

IT Service Management in Multiple Actor Network: Service Support from Customer's Point of View

Antti Lahtela

Development and Steering Unit for the Local Register Offices
Regional State Administrative Agency for Eastern Finland
Kuopio, Finland
e-mail: antti.lahtela@avi.fi

Marko Jäntti

School of Computing
University of Eastern Finland
Kuopio, Finland
e-mail: marko.jantti@uef.fi

Abstract—Many IT customer organizations see service support and multiple actor network as a big challenge. Multiple actor network may cause several types of problems between different organizations, such as communication gaps, unclearness in roles and responsibilities, contract related challenges, lost incidents and conflicts in understanding the content of agreements between development and continuous services. The research problem of this study is: how IT service support can be improved from an IT customer organization's perspective? The main contribution of this paper is to describe multiple actor network of IT service support. A case study research method with a single case from Finnish public sector was used as a main research method.

Keywords—IT Service Management; Multiple Actor Network; Public Sector; Enterprise Architecture.

I. INTRODUCTION

The Finnish Public Sector ICT is under massive change. The changes are based on the *Government Programme of Finland* [1], which is an action plan agreed on by the parties represented in the Government and it sets out the main functions of the Government, also for ICT development:

- The development of public on-line services will be placed under the management of a full-bodied actor.
- Clear goals will be set for productivity improvements.
- The interoperability of public information systems will be ensured through the use of open interfaces and standards.
- The implementation and effectiveness of the project entities of the Electronic Services and Democracy Development Programme will be evaluated.
- Productivity in the public sector will be boosted through better utilisation of business intelligence, more compatible information systems, and by bringing together information management data and procurement resources data in public administration.
- Shared use of public administration information will be facilitated.
- All common functions of the State ICT service centers will be brought together.

- To promote interoperability of information systems, open source standards are used in public administration, which determine the compatibility of information content and IT interfaces.
- Enterprise architecture will be employed, utilizing shared information platforms and shared eGovernment platforms and eServices.

A new *Public Sector ICT Strategy* [2], based on the Government Programme, has been published in year 2013 to provide strategic guidelines for the whole IT management of public sector in Finland. As a result of the new strategy, several new services and organizational changes will be established, for example a new government IT service centre in year 2014.

The implementation of the Public Sector ICT Strategy was chaired by the Ministry of Finance of Finland as an open process including people from public administration, business enterprises and non-governmental organizations. The vision in the strategy reaches to 2020, and policy approaches and measure to the end of 2015. The vision of the ICT Strategy has two main points where the main goals are service improvement and public sector cooperation:

- Services and information required by users are available and usable easily and securely.
- Cooperation of public sector organizations, businesses and users at the leading edge of development.

According to the Government Programme and the Public Sector ICT Strategy, Finnish government organizations and officials must improve their own service production as well as bring services on-line for citizens and corporations. The purpose is to develop organizations' operation more efficient and lead customers to use eServices as a primary service. For the service improvement, a large number of organizations are involved in managing, developing and implementing IT services in public sector. This is mainly due the acquisition policy that the Finnish government practices. Usually the multiple actor network consist of following participants (Figure 1):

- End user organization.
- Customer.

- Service provider
- Third party service provider

The end user organization is usually the one who receives the delivered services that the customer has ordered from the service provider. The service provider delivers the service and can use third party service providers to build and produce the service. Sometimes the end user organization and the customer are the same. The presented network is often called as a *Customer-Provider Model* where the agreements of the delivered service is made between the customer and the service provider. After the service is delivered, continuous services begin (service management).

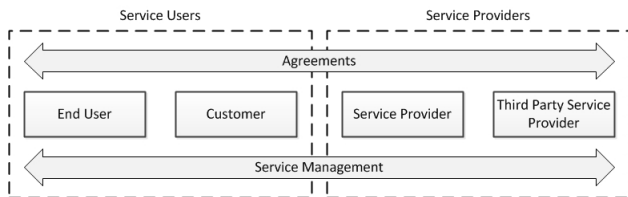


Figure 1. Example of a multiple actor network.

