Establishing a Continual Service Improvement Model: A Case Study

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Abstract. The Continual Service Improvement (CSI) section of the IT Infrastructure Library (ITIL) version 3 provides IT companies with best practices for the improvement of services and service management processes. Unfortunately, many IT companies consider ITIL-based practices (including CSI) too abstract for their purposes. The research problem in this study is: which methods and practices are related to Continual Service Improvement in IT service management? The main contribution of this paper is an improved version of the CSI model that provides a more detailed and practical view of CSI activities: measurement, reporting and processing of the service development ideas. Our model is compatible with ISO/IEC 20000 standard requirements and ITIL v3 practices. The model emphasizes the importance of change management process in the management of development ideas. The CSI model was created in the cooperation with a Finnish IT service provider company and validated with three different service provider companies.

Keywords: IT service management, continual service improvement, ITIL.

1 Introduction

Due to continual change in technologies, services, products and organizational structures the IT service management is a challenging task for IT organizations. Processes, functions, and services require continual improvement in order to generate positive business results. By improving the service management process maturity, service excellence can be reached. Effective and efficient IT service management very likely leads to improved performance, early detection and prevention of errors and to address problem areas.

Information Technology Infrastructure Library (ITIL) is a set of good practices for IT service management [1]. ITIL is the most widely used IT service management (ITSM) approach that has gained a de facto standard status. ITIL focuses on aligning IT services with the needs of business. ITIL version 3 approaches service management from the service lifecycle viewpoint. The service lifecycle describes the way how service management is structured [2]. The service

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lifecycle consists of five phases: Service Stategy [3], Service Design [4], Service Transition [5], Service Operation [6] and Continual Service Improvement [7].

In this paper, we clarify how organizations measure, report and use the data to improve not only the new processes but also the IT services. To run the CSI as a process, we need clearly defined goals, documented procedures, inputs, outputs and identified roles and responsibilities. In order to be successful CSI must be embedded to the organizational culture [7]. The primary purpose of CSI is to continually align and realign IT services to the changing business needs by identifying and implementing improvements to IT services that support business processes. These improvement activities support the whole service lifecycle. CSI aims to find new ways to improve process effectiveness, efficiency as well as cost effectiveness.

Measurement is an important part of the service management system by steering and controlling IT to the desired direction. Thus, metrics must be designed to match customer requirements, benchmarked to ensure that they are achievable and monitored to ensure that they keep within desired threshold with action taken to correct any problems [8]. Metrics play an important role the Continual Service Improvement because the processes and services must continuously improved. Since improvement initiatives will be more than likely require changes, specific improvements will need to follow the defined ITIL Change Management process [7].

1.1 Related Work

Continual service improvement can be related to improving both organizational and process performance. Some studies deal with business perspective and services while others focus on process, people and technology perspectives. Much has been written about IT Service Management and especially implementing best practices of ITIL [9], [10]. Wegmann et al. [11] have described the main principles of ITIL Service Management and presented how ITSM methods can contribute to the definition of an SLA (Service Level Agreement) by modelling the service provided by an IT department, the stakeholders of this service and the value the stakeholders expect from this service.

Pyon et al. [12] report that service improvement should be considered from process viewpoint and customer viewpoint in the financial service industry. They have proposed a Business Process Management (BPM) framework for managing customer complaints.

Lahtela and Jäntti [13] have examined what types of challenges are related to the service support interface between an IT service provider and IT customers and have identified challenges such as problems in priorization of support requests, challenges in information sharing, and poor transparency of support processes. Jäntti and Kalliokoski [14] have presented knowledge management challenges in the service desk function on a large IT service provider company in Finland. Challenges were related to incident classification, quality of instruction documents, automatization of incident and order processes, escalation of incidents and the interface between incident management and problem management.

Moreover, Jäntti and Järvinen [15] have carried out a case study that focused on evaluating the deployment of an incident management process.

Continual service improvement is included in many standards and frameworks in addition to the ITIL framework. CSI is visible in the Plan-Do-Check-Act requirements of ISO/IEC 20000 standard [16] and COBIT framework (PO8:Manage Quality) [17].

The ISO/IEC 20000 standard [18] requires that organizations continually improve their services and document the improvement actions and results. Lima et al. [19] have studied improving the quality view. They have dealt with how to estimate quality percent of an IT service, in order to provide a continual activity in the service life cycle.

1.2 Our Contribution

This paper belongs to the results of ongoing KISMET (Keys to IT Service Management and Effective Transition of Services) research project.

