Improving ITIL processes using a Lean Methodology

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Abstract: Many companies around the world have already implemented ITIL as a way to manage and control their IT Departments more effectively. These companies are now willing to improve their ITIL processes in order to become even more efficient. Lean is a methodology that can be used to conduct these improvements and its application in the IT Services area is becoming increasingly popular. The initiatives taken to improve ITIL processes using Lean have some limitations as they do not address all Lean's principles and goals. In this paper we propose a framework that addresses all the principles and goals and that can be used to improve ITIL processes. The framework is being applied in a Portuguese Public Organization and the results are presented and discussed in this paper.

Keywords: Lean; ITIL; IT Services; improvement; framework; costumer; value; waste; quality; quickness

1. Introduction

ITIL is a framework of best practices for delivering IT Services. It was developed by the British Government during the 1980s trying to increase efficiency, value and success in the delivery of programs and projects in the public sector. Over the years, ITIL became popular and, nowadays, its credibility is highly recognized. Its practices are aligned and have contributed to the ISO 20000 Service Management standard, the first international standard for IT service management (Reiner, 2007).

In order to guarantee a better quality of service, lower costs or to achieve a better alignment between business and IT, organizations have been implementing ITIL processes in their IT Departments (Greenever Systems, 2006). When the implementations are successful, the results are usually positive, but that must not be the end of the road. As ITIL v3 states, after implementing the processes, they must be continuously improved to steadily increase efficiency. Furthermore, business itself is not static, and IT processes must evolve at the same pace in order to effectively support it and remain aligned with it. However, conducting improvements isn't easy (Van Bon & Pieper & Veen, 2006) and ITIL literature just suggests some methodologies that can be used to do so.

In this paper we suggest and evaluate a framework, based on the Lean methodology, which can be used to guide ITIL processes optimization.

Lean is a methodology to organize, manage, develop and improve business processes with the aim of doing more with fewer resources. It emerged after the World War II in Toyota's manufacturing environment, however, in the last few years, it has been applied in the services industry (Fillingham, 2008).

Lean is based on the principles of specifying value, mapping the value stream, enabling continuous flow, pull strategies and pursuing perfection. Following these principles enables quicker and more flexible processes allowing the delivery of services with higher quality and more value to the costumer (Sayer & Williams, 2008). In this paper, the expression *value* is used to describe any feature or service for which the customers would be willing to pay for.

The framework is being applied in a Public Portuguese Organization and the achieved results are presented and discussed at the end of this paper.

2. Problem

Many companies have already implemented ITIL processes in order to enhance better results from their IT departments. The benefits are usually high but as ITIL v3 states, it is important to keep improving the processes, always aiming to provide IT Services with higher quality and efficiency. On the other hand, IT Departments can no longer be isolated silos in the organizations. They must be completely aligned with business in order not only to support it, but also to improve it (Peynot, 2007). Still, business is not static, and it needs to be adapted as a response to market needs or to exploit a business opportunity that has arised. As business is not static, IT Services can't be static either.

The problem is that often managers do not know how to improve their IT Department's processes (Peters, 2008). ITIL books define which processes should exist, how they should interact with each other and which metrics can be used. They also define which steps are relevant for the Continual Service Improvement process (OGC, 2007):

- Define what you should measure
- Define what you can measure
- Gather the data
- Process the data
- Analyze the data
- Present and use the information
- Implement corrective actions

However, these steps are no more than a very high level strategy for process improvement. There are no references to tools and procedures that can be used.

Understanding what can be improved is not simple and conducting the improvements is even harder. In fact, the amount of changes to introduce can be extremely high and according to Laudon's framework they can be organized as following (Laudon, 2007):

- Organizational changes
    - New organizational structure for IT departments
    - New skills demanded for IT employees
    - New activities and processes
    - Different ways to perform old activities
    - New perspectives of how IT supports and enables business
- Managing changes
    - New metrics and indicators to analyze
    - New SLAs
    - Higher expectations for IT Departments and services
- Technological changes
    - New software
    - New hardware

Implementing technological changes should not be too hard as IT staff is usually highly skilled in this area, however, organizational and managing changes represent a big challenge due to people's intrinsic resistance to change (Peynot, 2006). It is important to understand how this resistance can be mitigated, assuring that a process can effectively be improved and that once it was, there is no coming back. But once again, ITIL does not address these topics, providing little guidance to IT managers. In the current panorama, only experienced consulting firms can effectively assist organizations in ITIL deployment and process improvement (Peynot, 2006).

