



Studying Continual Service Improvement and Monitoring the Quality of ITSM

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Abstract. Through Continual Service Improvement (CSI), IT service providers aim at identifying, documenting, evaluating and prioritising improvement areas in services and service processes. CSI plays a crucial role in managing service and process quality as well as transforming improvement suggestions and ideas into concrete actions and product features. Unfortunately, many companies lack the systematic CSI approach and tools. This may lead into lost business opportunities, long processing times in implementing customers' change requests and finally losing key customers. Additionally, digital transformation creates a need for more agile and flexible CSI. Therefore, CSI is an actual and interesting research target from service quality perspective. In this paper, CSI practices of a Finnish IT service provider company are studied. The research problem is: How IT service provider organizations perform Continual Service Improvement methods as part of daily service operation management? The main contribution of this paper is to present findings from a case study with a ISO/IEC 20000 compliant service organization. We focus on exploring how the quality of CSI targets is monitored, how CSI is organized and deployed into practice and how service-related improvements are managed.

Keywords: Continual Service Improvement · Service quality · Service management

1 Introduction

Continual Service Improvement (CSI) enables IT service providers to identify, document, evaluate and prioritize improvement areas in services and service processes leading to increased quality in service provision [5]. CSI plays a crucial role in transforming improvement suggestions and ideas into concrete actions and product features. Especially in today's digital service business, customers have

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high expectations regarding delivery time of new service features and customer experience [10]. Together with service design [6], CSI is able to identify improvements to service solutions and thus helps to meet better changing business needs of customers.

Unfortunately, many companies lack the systematic CSI approach and tools. This may lead into lost business opportunities, long through put times in implementing customers' wishes and even losing key customers. Therefore, CSI is an actual and interesting research target in the context of service management and service science [32]. Best practices of service management and continual service improvement can be applied by not only IT providers but any service company from any industry such as hospitality, healthcare, energy [3] or legal services [22] to manage, operate and improve services more systematically. In this paper, we focus on CSI performed by IT service providers.

CSI requires continuous monitoring of customer satisfaction, services and processes, staff performance, competences, and service efficiency. By processing improvement suggestions systematically, the organization is able to improve the quality of provided services, effectiveness of service operations, and cost efficiency. Communicating improvement suggestions and the actions required by them the organization strengthens the positive attitude towards the culture of continual improvement.

Continual improvement can be found in several service quality management standards and frameworks such as:

- ISO 9001:2015. The organization shall determine and select opportunities for improvement and implement any necessary actions to meet customer requirements and enhance customer satisfaction [14].
- ISO/IEC 20000-1:2011. There shall be a policy on continual improvement of the Service Management System (SMS) and the services. The policy shall include evaluation criteria for the opportunities for improvement [15].
- ISO/IEC 15504-8. The purpose of the improvement process is to continually improve the SMS, services and processes. Base practices involve identifying and evaluating improvement opportunities, planning and implementing approved improvements, and communicating results of improvement actions [16].
- IT Infrastructure Library (ITIL). Continuous improvement of services is performed through Continuous Service Improvement Programmes (CSIP). CSIP is an ongoing formal programme undertaken within an organisation to identify and introduce measurable improvements within a specified work area or work process [25].
- Control Objectives for Information and related Technology (COBIT) PO8: Manage Quality. Continuous improvement is achieved by ongoing monitoring, analysing and acting upon deviations, and communicating results to stakeholders [7].

Previous studies on continual service improvement have focused on business-driven continual service improvement [23], establishing a continual service

improvement model [12], continual improvement in the context of Kaizen [2] and success factors on ITSM implementations [26]. Shrestha et al. [28] use a combination of Balanced Scorecard and SERVQUAL [31] (a model of service quality) to assist service improvement. They aim at proposing a tool that would help IT organizations to select targets (ITSM processes) for process improvement with evidence-based information. The automation of process assessment activities with a tool reduces the effort in determining IT service management process capability levels [29].