The Continual Service Improvement in the IT Service Management was one of the KISMET focus areas. The main contribution of this paper is to:

- describe how the Continual Service Improvement process model was established,
- describe the main elements of the CSI process model and
- describe how the research team validated the CSI process model.

The goal of this study was to create a systematic model for managing improvement actions concerning IT services and service management processes. We aimed at helping IT service provider organizations to achieve a high quality of service and customer satisfaction. The study was carried out between August 2010 and June 2011.

The rest of the paper is organized as follows. In Section 2, the research problem and methods are described. In Section 3, we present the CSI process model and describe its elements. 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

This case study is a part of the results of KISMET (Keys to IT Service Management and Effective Transition of Services) research project at the University of Eastern Finland. The research problem of this study is: Which methods and practices are related to Continual Service Improvement in IT Service Management?

We used a case study research and constructive research methods with a single case organization to answer the research problem. The research problem was divided into following three research questions: 1)What is CSI and what functions, roles and responsibilities are related to it? 2)How IT services are measured and reported? 3)How does the CSI deal with the improvement initiatives?

In this study, we used a qualitative research approach to improve IT service provider's processes and practices. Additionally, we exploited triangulation of methods, a combination of the study case research, constructive research and literary review. The main contribution of the study was a detailed CSI process model that was targeted to IT service provider companies. We aimed to create a model that IT companies could use while improving their service management. Our model was divided into three sections: measurement, reporting and processing of the improvement ideas.

According to Yin [20] a case study is "a research strategy which focuses on understanding the dynamics present with single settings". A typical feature of the study is that the focus is often the processes. The case study focuses on studying and understanding of a particular object of study, activity in connection with their environment [20]. During the case study researcher is an outsider, who observes and analyzes the environment, making notes by combines different data collection methods.

Additionally, we used a constructive research method which is widely used in software engineering and computer science. Constructive research aims at producing novel solutions to practically and theoretically relevant problems. Constructive research can be defined as "managerial problem solving through the construction of models, diagrams, plans, organizations, etc.". To be considered constructive research, the research must combine problem solving and theoretical knowledge. The third method that was used in this study was a small-scale literary review. It focused on the studies in IT service management (ITSM), Information Technology Infrasfructure library (ITIL) and ISO/IEC 20 000 standard. It revealed that very few studies had investigated continual improvement from the IT service management viewpoint.

Our case organization Alfa is a Nordic IT service provider organization that has operations both in Finland and in Sweden. Alfa provides companies and organizations with easy-to-use IT services. Alfa has around 700 employees and its turnover was approximately EUR140 million in 2011. Alfa provides various types of services to its customers: application services, desk top services, servers and capacity services, network services etc. The case organization was selected by using elite sampling. Alfa was a unique case in Finland with a strong focus on ITIL, ISO/IEC 20000 and ITSM tool improvement. The case study with Alfa was performed in three separate phases (August 2010 - July 2011).

Multiple data sources were used in collecting data from the case organization's service management processes:

- **Documents**: Administrative documents, progress reports, meeting memos and other internal records
- **Archival Records**: Incident and service request records **Interviews and discussions**:
- **Participative Observation**: Process improvement meetings with CSI Managers and Process Managers from the case organizations
- **Physical Artifacts**: Access to the case organization's intranet, reporting tool, process tool and customer support tool

The data were collected in three phases. The start of the study and data collection started in August 2010, when a researcher began her master studies trainee period (3 months). The goal of the period was to identify and study the ITIL framework and start the development of CSI model. During the period the researcher had the opportunity to explore the literature review, participant observation, and business documents using. The first phase of the study resulted in the first version of CSI (Continual Service Improvement) model as well as descriptions of the roles and process metrics.

The phase 2 started in middle of the November, 2010 when the researcher started working in the KISMET project. The work included designing and building a process description for Continual Service Improvement. During the phase 2, the researcher carried out the literature review and analyzed the archival records. The result of the phase 2 was the 2.0 version of the CSI model and a process description of Improvement Process (v 0.1).

During the phase 3 researcher worked in the KISMET research pilot with the case organization. The organization carried out the study to identify and improve ITSM practices. Data collection was done by using the literature review and corporate documents and participant observation (meetings, information and training sessions). The main result of phase 3 was a model to support the handling of development proposals.