3. Related work

Some efforts have previously been taken in order to improve IT processes using a Lean methodology.

3.1. Fujitsu – Sense and Response

Fujitsu is a multinational company, providing IT services to more than four hundred clients in the areas of financial services, telecommunications, utilities and government markets. They were facing some problems, being the following the most relevant (Parry, 2004):

- Clients were not satisfied with the provided services and were looking for another service supplier.
- There was a constant need to acquire new clients to replace the ones that were being lost
- The Call Center Service was performing at a low level

In order to solve these issues, Fujitsu decided to develop a Lean based methodology which should firstly be applied to their Call Center Service. The objectives were simple: to provide a better service, increasing their direct and indirect costumer's satisfaction level. The methodology consisted in four distinct phases:

- Phase 1 – Learning to Sense
    - See the organization from costumer's perspective
    - Evaluate the value chain
    - Understand front-line roles and responsibilities
- Phase 2 – Learning to Respond
    - Re-educate management
    - Replace *Push* system by *Pull* system
    - Replace mass production systems by lean production
- Phase 3 – Leading Change
    - Use transformation leadership theories
    - Employ cognitive behavior methodology
    - Operate within leadership and coaching frameworks
    - Award staff with accreditations
- Phase 4 – Mobilizing
    - Provide detailed change programs to transform corporate infrastructure
    - Design plans for mobilization

The results of its first application were quite positive:

- First-contact fix increased 64%
- End-to-end service cycle reduced 60%
- End-to-end service costs decreased 30%
- Costumer's satisfaction increased 28%
- Employee satisfaction increased 40%

Critical Analysis

Analyzing the proposed methodology, one can realize that most Lean principles and goals are addressed. In fact, just the continuous flow principle couldn't be found. Yet, this methodology has some limitations:

- When this methodology is applied to a new service, a new set of metrics must be defined. There is no reference to the usage of standard metrics, based in best practices, for the targeted service. This activity may then represent overproduction waste, while possibly not producing the best metrics.
- As there is not a base architecture to structure the organization/department where this methodology is being applied, it might take a while until the best one is found.
- This methodology can only be taken into practice by highly experienced professionals in the targeted services industry.

These issues support the fact that nowadays only experienced consulting firms can effectively assist organizations in IT processes improvement. Furthermore, as it does not take industry's best practices into consideration, there is the risk to waste time redefining metrics and organizational structures.

3.2. Infosys – Applying Lean to optimize ITIL v3 Event Management process

After implementing the ITIL v3 Event Management process, an organization was taking significant efforts towards monitoring alerts triggered by applications. Service Desk was overwhelmed as it was their responsibility to handle these alerts. Infosys was asked to analyze and solve this problem (Nand & Changanty, 2008). The main issues and goals identified are stated in the following table:

Table 1 – Main issues and associated goals

Main Issues	Goals
Significant non-value adding monitoring efforts	Reduce monitoring efforts. Automate manual activities
High probability of missing critical alerts	Improve ability to detect and address critical alerts
Crowded alert interface	Cleaner alert interface

Several alerts were no more than waste and they should be eliminated. In order to do so, a Lean approach was taken, consisting in three phases:

- Phase 1 – Analysis
  - Map the Value Stream
  - Collect data
  - Identify waste
  - Validate waste identification with application groups
- Phase 2 – Business Case
  - Develop a business case (effort/savings)
  - Determine the implementation requirements
- Phase 3 – Implementation

- Setup implementation team
- Implement changes
- Validate the achieved results

With this approach, Event Management efforts were reduced by 44%. Classifying the eliminated waste accordingly to the 7 kinds of waste:

- 32% inventory
- 24% processing time (redundant alerts)
- 13% waiting time (alerts performing reminder service)
- 11% product defects
- 10% overproduction
- 5% motion
- 5% transport

Critical Analysis

Once again, this approach takes into consideration most Lean principles and achieves quite positive results. There is, however, one aspect that is important to address: the non identification of end users and their expectations. It would be important to understand how each alert influences or contributes to the productivity or satisfaction of end users. IT staff may think that some alerts are crucial while the actions triggered by those alerts may not represent value to the final costumer. As a result, some waste may have not been identified and removed. On the other hand, this may represent an opportunity to further employ a costumer-pull strategy, where end users can actually ask for the kind of actions they consider valuable.

