and 3) maintaining a chain of evidence. This study provided us important feedback on ITSM trainings, valuable observations on process interfaces. Second, we could have had discussions with the employees from other service areas, such as hardware technology groups of Tax Administration. Unfortunately, the lack of time was a limiting factor. Third, due to research project, we had easy access to the case organization. Every project member receives certain amount of time for process improvement. Thus, the case was not randomly selected.

To conclude, more case studies are needed to examine interfaces between IT service management processes. Further work could focus on creating and validating a Continuous Service Improvement model in IT service provider organizations.

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