Gervala [11] states that IT governance (through use of ITIL) can contribute to better business performance, for example, in the form of performance evaluation of services and identification of performance problems. Similarly, Jäntti and Hotti [18] explore interface between IT service governance and IT service management and propose that it is valuable to recognize the differences between these two. Effective IT service governance would ensure that all ITSM processes are considered equal in terms of receiving resources for continual improvement. A Service Management Office function with ITSM process owners would be a good example of a governance function while process managers and practitioners operate perform daily operative service management.

Additionally, many of existing service improvement studies have focused on improving a specific IT service management process such as incident management [17], problem management [20] and release management [19].

There are various monitoring targets for CSI such as services, processes and infrastructure. Lima et al. mention in their study [23] staff behavior (how staff follows processes), project budgets, and automatic monitoring of IT infrastructure [23]. Some targets (elements of IT infrastructure) can be monitored automatically through monitoring tools while other areas might require manual observation by service staff. Pollard and Cater-Steel [26] report that IT service management (ITSM) implementations need a project champion. Therefore, organizational CSI programme also requires a strong champion in order to succeed.

Van Aartsengel and Selahattin [1] propose establishment of a systematic performance measurement framework to assist CSI. They comment that a good performance measurement framework enables organization to receive more visibility how local performance measures fit with enterprise level global performance measures. Thus, everybody in the organization is able to see how individual performance measurements are related to each other.

Gacenga and Cater-Steel [9] have studied performance measurement of ITSM in an Australian university. They found that there were both internal factors (meeting the need for improved governance, alignment of IT strategy with organisation strategy, and having a mechanism to provide feedback to IT customers) and external factors (benchmarking against others in the same industry, and availability of metrics in the ITSM tool) that influenced selection of performance metrics. In addition to performance measurement, there are studies that have focused on improving IT Service Management evaluation [24] and creating measurement systems to improve monitoring of IT service management [21].

In this paper, CSI practices and quality monitoring methods of a Finnish IT service provider company are studied. The results of the study might be used by quality managers, CSI managers, and any service staff responsible for continual improvement. The results can be applied for speeding up the establishment of a CSI programme and CSI activities. The remainder of the paper is organized as follows. Section 2 describes the research methods. Section 3 presents the results of the study. Section 4 provides an analysis, and conclusions are given in Sect. 5.

2 Research Methods

This study aims at answering the following research problem: How IT service provider organizations perform Continual Service Improvement as part of daily service operation management? The study was started by dividing this broader level research problem into three research questions:

- How the quality of services, service processes and service management system are monitored?
- How Continual Service Improvement has been organized and deployed?
- How service-related improvement suggestions (CSI items) are managed?

According to Yin [30], a case study is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context”. The real life context refers to daily service management of an IT service provider organization.

This study focused on continual service improvement methods in the context of IT service management. The case organization was selected because the main author of this paper was working for the case organization, thus having an easy access to data. Additionally, we considered the case as a representative case because its service operations and processes are compliant with ITSM standards (ISO/IEC 20000) and service management frameworks (ITIL). Finally, the research team has had long term collaboration with the case organization which helps in receiving relevant data on ITSM. This study can be considered as exploratory case study with process improvement aspects [27].

2.1 Case Organization

The case organization Alfa has 570 employees and provides information, communication and medical technology services to its customers in Finland. Alfa also operates in a service integrator role for social and healthcare organizations and municipalities.

The turnover in 2018 was 112 million euros with facilities in three cities. Alfa’s service management system is based on ISO/IEC 20000 and ISO 9001. Service process assessment and reviews are carried out systematically in Alfa to enable continual improvement. Alfa had recently replaced the service management tool with a new one.

2.2 Data Collection Methods

Data for this study was collected by using multiple sources of evidence from the case organization Alfa between 2018-2019. The data was captured by the first author while the second author participated in documenting the case study.