3.3. Reflection

Through the analysis of these examples it is possible to realize that Lean may be used in the IT services area. Although the achieved results are significantly positive, these approaches still need to reach a higher level of maturity in order to fully explore Lean's potential. As a standard framework does not exist to be followed, when taking Lean initiatives it is hard to address all its principles and goals.

4. Proposal

In order to guide ITIL processes optimization, a framework is proposed in this paper. The framework is based on the Lean methodology and addresses all its principles and goals. The following diagram represents the application of the framework in practice:

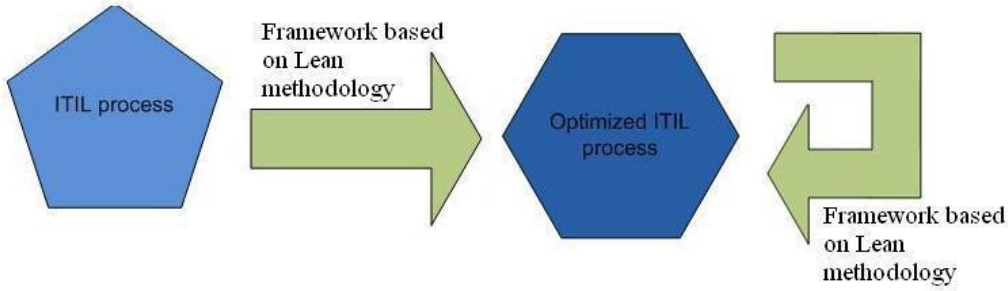

Figure 1 – Application of the framework

The framework can repeatedly be applied to an ITIL process in order to constantly improve it. As Lean states, there is always waste to eliminate. It is based on the Plan-Do-Check-Act cycle and consists in six phases, as represented in Figure 2. In the following sections the framework will be explained in detail.

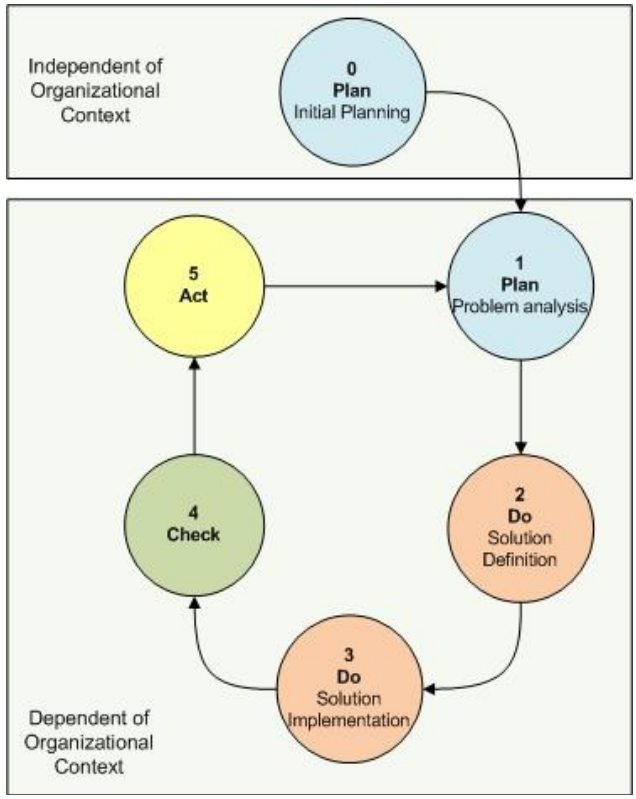

Figure 2 – Framework Phases

4.1. Plan – Initial Planning

The objective of this phase is to assess and understand ITIL best practices towards the process to be improved. It consists in three activities:

1. Define relevant metrics for the process – metrics are needed in order to quantitatively evaluate the process. They can be found in ITIL books, papers and case studies.
2. Map a desirable to-be Value Stream – Value Stream Maps are a graphical representation of the process, including the sequence of activities that compose it and quantitative information about them. This Value Stream map should represent a perfect process where Non-Value-Adding activities should only be present if they are considered essential. By reading ITIL literature it is possible to define it, as there is a detailed description of each process.
3. Define tools to capture the Voice of the Costumer (VOC) – The Voice of the Costumer represents the user's expectations towards the outputs of the process. In order to capture this information there is the need to develop inquiries and interviews. With these tools, it must be possible to understand the current level of user's satisfaction and which features truly represent value to them.