2.1 Data Analysis

A within case analysis technique [21] was used in this study with content analysis methods. Especially, theoretical content analysis was used in the data analysis. Content analysis is a research method for making replicable and valid inferences from data to their context, with the purpose of providing knowledge, new insights, a representation of facts and a practical guide to action. The aim is to attain a condensed and broad description of the phenomenon, and the outcome of the analysis can be concepts or categories describing the phenomenon. Usually, the purpose of those concepts or categories is to build up a model, conceptual system, conceptual map or categories.

3 Establishing a CSI Model

In this section, we will introduce how the CSI model was established in cooperation with the case organization and the KISMET project research team. The research work consisted of three main phases: Phase 1: Defining the research problem and investigation, Phase 2: Building the CSI model, Phase 3: Validation of the model. These phases are described in the following subsections.

3.1 Defining the Research Problem and Investigation

The kickoff meeting of the pilot project was arranged in August 16, 2010. In that meeting, the representatives (CSI manager, process owner of the incident

management, change management and configuration management) of the case organization reported that they would like to improve the process of managing improvement initiatives. **The diagnosed problem:** Lack of systematic and easy-to-apply model for continual service improvement. The research work started by exploring the practices and tools of measurement and reporting in the case organization. The organization already used IT service management framework ITIL. Creating a process framework for CSI was started from the 7-Step improvement model of ITIL framework. Additionally, the researcher started examining ISO/IEC 20000 requirements for PDCA cycle.

3.2 Building the Continual Service Improvement Model

The CSI model was improved in two meetings with the case organization. Implementation of improvement ideas was combined to the change management process because change management is a natural place to handle improvement ideas. Figure 1 describes the activities of the CSI model.

CSI model has been designed to demonstrate and clarify how services and processes can be systematically improved through measurement, reporting and management of improvement ideas. Next, we briefly describe the elements of the model. Regarding the measurement, it is essential that company's business vision and goals have been identified before one can start building process performance metrics. It is possible that current tool does not meet the requirements of IT service management. Thus, the organization should make a decision whether to buy a new tool or improve the existing one. The organization needs three types of metrics to support the continual service improvement: technology, process and service metrics. The organization should define limit values for measurements to be able to benchmark results and identify deviations. Measurement data can be collected from service desk tools, monitoring tools, existing reports etc.

In reporting phase, collected data is converted into desired form and audience. Quite often, organizations have a reporting unit that is responsible for creating reports and maintaining reporting technologies and tools. Data should be processed into information to enable more effective data analysis. Reports are produced monthly or weekly to customers and management. In case of service level breaches, one should discuss about required improvements. Identified improvement areas are reported to all relevant stakeholders.

During the improvement phase, improvement areas can be identified by using several ways, such as customer feedback, survey results and audit and review results. Identified improvement ideas are dealt within the change management process. Change managers and Change Advisory Board meetings evaluate, prioritize, authorize and plan changes. The scope and business impact of the improvement defines whether it shall be implemented by an employee or an implementation group. The change can also turn out to be a major change. In that case, it shall likely initiate a project. The project management has a clear interface with continual service improvement. CSI should analyze the lesson logs of IT projects and define improvement actions. Project management shall likely produce project tails that are inputs for CSI. At the end of the improvement phase improvements