- Documentation (case documentation such as quality handbook, ITSM process descriptions, standards: ISO 9001 and ISO/IEC 20000, monthly steering board infoletters, personnel info presentations, intranet information letters, and CSI guidelines documentation)
- Archives (CSI records in the service management system)
- Interviews/discussions (CSI process owner, quality manager, process managers, financial manager, HR manager, HR specialists, development manager, group managers, Service Management Office SMO)
- Participative observation (observations on monitoring methods in case Alfa, participation in SMO meeting in a CSI process manager role)

Each interviewee was asked to provide his/her own perspective or opinion on CSI, for example, Financial Manager was asked to provide a list of monitoring and measurement methods and information how they analyze data and which metrics they use. Service Management Office is a function inside Alfa aiming at meeting monthly to discuss the progress of process improvement tasks, to receive support from other process managers, to solve process related problems in a bigger group, and to prepare for forthcoming changes and audits.

2.3 Data Analysis

A within case analysis technique [8] was used to analyze case study data from a single case organization. Authors performed data collection and data analysis as a joint effort. Main analysis techniques included tabularization and categorization of data from case Alfa. The analysis was performed by pattern matching technique and tabulating the most relevant findings.

Patterns in our case were: 1. quality monitoring and measurement (monitoring and measurement of services, service management processes and service management system), 2. organization and deployment (organization and deployment of Continual Service Improvement, including roles, responsibilities, model of introducing CSI in the organization) and 3. management of improvements (management of improvement suggestions within CSI covering tools, processes and methods for identification, management and implementation of improvement/development ideas). Patterns 1 and 3 were major elements of CSI [6] that can be seen as predicted patterns [30]. The pattern 2 was based on the authors' own experiences referring to the fact that organizing CSI is a complicated set of tasks and requires more investigation.

3 Results

The results of this study have been presented in this paper according to three research questions.

3.1 How the Quality of Services, Service Processes and Service Management System Are Monitored?

Figure 1 shows quality monitoring mechanisms for services, service management system and service management processes in the case organization Alfa. Elements that we identified included customer and service management aspects, monitoring and measurement actions, schedules, and roles responsible for the measurement actions.

Monitoring and measurement aspects	Service and customer satisfaction	Actions	When	Role
		Customer survey	1 x year	Business relationship management's process manager
		Customer feedback	After closing incident/service request	Group manager
		Customer satisfaction survey (Text message survey after service Desk call)	1 x month	Service Desk group manager
		Pos/neg feedback and complaints	Continuous	Service manager & customer manager
		Project feedback	After each project	Project manager
		Service meetings	2-4 x year	Service manager& customer manager
	Service manager and Group manager meetings	Every 1,5 month	Service manager & group manager	
	Maintenance and development of the service management system (SMS)	Actions	When	Role
		Internal audit	1 x year	Quality manager/specialist
		External audit	1 x year	3 part
		Service Management Office (SMO) meetings with process managers	1 x month	Quality manager
		Process improvement plan and tasks	In the first quarter (Q1)	Process owner
		Process metrics	1 x month	Process manager
		Process maturity assessment (Tudor IT Process Assessment, TIPA)	1 x year	Quality specialist
		Management review	2 x year (spring and fall)	Quality manager
		Quarterly meeting to plan SMS task	4 x year	Quality manager & quality specialist

Fig. 1. Quality monitoring mechanisms of services, SMS and service processes in case Alfa.

We observed that quality monitoring covers various aspects (service and customer satisfaction, maintenance and development of a SMS, economy, and staff satisfaction, competence and performance). The case organization monitors the provided services in order to verify that customer requirements are fulfilled. At the same time, one may observe flaws or improvement suggestions identified by customers. According to case Alfa’s quality manual, every employee of case Alfa is responsible for continuous monitoring and evaluation of daily work routines and identification as well as sharing information of bottlenecks and improvement suggestions.

Staff satisfaction and competence level is defined by personnel surveys and career development discussions. Various types of customer satisfaction monitoring was found, such as collecting service and customer satisfaction data with annual customer satisfaction surveys, ticket resolution surveys after closure of each service request or incident and text message surveys in case of service desk phone calls. In order to monitor success of project management, the organization uses project feedback surveys.