Much has been written about IT service management, help desks and service desk processes. For instance, Caldeira and Brito e Abreu [3] has studied how to use statistical methods to learn from incident classifications. Additionally, Hochstein, Zarnekow and Brenner [4] have provided recommendations how to improve IT management processes based on four case studies. One of the recommendations was to create a company specific IT service management model. Surprisingly, few studies have dealt with customer support in multiple actor network. Jäntti [5] has presented a single point of contact service model as a solution for managing support requests between a customer, a main service provider and a third party service provider.

There are studies that have focused on exploring challenges in customer support. For example, the study of Jäntti, Tanskana and Kaukola [6] reported incident resolution documentations, incident classification, a lack of knowledge base and the missing knowledge flow as main challenges. Kajko-Mattsson, Ahnlund and Lundberg [7] have presented corrective maintenance maturity model (CM3) where service level management is one of the CM3 modules. The model was tested with four Swedish organizations. Additionally, Lahtela and Jäntti [8] [9] have done research on IT services support both from service provider and from customer point of view. They have studied on challenges and problems in release management process and in service support interface.

Many IT service organizations use *IT Infrastructure Library* (ITIL) to improve IT service management processes. ITIL describes the service lifecycle that contains five core phases: Service Strategy [10], Service Design [11], Service Transition [12], Service Operation [13] and Continual Service Improvement [14]. In the ITIL framework, customer support is divided into several processes, such as incident management, service request management, event management and problem management.

In addition to incident management, there is a process called problem management within IT service management

frameworks. While incident management aims to solve incidents as soon as possible, the main objective of problem management is to identify the root cause of the incidents [13]. Thus, problem management is responsible for proactive customer support. Jäntti et al. [15] have studied implementation of problem management from knowledge management point of view. Incident management and service request management are also visible in *Control Objectives for Information and Related Technology* (COBIT) [16]. COBIT is a IT governance framework that describes IT service management processes, metrics, roles, responsibilities and control objectives.

ISO/IEC TS 15504-8:2012 process assessment model [17] can be used to improve the service management process capability and maturity. This is a very useful tool for carrying out process assessments, when the target of the assessment is a single service management process. Compared to *Capability Maturity Model Integration* (CMMI) [18], the assessment can be done in a more light weight way because the assessment can focus even on one process.

The Finnish Government has published several guidelines and instructions on how government officials should manage their IT. *The Public Administration Recommendations* (JHS recommendations) [19] provide information management guidelines for public administration. The JHS recommendations system aims to improve the interoperability of information systems and the compatibility of data in them, to facilitate process development and to make the use of existing data more efficient. The JHS recommendations are approved by the Advisory Committee on Information Management in Public Administration (JUHTA). JUHTA is also the head of the Finnish public sector enterprise architecture where the enterprise architecture work is done by the Public Sector Enterprise Architecture Division. The Division develops and publishes government level enterprise architecture descriptions. For example, the architecture description for eServices [20] is one of the documents that is implemented for government officials to use as a guideline in their own architecture work.

For information security, the Government Information Security Management Board (VAHTI) [21] has established a set of instructions for directing information security measures in central government. Additionally, the board functions as an organ for coordination, cooperation and preparation among government organizations in charge of steering and developing data protection and information security. For open data, eServices and eDemocracy, Finland has organized two separate programs. *The Open Government project* [22] aims to apply for membership in the Open Government Partnership initiative. *The Action Programme on eServices and eDemocracy* [23] develops comprehensive services for citizens, companies and the authorities. The purpose of this program is to enhance service quality and cost-efficiency in the public sector.

A. Our Contribution

This case study is a part of the results of Keys to IT Service Management and Effective Transition of Services (KISMET) research project at the University of Eastern Finland, School of Computing, Finland. The main objectives of the KISMET project are to develop, share new ideas and experiences regarding IT service management in the network of organizations,

and strengthen the research and know-how of IT service management in Eastern Finland. The case study was made in cooperation between KISMET project and Regional State Administrative Agency for Eastern Finland, Development and Steering Unit for the Local Register Offices in year 2013.