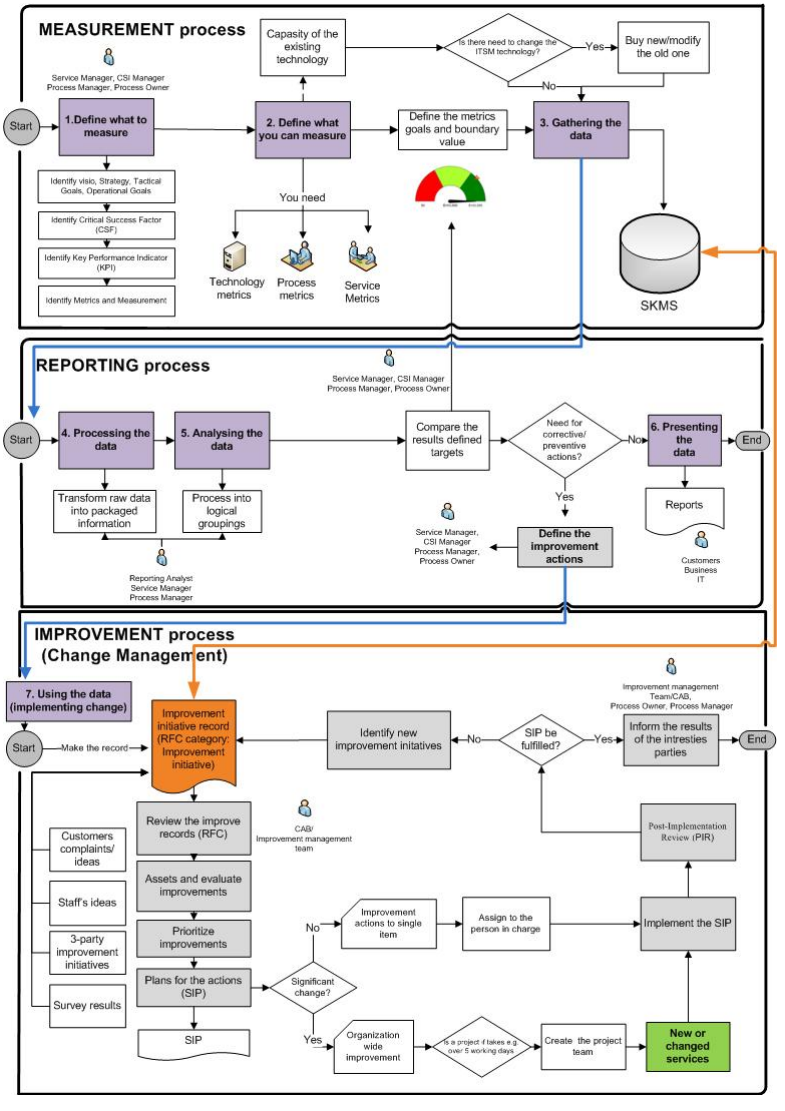

Fig. 1. The CSI model

are implemented, post-evaluated and communicated to stakeholder groups. Post-implementation review should be carried out both for failed changes and successful changes.

Swimlines were added to the CSI models: change manager, change advisory board, design and transition of new and changed services. Additionally, a new action, handling project tails, was inserted to the model. Project tails are issues (for example, change requests) that are not implemented during the project but need to be transferred to the operation. Usually, project tails are identified while writing the closure report of the project.

3.3 Validating the CSI Model

Besides Alfa, the CSI model was validated with two other organizations, 1) Beta, the Information System Management unit of a government agency that provides IT services (application services, user support, desktop, servers) to employees, 2) Gamma, an ICT provider company that provides IT services (server and data center services, network and telecommunication services, ICT acquisition services, IT consulting, project and introduction services) mainly for 2 main customers. Validation was done in three meetings June 15 (Alfa), October 5 (Beta) and November 29 (Gamma). The following comments have been collected from validation meetings. In order to keep comments anonymous, we have not categorized them according to companies.

- "In our company, especially incident management and service request management are measured very well"
- "Measurement plays an important role in IT service management"
- "It is not enough to measure volume of support requests, we need to know how much one ticket consumes resources?"
- "Regarding change management, we need to identify different types of changes: emergency changes, strategic changes..."
- "Good model that could also be used for other purposes than solely managing improvement ideas"
- " It is good to see interface between projects and CSI"
- "We would need unified reporting and measurement practices to our organization"
- "What is the interface between change and improvement idea in practice?
- "What types of inputs project managemement produces for CSI? We are planning PRINCE2-based project management."
- "We measure montly the customer satisfaction on service desk cases"
- "Additionally, we carry out reviews for projects and applications"
- "We have a lot of service desk related metrics: User support resolution time and volumes, volume of support requests assigned to local support"
- "We receive quite few formal complaints. Most common causes of the complaints are unclearly documented resolutions, delays in receiving answer or service and conflicting instructions given by service desk specialists"

Based on the validation meetings, we observed that IT service providers considered the model useful but still needed some practical guidelines to support the process model.

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: Create an organization-wide CSI policy (ID, O, AR, PA, D)
We observed that various types of continous improvement methods were used in the case organization. However, there was not a systematic organization-wide model for managing improvement suggestions. The same issue was addressed by Beta and Gamma. In Alfa, improvement ideas were assigned to unit leaders who shall analyze them and initiate improvement actions. Improvement ideas are often discussed on hallways, email and in meetings. The goal would be to capture and store them to the IT service management system.

Lesson 2: Start the measurement program by defining CSFs, KPIs and Metrics (AR, ID, D)
During the case study, we observed that the organization had numerous performance metrics in use. Additionally, IT service measurement was focused on certain parts of IT service production, especially, service desk, incident management and service request management. In order to select few good metrics that support the core business requirements one could use CSFs, KPIs and metrics as a basis of the measurement program.