3.2 How Continual Service Improvement Has Been Organized and Deployed?

According to case study observations, Continual Service Improvement in case Alfa was organized around organization-wide service management where two quality management standards (ISO 9001, ISO 20000) were directly linked to maintenance and development of the service management system. In addition to standards, project management frameworks (PRINCE2), IT service management best practices (ITIL), IT service process assessment frameworks (Tudor IT Process Assessment Model [4]), Lean frameworks and Service Integration and Management (SIAM) were identified to have relations to the service management and continual improvement of case Alfa.

The case Alfa had established a CSI manager role in order to boost continual improvement of services and service management as well as a CSI specialist role that focused on documenting improvement practices to ensure compliance with requirements of standards and to introduce the CSI model to staff and perform the CSI process manager role.

For every process, there is a dedicated process owner (member of Alfa management board) that is responsible for defining annual goals for process aligned with the organization's strategy. Additionally, for each service management process, there is a process manager that is responsible for continual process improvement of his/her own process area.

Moreover, there are development managers who are responsible for unit development according to tasks assigned by the director of the unit. Development managers also develop service offerings for business units in the context of processes, customers and products and services.

Our next step was to study how CSI had been introduced in case Alfa. The introduction of formal CSI in Alfa started and proceeded with following steps. The first step was to clarify the CSI-related process description text and make it more unified. A new section (Chap. 6) was created describing how data is collected by measurements, how it is analyzed and evaluated and how improvement areas are identified.

The second step was to create unified process templates and create version control and acceptance procedures for them. Third, intranet (file management) was deployed to serve as a centralized datastore for process documentation. Fourth, service management office meetings were started with process managers.

Fifth, service management tool Beta (name changed from anonymity reasons) was introduced in 2016. It enabled monitoring various types of tickets and improved specialists' understanding on various service management processes (change tickets, incident tickets, problem tickets) because before this all the requests had been classified as service requests. Sixth, metrics were prepared for service management processes and these were monitored from ppt presentation (in Service Management Office meetings).

Finally, Continual Service Improvement manager participated in monthly meetings of service groups and informed staff on continual improvement and management of improvement suggestions. Discussions with CSI process owner

revealed the benefits that CSI had provided to organization (March 21st, 2019). According to comments from these discussions, CSI makes communication easier, gives a better overview of big picture, provides a diagram that is easy to present to interested parties, and should perhaps have swimlanes in order to address and clarify action requests coming from management.

3.3 How Service Related Improvement Suggestions (CSI Items) Are Managed?

Among first tasks of the new CSI manager had been to define a process for identifying and managing improvement suggestions. Next, an overview of that process is presented in Fig. 2.

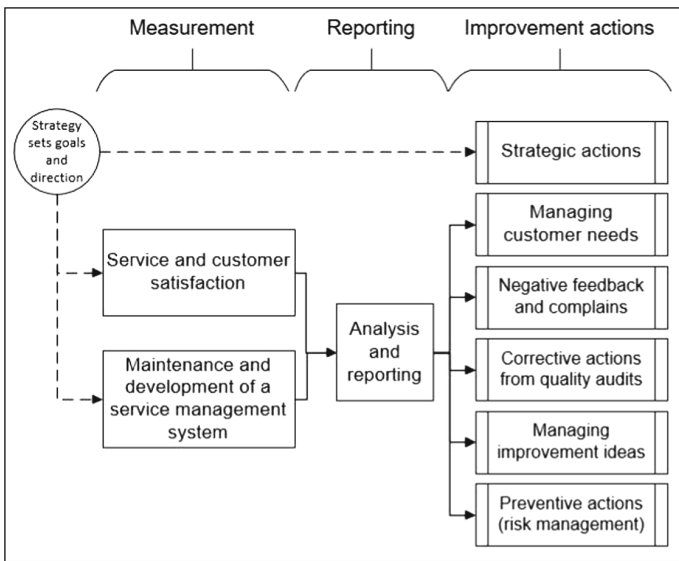


Fig. 2. Types of improvement actions in case Alfa.