Our contribution is to present a case from Finnish public sector where IT service management and IT service support are managed in a multiple actor network. The remainder of the paper is organized as follows. In Section 2, the research methods of this study are described. In Section 3, we present the results of this study. The conclusions are given in Section 4.

II. RESEARCH METHODS

The research problem of this study is: how IT service support can be improved from an IT customer organization’s perspective? The research problem was further divided into following research questions:

- How service level agreements (SLAs) should be designed in order to support IT service management in multiple actor network?
- What kind of communication strategy should be established between a customer and a service provider?
- How service support roles and responsibilities should be defined both from a customer’s and a service support provider’s point of view?
- How to decrease the number of support requests (incidents and service requests)?
- Which issues must be taken into consideration while creating IT agreements?
- How to deal with organizational changes that affect the service provider model?

A case study research method with a single case was used as a main research method. Our case organization is a small unit that manages IT for another organization. The case organization’s main responsibilities include IT agreements, IT development and IT management. The service providers consist from different government IT service providers and third party IT service provider companies.

Our case organization was selected for this study because the researcher had easy access to the research data. Additionally, the case organization was a representative case of Finnish government organization that deals with multiple service providers and acts in different roles (customer and service integrator for another organization).

A. Case Context

Figure 2 describes the case study context and how our case organization is positioned from service, steering and development perspective. The case organization is located inside of another government official in a ministry administration. The main objective of the case organization is to develop, steer and control another government agency that provides services for Finnish citizens. Other main stakeholders in the

case context are different ministries and agencies inside ministries’ administration. The stakeholders are mainly content and substance developers. Other coordinators are the Finnish legislation, strategy and IT strategy (organizational level strategies are made in cooperation with all the context organizations), enterprise architecture, guidelines and recommendations as well as other architectures that effect our context.

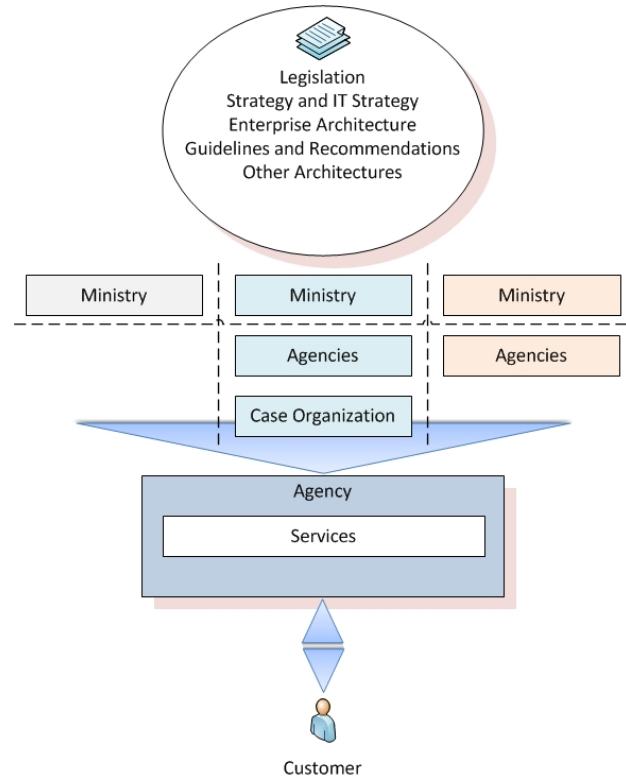


Figure 2. Case context.

Figure 3 shows how IT services are managed in our case. The case organization, where the IT management is situated, executes all the agreements with the service providers from delivered services that are provided for the agency and the end users. For example, a individual SLA is made between case organization and every different service provider.

First, incidents and service requests are sent to the internal IT service provider (also a government agency), which will handle them. Secondly, the internal IT service provider can escalate incidents and service requests to a third party service provider depending on the case. Usually, the internal IT service provider deals all the cases concerning to infrastructure services (workstations, networks, usernames, etc.) and the third party service provider deals with software services (coding, major problems in the system, development work, etc.). In some cases, the third party service provider can also be another government agency.