Lesson 3: Clarify the concept of Service Improvement Plan (AR, ID)
During the study researchers were asked many times what is the SIP in practice. Both ITIL and ISO/IEC 20000 use the term SIP. According to ITIL a SIP is a formal plan to implement improvements to a process or IT service. An IT service provider could simply implement a SIP by collecting data on improvement suggestions regarding processes and services, analyzing them frequently (for example, monthly), creating requests for change to implement improvements and reviewing improvements.

Lesson 4: Check the interfaces between CSI and other processes (O, ID)
During the validation, we noticed that companies were really interested in the interface between continual service improvement and other ITSM processes such as change management and design and transition of new or changed services. In our model, change management is an active participant in the CSI process and responsible for managing the development ideas like other changes. We also added the interface to project management while organizations were very interested in that.

Lesson 5: Remember communication about the results of Continual Service Improvement (D,ID)
Organization had put a lot of efforts on creating unified service management practices. For example, there had been mandatory company-internal ITIL trainings for service center employees. During training events (organized four times per year) employees receive information on actual improvement plans of the organization and changes on work practices. Some employees indicated the need to get more information on improvements.

Lesson 6: Identify the sources of improvement ideas (O)
We observed that employees have difficulties to identify sources of improvement ideas and define a systematic process for handling them. The sources of improvement ideas may include feedback from customers and personnel, research results and survey results, third-party feedback, measurement results and project closure reviews. The organization would need clearer methods to support the process and service improvement because at the moment a lot of time goes to reactive work, "fire fighting" and there is often no time for proactive activities.

Lesson 7: Defining roles, responsibilities and tasks supports the service improvement (O, D)
Through the processes, people's expertise can be converted into knowledge, skills, models and theories. During the study, we defined two new roles; CSI manager and process owner role. The goal behind the CSI manager role is to enhance managing improvement suggestions and introduce the CSI methods in practice. The process owner is a role that ensures that the process follows agreed and documented practices and reaches the defined process objectives.

Lesson 8: Create a CSI calendar for process and service reviews (DI, O)
Organizing process and service audits and reviews is one of the CSI teams core tasks. An open CSI calendar with review dates would help process and service managers to prepare better for reviews. Internal reviews can be performed, for example, to check whether support request handling has followed documented processes and to identify deviations and their root causes. It is also a good idea to use external auditors frequently to identify improvement areas.

Lesson 9: Identify the wide scope of CSI (ID, O, AR, PA, D)
In order to implement CSI and identify improvement areas one can use varius methods and tools. The following list is based on our findings from the case organization Alfa: customer satisfaction surveys, process and quality improvement meetings, writing work instructions, carrying out trend analysis for incidents and service requests, weekly team meetings, project lesson logs and analysis of measurement data.

5 Conclusions

The ITIL framework provides best practices for continual improvement of services and processes. However, many service providers are not familiar with CSI practices or consider CSI practices too abstract for daily use. Additionally, the ITIL presents the CSI activities (measurement, reporting and management of improvements) as separate actitivies lacking the unified view of CSI. Therefore, CSI is a fruitful research target. The research problem in this study was: Which methods and practices are related to Continual Service Improvement in IT service management?

The main contribution of this study was to present an improved CSI model that provides a detailed description of activities within measurement, reporting

and processing improvement ideas. The model was created in cooperation with a Finnish IT service provider organization Alfa that was the unit of analysis in the case study. In addition to Alfa, the model was validated with two other IT service provider organizations who provided valuable comments for the further work. Finally, we provided lessons learnt from establishing and validating the model.

This study included the following limitations. First, the CSI model was build mainly with one case organization. Multiple organizations would have provided a richer view on the structure of the model. However, we carried out the validation phase with two additional service providers. Second, generalization of the results might be weaker due to small number of cases. In order to increase the quality of the case study, we used various forms of triangulation: method triangulation, researcher triangulation, and data triangulation. Third, the model was validated with manager-level persons from IT service provider organizations. We could have had validation meetings with employees such as service desk workers who enter the data on improvement suggestions to the ITSM tool. Unfortunately, the lack of time was a limiting factor.

To summarize, more case studies are welcome in the area of continual service improvement. Further work could focus on deployment of Continual Service Improvement practices, analyzing the bottlenecks in CSI methods or investigating the interfaces of CSI with other IT service management processes.

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