Figure 2 shows how the CSI items (improvement actions) fall under 5 main categories: managing customer needs, dealing with negative feedback and complaints, corrective actions from quality audits such as ISO/IEC 20000 followups, improvement ideas related to services, and preventive actions from the risk management process. Additionally, there are strategic actions addressing the strategic goals of Alfa. Concerning tools and systems, our findings from the case organization showed that tools served two main purposes in CSI: (1) identifying improvements and (2) managing the improvement suggestions.

- IT service management system (communicated as an enterprise resource planning system within the case organization and to its customers)

- Survey tool to capture feedback on resolved tickets
- File management system to store CSI-related documentation
- Intranet involving information letters, process sites and instructions
- Wiki system involving production instructions
- Reward management tool. Based on implemented improvement suggestions, one can suggest reward for a specialist or a specialist group.

The final step in our study was to conduct interviews with process managers (April 2019) to identify how they see the Continual Service Improvement Model. Next, findings from these interviews are presented:

Release, Deployment and Change Management Process Manager:

“The model includes descriptions, data and inputs that have been collected together under the umbrella of CSI. In the process manager role, one can take a part of CSI and start improving that particular part of it. Thus in the future, the next potential developer has a more complete picture of the process upon which to continue improving it.”

Quality Specialist and Knowledge Management Process Manager:

“The model benefits and supports the continual improvement required by standards. Continual improvement is not only processing improvement suggestions. In the process manager role, the model enables improvement of operations (core activity). There are also deficiencies related to CSI. The staff does not recognize improvement model and thus shall complain instead. They do not recognize that there are persons to whom ideas could be delivered. The staff is not able to identify how ideas could be logged or managed.”

Incident and Service Request Management Process Manager:

“The challenge is that we have too few people to promote and work in Continual Improvement. We should have a working group. Our management should participate and sell Continual Improvement further. I am thinking whether measurement results are stored in a fragmented way. Additionally, challenges are caused by diversity of data. We should describe the process of implementing improvement targets. Evaluation and analysis of results should be clarified in the next release. The selection of appropriate implementation method requires understanding on organizational processes.

Configuration Management Process Manager:

“The CSI model creates good basis for a process visualization tool. I got good feelings from the presentation. Strategy, vision, mission in logical order. There are metrics that lead to identification of improvement targets. From the process manager perspective, it makes my own role/share in CSI clearer and clarifies tasks. It describes inputs for continual improvement.”

4 Analysis

Table 1 shows the analysis of results according to three research questions. Data source has been described by using abbreviations: IN = Interviews/discussions,

Table 1. Analysis of key findings

RQ	Observation (Source)	Conclusion
RQ1	Every employee responsible for improving (DO)	Joint responsibility for CSI
-"-	SMO/audits in key role in improv. SMS (PO, DO)	SMS under CSI
-"-	ITSM maturity assessed by TIPA (PO)	From compliance to maturity
-"-	Customer feedback from many points (PO, DO)	Customer focus visible
-"-	Meas. results easier to find (PO, DO, IN)	Evidence available
RQ2	CSI workgroup needed (IN)	More discussion on CSI
-"-	CSI gives a big picture (IN)	Clear view as a benefit
-"-	Define responsib. for IAs (PO)	Ensure implem. of IAs
RQ3	Staff not aware where to record impr. (IN)	Continue CSI awar. work
-"-	Manag. should participate in CSI (IN)	Engage top management
-"-	Speed up processing time of ideas (PO)	Go or No go decision

DO = Documentation, PO = Participative observation, DOB = Direct observation, PA = Physical artefacts. Other abbreviations: IA = Improvement action.

The process of Continual Service Improvement had a clear interface to quality improvement of services, products and service management processes in the case organization Alfa. We found processes, metrics, roles and several tools supporting directly continual service improvement including quality monitoring, reporting and management of improvement ideas.

We observed that monitoring targets were clearly defined and also communicated to employees. One of the key reasons or a trigger for developing a systematic CSI approach seemed to be establishment of ISO 20000 compliant service management system and its follow up work on ITSM maturity assessment.