B. Data Collection and Data Analysis

The research data was collected by using the sources of evidence defined by Yin [24]:

- Interviews: customer, end user and service provider interviews.

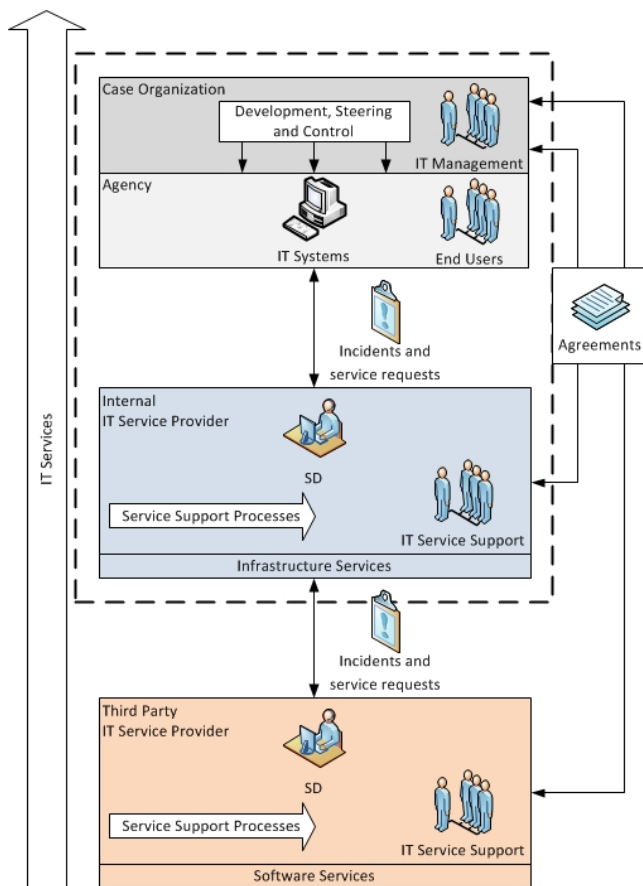


Figure 3. IT service management in our case.

- Documentation: enterprise architecture descriptions, IT agreements, service definition documents, etc.
- Physical artifacts: access to customer’s and end user’s IT systems.
- Observation: participative observation in the case organization.
- Archives and records: access to document archives of the case organization.

The collected data was analyzed with the KISMET research project team and a member from the case organization. A list of identified challenges was created and each challenge was analyzed for improvement suggestions.

The within-case analysis method was used to analyze the case study material. Analysis of the data was based on the following categories: SLAs, communication strategy, service support roles, proactive service support, IT agreements, and organizational changes.

III. RESULTS

The main contribution of this study was to describe multiple actor network of IT service support and how it can be improved. The following six major challenges and improvement suggestions from an IT customer organization’s perspective were identified and presented based on the data analysis of the case:

1) **SLAs**
Challenge: The case organization creates individual SLAs between every service provider. This is a major challenge when tickets are escalated from one service provider to another because it is almost impossible to manage that the service process will be executed according to the agreed service levels.
Improvement Suggestion: All the SLAs should be collected and documented on a single document, which includes an end-to-end service process description with agreed service levels. Thus, it is much easier to monitor service levels and support IT service management in a multiple actor network. SLAs may cover the service level objectives, such as target response times and target resolution times.

2) **Communication Strategy**
Challenge: The communication between all the actors of the network is difficult to manage. There isn’t any specified strategy on how to perform communication (how, when, where and to who) between participants. Usually, the communication is done in a hurry without any proper plan. During the study, we observed that the communication related to incident resolutions was not systematic. This was a problem especially during the diagnosis and solving of high priority incidents and holiday times.

Improvement Suggestion: Correct information for all the participants in a multiple actor network needs a good communication strategy with clear escalation points (can be implemented, e.g., into Excel file). The strategy should include clear definitions on how to perform communication with various actors (e.g., application/service, contact person name, email, phone, holiday times and work responsibilities). Managing the feedback, related to services, should be part of the communication strategy. In IT service management, managing the feedback is part of the Business Relationship Management [11].