Implications for Practice: We found a rich set of evidence how CSI and 7-step improvement model had been introduced in Alfa: (1) identifying and documenting the 7-step improvement model from the perspective of ITSM processes, (2) recording annual development tasks of ITSM processes and monitoring them in SMO meetings, (3) gathering process documentation to the organization’s intranet and quality management system, (4) implementing ITSM process assessment (for 9 processes), (5) enabling logging improvement ideas from a self-service portal (ITSM tool) for staff, (6) communicating the procedure of logging and processing improvement ideas in Intranet, conducting information sessions for staff, providing guidance for recording improvement ideas in monthly group meetings, and CSI workshop, (7) selecting specific management board persons to process owners, (8) documenting the monitoring and measurement methods, (9) including Continual Improvement to management review (status of external and internal audits, TIPA assessments, and improvement ideas), (10) developing an improvement suggestion record with new features (automated routing to the group responsible for evaluating the idea, functionality regarding prioritization and evaluation of ideas), and (11) planning the deployment of process

visualization tool to support better process transparency, interfaces between processes and inputs to improvement actions.

Regarding implications for practice, data constructed from this study may help other service organizations to establish their own continual improvement methods and metrics within a shorter timeframe and to decrease change resistance towards continual improvement programmes.

Concerning the management of improvement suggestions, we identified five different types of improvements (e.g. managing customer needs, negative feedback, improvement ideas, corrective actions, preventive actions) that had their own specific workflow and source. We observed that the new ITSM tool had been adjusted to serve also needs of CSI and allowed easy collection, reporting and management of improvements.

Implications for Theory: The development of our Continual Service Improvement model started from an ITSM theory-based model approx. ten years ago. While CSI subprocesses have been written in quite a generic way in ITIL publications, there is definitely more room for innovative theory-based CSI models that challenge the traditional (and rather generic) Measurement - Reporting - Manage improvements process structure or literature reviews that would focus on continual service improvement but would utilize the findings of existing ITSM-related literature reviews [13]. ITSM theories can also introduce new tools to increase productivity of ITSM. This study supports the findings of Shrestha et al. [28] regarding continual service improvement of ITSM. They reported that ITIL framework and the international standard ISO/IEC 20000 of ITSM fail to provide guidelines or requirements for selecting target processes that should be improved. In our study, the case organization's process managers select improvement targets in the beginning of the year and record improvement actions to a joint document. Additionally, we made a general observation that most employees in Alfa were quite positive towards CSI concept and willing to share their opinion on CSI model.

We agree with Lewis and Brown [22] that service operation quality may depend very much on how well service package design and process design have been made. Poorer the design of service, more improvement efforts needs to be placed to the service in service operation phase. Very few of existing academic articles discuss how CSI is visible in each service lifecycle stage: strategy, design, transition, operation. More research is needed to address this. Gacenga and Cater-Steel [9] reported an interesting finding that availability of the metrics in ITSM tool affected the selection of performance metrics. We observed that reporting capabilities of the tool was one of the key reasons, besides better customization opportunities and tool performance issues, why case organization Alfa had started to replace their old ITSM tool with a new one. The new tool enabled quick creation of dashboards (personal and public) and metrics.

Regarding implications for theory, we consider this study valuable for academic community because it provides deep insights and increased understanding of a service organization's CSI tools, methods, metrics, roles and practices. We highly recommend engaging ITSM practitioners to participate in writing

academic IT service management case studies. This would better generate discussion on real world ITSM problems.

5 Conclusions

This study aimed at answering the research problem: How IT service provider organizations perform Continual Service Improvement methods as part of daily service operation management? The main contribution of this paper was to present findings from a CSI-related case study with a ISO/IEC 20000 compliant service organization.

This research problem was divided into the following three research questions: (1) How the quality of services, service processes and service management system are monitored? (2) How Continual Service Improvement has been organized and deployed? and (3) How service-related improvement suggestions (CSI items) are managed?