3) **Service Support Roles**
Challenge: Who is responsible of the service? Usually, this should not be a problem, but environment of different actors can make it very challenging. It can be hard to be responsible from a part of the service if the whole service is developed in cooperation between many providers. From the customer’s point of view, it can be demanding if the end user and the customer are different agencies. Additionally, from the perspective of the internal service provider, which is always the first line support and acts as a service desk, it is difficult to coordinate services that are provided by a third party service provider. Following roles were identified regarding customer support: service managers, customer service managers, developers, process managers (incident, problem, change and release managers), help desk and service desk workers, specialists, end users, customers, project managers and service owners.
Improvement Suggestion: The whole network of services and its participants has to be described and

documented. Previous studies [5] have used UML sequence diagrams to model complex interactions between actors of customer support. In order to document the roles and responsibilities, a service based matrix can be used to show the different roles and tasks for all participants. An example of this table is given in Figure 4 to show what kind of attributes the table can contain. The table is presented in organizational level.

4) **Proactive Service Support**

Challenge: The number of service desk cases increases rapidly, because end users and the customer report every single defect or incident to the service desk. There isn't any specific proactive service support for the end users or the customer where they could solve minor problem by themselves. This leads to unnecessary tickets and extra work.

Improvement Suggestion: To promote proactive support, the service provider organization could implement a knowledge base that contains instructions, guidelines and workarounds to known errors. The service provider must instruct end users and the customer to provide required details on incidents and service requests, such as printer numbers and names. For simple tasks, such as lost passwords and new users, the service provider could give permission for the customer to handle these situations or automate the process of generating new passwords. Because of every contact to the service desk (incident or service request) leads to opening a support request to the service provider's IT service management system, one should identify the types of unnecessary requests, such as information requests on the progress of incident resolutions.

5) **IT Agreements**

Challenge: IT agreements are usually a stack of multiple different documents without clear management. It is complicated to get a general overview on what has been agreed about the service as well as between development and continuous services. Additionally, one customer might have dozens of agreements, which may cause difficulties (delay in processing) in classifying the incidents and service requests in the service desk.

Improvement Suggestion: IT agreements management process should be established in order to improve the management and to clarify agreements between development and continuous services. This requires communication between several process managers, such as service level management, sales management and supplier management. Our simple model for managing IT agreements is presented in Figure 5.

6) **Organizational Changes**

Challenge: Finnish public sector ICT is under constant change. The Government Program, various productivity programs and the Public Sector ICT Strategy are driving organizational changes for government officials to save costs and to increase

effectiveness. This has a big influence for the public sector, which struggles to improve and deliver services for the citizens.

Improvement Suggestion: Every organizational change has to go through the change management process. Changes, that have major impacts, should be considered as major changes that need more careful planning and much more effort than minor changes. For the end user, organizational change should go smoothly without any massive impact to the service. Correct communication between the participants supports this.

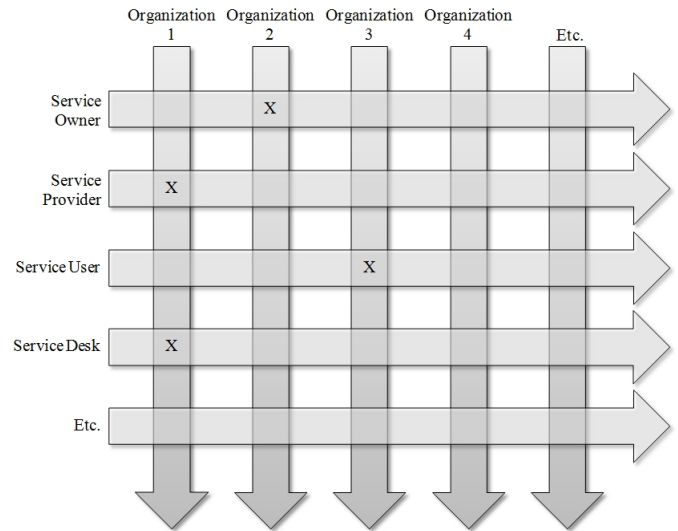


Figure 4. Matrix for roles and responsibilities in organizational level.

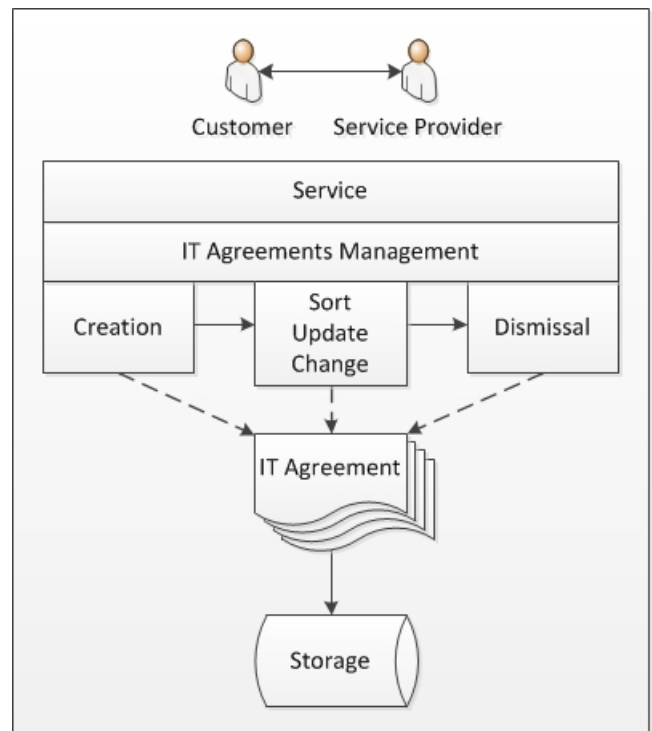


Figure 5. IT agreements management process.

One major improvement suggestion, for developing operation in a multiple actor network, could be the use of the *Enterprise Architecture* (EA). EA is a method that helps to describe the operational environment and to manage the development of services as a whole [25]. The method can help getting the big picture on how IT service management and IT service support is established and to find potential environment and operational problems. The Finnish public sector uses a EA framework called *JHS 179* [19] as a recommendation for describing their present state and future environment from operation, information, information system and technology point of views.

IV. CONCLUSION

This paper and the included case study aimed to answer on the research problem: how IT service support can be improved from an IT customer organization's perspective? The problem was divided into six different research questions. The case itself was build between a Finnish government agency and its service providers. We used a case study research method with a single case as a main research method. The within-case analysis method was used to analyze the case study data.

The main contribution of this study was to describe a multiple actor network of IT service support, present found challenges and bring improvement suggestions to develop operation in the network of customers, end-users and service providers. The following six major challenges and improvement suggestions from an IT customer organization's perspective were identified and presented based on the data analysis of the case: SLAs, Communication Strategy, Service Support Roles, Proactive Service Support, IT Agreements and Organizational Changes. The next task is to implement the presented improvement suggestions and evaluate the results.

We also introduced a recommendation to use EA as a development tool in multiple actor networks. Further work could focus on studying how EA and IT service management are related and how EA is used to improve IT service support.

ACKNOWLEDGMENT

This paper is a part of the research project KISMET at the University of Finland, Finland. KISMET is funded by the National Technology Agency TEKES, the European Regional Development Fund (ERDF) and industrial partners. This research was made in cooperation with the KISMET project and Regional State Administrative Agency for Eastern Finland, Development and Steering Unit for the Local Register Offices.

REFERENCES

- [1] Finnish Government, "Programme of Prime Minister Jyrki Katainen's Government," www.valtioneuvosto.fi, 2012, referred 2.12.2013.
- [2] Public Sector ICT Unit, "Using services and information: A proposal for the first common strategy to address challenges in public sector ICT utilisation 2012-2020," www.vm.fi, 2012, referred 2.12.2013.
- [3] J. Caldeira and F. B. e Abreu, "Influential factors on incident management: Lessons learned from a large sample of products in operation," in *Product-Focused Software Process Improvement*, A. Jedlitschka and O. Salo, Eds., vol. 5089. Springer Verlag, 6 2008, pp. 330-344.