Regarding the first research question, Alfa aimed at increasing transparency and utilization of data by documenting monitoring and measurement methods (what, when, who is responsible, what is the output). This also enables Alfa to evaluate usefulness and effectiveness of metrics, for example, whether they produce data to support decision making. When implementation date of metrics is known, it helps allocating resources to measurement, data analysis and improvement actions (for example, annual customer survey in the end of year, monitoring process improvement targets monthly in SMO meetings).

Related to the second research question, we presented steps how CSI and 7-step improvement model were introduced in case Alfa. Introduction methods included a rich set of activities such as workshops, information seminars, interviews, implementing changes to the ITSM tool and the improvement suggestion record.

Concerning the third research question, we identified that when timelines of measurement and monitoring methods are known and resources have been allocated for them, the organization can focus better on analyzing results from measurements and planning improvement actions. For example, identified improvement actions (customer need, negative feedback, preventive actions) based on a customer survey are taken into account in the service improvement plans; and it is possible to implement corrective actions (quality exceptions, improvement ideas) from internal audits before external audits. Thus, improvement actions can be planned in a smarter way (paying attention to the big picture of parallel improvements instead of single improvement actions) to be able to implement them. This may lead to more transparent, systematic and managed improvement actions.

The following limitations are related to this case study: First, research data was collected from one service company in Finland by one researcher. Using researcher triangulation could have provided additional insights into case organization. Second, case study does not enable us to generalize results to other

companies. However, findings that we found were valuable add on to the existing service science including detailed information on service monitoring mechanisms and types of improvement actions that can be used to extend the theory of IT service management and Continual Service Improvement. Third, regarding internal validity, there may be bias caused by the fact that one of the authors was working in the case organization. However, this also increased the quality of inferences because the author's work role included improvement of CSI and thus, the research team gained a deep understanding of the research subject. Fourth, we did not categorize results according to different organizational levels such as management and service operations. These levels could be taken into account in further case studies. Additionally, most of our interviews focused on managers. Interviews with staff might have revealed new insights on CSI. Further research could be related, for example, managing improvement records systematically with an ITSM tool.

References

1. van Aartsengel, A., Selahattin, K.: *A Guide to Continuous Improvement Transformation - Concepts, Processes, Implementation*. Springer, Heidelberg (2013). <https://doi.org/10.1007/978-3-642-35904-0>
2. Abdulmouti, H.: The role of Kaizen (continuous improvement) in improving companies' performance: a case study. In: *Proceedings of the 2015 International Conference on Industrial Engineering and Operations Management (IEOM)*, pp. 1–6, March 2015
3. Allen, S.: Development of a work monitoring, evaluation and improvement process. *Eng. Manag. J.* **10**(3), 135–141 (2000)
4. Barafort, B., et al.: *ITSM Process Assessment Supporting ITIL*. Van Haren Publishing, Zaltbommel (2009)
5. Cabinet Office: *ITIL Continual Service Improvement*. The Stationary Office, UK (2011)
6. Cabinet Office: *ITIL Service Design*. The Stationary Office, UK (2011)
7. COBIT 4.0: *Control Objectives for Information and Related Technology*. ISACA (2005)
8. Eisenhardt, K.: Building theories from case study research. *Acad. Manag. Rev.* **14**, 532–550 (1989)
9. Gacenga, F., Cater-Steel, A.: Performance measurement of it service management: a case study of an Australian university (research in progress). In: *PACIS 2011–15th Pacific Asia Conference on Information Systems: Quality Research in Pacific*, AIS Electronic Library (2011)
10. Gentile, C., Spiller, N., Noci, G.: How to sustain the customer experience: an overview of experience components that co-create value with the customer. *Eur. Manag. J.* **25**(5), 395–410 (2007)
11. Gervalla, M., Preniqi, N., Kopacek, P.: IT infrastructure library (ITIL) framework approach to IT governance. *IFAC-PapersOnLine* **51**(30), 181–185 (2018)
12. Heikkinen, S., Jäntti, M.: Establishing a continual service improvement model: a case study. In: Winkler, D., O'Connor, R.V., Messnarz, R. (eds.) *EuroSPI 2012*. CCIS, vol. 301, pp. 61–72. Springer, Heidelberg (2012). https://doi.org/10.1007/978-3-642-31199-4_6