- [4] A. Hochstein, R. Zarnekow, and W. Brenner, "Itil as common practice reference model for it service management: Formal assessment and implications for practice," in *EEE '05: Proceedings of the 2005 IEEE International Conference on e-Technology, e-Commerce and e-Service (EEE'05) on e-Technology, e-Commerce and e-Service*. Washington, DC, USA: IEEE Computer Society, 2005, pp. 704-710.
- [5] M. Jäntti, "Improving Customer Support and Maintenance Processes: A Single Point of Contact Service Model," in *Software Engineering Techniques in Progress*, 2008, pp. 261-270.
- [6] M. Jäntti, K. Tanskanen, and J. Kaukola, "Knowledge management challenges in customer support: A case study," in *Proceedings of the International Conference on Information, Process, and Knowledge Management (eKNOW 2009)*. IEEE Computer Society, 2009, pp. 78-83.
- [7] M. Kajko-Mattsson, C. Ahnlund, and E. Lundberg, "Cm3: Service level agreement," in *ICSM '04: Proceedings of the 20th IEEE International Conference on Software Maintenance*. Washington, DC, USA: IEEE Computer Society, 2004, pp. 432-436.
- [8] A. Lahtela and M. Jäntti(a), "Improving it service management processes: A case study on it service support," in *EuroSPI*, ser. *Communications in Computer and Information Science*, vol. 99. Springer, 2010, pp. 95-106.
- [9] A. Lahtela and M. Jäntti(b), "Challenges and problems in release management process: A case study," in *IEEE International Conference on Software Engineering and Service Sciences*, 2011, pp. 10-13.
- [10] Cabinet Office (a), *ITIL Service Strategy*. The Stationary Office, UK, 2011.
- [11] Cabinet Office (b), *ITIL Service Design*. The Stationary Office, UK, 2011.
- [12] Cabinet Office (c), *ITIL Service Transition*. The Stationary Office, UK, 2011.
- [13] Cabinet Office (d), *ITIL Service Operation*. The Stationary Office, UK, 2011.
- [14] Cabinet Office (e), *Continual Service Improvement*. The Stationary Office, UK, 2011.
- [15] M. Jäntti, A. Miettinen, N. Pylkkänen, and T. Kainulainen, "Improving the problem management process from knowledge management perspective," in *Product-Focused Software Process Improvement*, ser. *Lecture Notes in Computer Science*, J. Münch and P. Abrahamsson, Eds. Springer Berlin / Heidelberg, 2007, vol. 4589, pp. 389-401.
- [16] COBIT 5.1, *Control Objectives for Information and related Technology: COBIT 4.1*. ISACA, 2012.
- [17] 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.
- [18] Software Engineering Institute, *Capability Maturity Model Integration for Services v1.3*. Carnegie Mellon University, 2010.
- [19] Advisory Committee on Information Management in Public Administration (JUHTA), "JHS Recommendations," www.jhs-suositukset.fi, 2013, referred 2.12.2013.
- [20] Public Sector ICT Unit, "Enterprise Architecture in Finnish Public Sector," www.yhteentoimivuus.fi (in Finnish), 2013, referred 2.12.2013.
- [21] The Government Information Security Management Board (VAHTI), "Information Security Guides," www.vm.fi, 2013, referred 2.12.2013.
- [22] The Ministry of Finance Finland (b), "Open Government Project," www.vm.fi, 2013, referred 2.12.2013.
- [23] The Ministry of Finance Finland (a), "Action Programme on eServices and eDemocracy (SADe)," www.vm.fi, 2013, referred 2.12.2013.
- [24] R. Yin, *Case Study Research: Design and Methods*. Beverly Hills, CA: Sage Publishing, 1994.
- [25] A. Wegmann, "On the Systemic Enterprise Architecture Methodology (Seam)," in *International Conference on Enterprise Information Systems*, 2003, pp. 483-490.