13. Iden, J., Eikebrokk, T.: Implementing it service management: a systematic literature review. *Int. J. Inf. Manag.* **33**, 512–523 (2013)
14. ISO: ISO 9000:2005 Quality management systems - Requirements. ISO Copyright Office (2005)
15. ISO/IEC 20000:1: Part 1: Service management system requirements. ISO/IEC JTC 1 Secretariat (2011)
16. ISO/IEC TS 15504–8:2012: Information technology - Process assessment -Part 8: An exemplar process assessment model for IT service management. ISO/IEC TC JTC1/SC7 Secretariat (2012)
17. Jäntti, M.: Lessons learnt from the improvement of customer support processes: a case study on incident management. In: Bomarius, F., Oivo, M., Jaring, P., Abrahamsson, P. (eds.) *PROFES 2009*. LNBIP, vol. 32, pp. 317–331. Springer, Heidelberg (2009). https://doi.org/10.1007/978-3-642-02152-7_24
18. Jäntti, M., Hotti, V.: Defining the relationships between it service management and it service governance. *Inf. Technol. Manag.* **17**(2), 141–150 (2016)
19. Jokela, K., Jäntti, M.: Challenges and problems in product portfolio release and deployment management. In: *Proceedings of the 9th International Conference on Service Systems and Service Management (ICSSM12)*. IEEE, Shanghai (2012)
20. Kajko-Mattsson, M.: Corrective maintenance maturity model: problem management. In: *ICSM 2002: Proceedings of the International Conference on Software Maintenance (ICSM 2002)*, p. 486. IEEE Computer Society, Washington, DC (2002)
21. Lahtela, A., Jäntti, M., Kaukola, J.: Implementing an ITIL-based IT service management measurement system. In: *Proceedings of the 4th International Conference on Digital Society*, pp. 249–254. IEEE Computer Society, St. Maarten, February 2010
22. Lewis, M., Brown, A.: How different is professional service operations management? *J. Oper. Manag.* **30**(1), 1–11 (2012)
23. Lima, A., deSousa, J., Oliveira, J., Sauve, J., Moura, A.: Towards business-driven continual service improvement. In: *2010 IEEE/IFIP Network Operations and Management Symposium Workshops*, pp. 95–98. IEEE, NJ (2010)
24. McNaughton, B., Ray, P., Lewis, L.: Designing an evaluation framework for IT service management. *Inf. Manag.* **47**, 219–225 (2010)
25. OGC: *ITIL Planning to Implement*. The Stationary Office, UK (2002)
26. Pollard, C., Cater-Steel, A.: Justifications, strategies, and critical success factors in successful ITIL implementations in U.S. and Australian companies: an exploratory study. *Inf. Syst. Manag.* **26**(2), 164–175 (2009)
27. Runeson, P., Höst, M.: Guidelines for conducting and reporting case study research in software engineering. *Empir. Softw. Eng.* **14**, 131–164 (2009)
28. Shrestha, A., Cater-Steel, A., Tan, W., Toleman, M.: A model to select processes for IT service management improvement. In: *ACIS 2012 : Proceedings of the 23rd Australasian Conference on Information Systems*, pp. 1–10. ACIS (2012)
29. Shrestha, A., Cater-Steel, A., Toleman, M.: Virtualising process assessments to facilitate continual service improvement in IT service management. In: *ACIS 2015 Proceedings - 26th Australasian Conference on Information Systems*. ACIS (2015)
30. Yin, R.: *Case Study Research: Design and Methods*. Sage Publishing, Beverly Hills (1994)
31. Zeithaml, V., Parasuraman, A., Berry, L.: *Delivering Quality Service: Balancing Customer Perceptions and Expectations*. The Free Press, Nariman Point (1990)
32. Zhang, L.J., Zhang, J., Cai, H.: *Services Computing*. Springer, Heidelberg (2007). <https://doi.org/10.1007/978-3-540-38284-3>. Tsinghua University Press, Beijing