4.2. Plan – Problem analysis

This is the first phase that is depended of the organizational context. It is composed by eight activities, which contribute to fulfill different objectives:

- Understand the as-is state of the process
    1. Map the as-is Value Stream – Observe the process where it takes place (Gemba Walks) and create a diagram with the sequence of activities that compose it. Gather quantitative information about each activity.
    2. Quantify the previously defined metrics – Using the metrics defined in the first phase (the ones that are suggested in ITIL), try to quantify them. It may be relevant to search for data in logging tools, records or statistical information about the process. If it is possible/needed, observe the activities being performed in practice in order to measure and capture data.
- Identify process costumers and their needs
    3. Identify process costumers – They are the reason for a process to exist and it is important to understand who they are. They can be identified by observing the process outputs. Everyone who is receiving these outputs is a process costumer.
    4. Capture the Voice of the Costumer – By performing the inquiries and interviews, it becomes possible to capture the costumer's expectations. Afterwards, using Kano's Model, they can be categorized into Basic Needs, Performance features and Excitement features, assuming different levels of importance in the process.
    5. Identify Value-Adding (VA) and Non-Value-Adding (NVA) activities in the as-is Value Stream – With the as-is Value Stream already mapped and the costumer's expectations categorized, it is now possible to classify all the activities in the process as VA or NVA. For each activity answer six questions (5 Ws 1H): What, When, Why, Where, Who, How. With the answers, it becomes possible to comprehend the impact that each activity has in process outputs. If an activity enables a feature that represents value to the costumers, then it is considered as a Value-Adding activity, otherwise, it is considered Non-Value-Adding.
- Definition of a possible to-be state for the process
    6. Map a possible to-be Value Stream – This Value Stream represents a state for the process that is possible to achieve on the short term. Conduct brainstorming sessions

(Kaizen workshops) with process managers and collaborators. Introduce them to relevant Lean tools like the 7 kinds of waste, value stream maps or spaghetti diagrams (Schonberger, 2007). Analyze the as-is Value Stream Map searching for waste. Define a short term to-be Value Stream Map, which is an improved version of the current process. Use the desirable to-be Value Stream Map, defined in the first phase, as a reference.

- Identify the Gap between the as-is and the possible to-be state
  7. Identify the Gap between the as-is and the possible to-be Value Stream – The purpose of this activity is to create charts and tables to quantitatively compare the as-is and the short term to-be state. Spider charts and Box Scores might be appropriated tools to be used.
  8. Identify causes for the existing Gap – With the Gap documented, it is important to understand the reasons for its existence. Why is the process performing at this level? Which are the most relevant issues? These are the questions that is important to get answered. Fishbone diagrams may be useful for this analysis.

4.3. Do – Solution Definition

The objective of this phase is to determine how to achieve the possible to-be state. There are two activities that need to be performed:

1. Brainstorming Sessions (Kaizen workshops) – Once again, it is important to perform brainstorming sessions involving process managers and collaborators. The purpose is to define the set of actions to implement in order to achieve the possible to-be Value Stream. It may be important to turn things more visual or to automate some manual activities, however, the range of actions to implement will always depend on the kind of improvements to introduce.
2. Define a detailed plan of actions to implement – In this activity, it is created a schedule for the implementation and its scope is determined: Pilot trial or Global scale? The answer depends on how risky are the changes to introduce.

4.4. Do – Solution Implementation

The objective of this phase is to implement all the actions defined in the previous phases. It is important to explain to everyone involved why the process is changing and how it is supposed to be in the future. People may try to resist, therefore it is crucial that managers get involved in the implementation.

4.5. Check

In this phase the new state of the process is assessed. The goal is to understand if the previously defined state was actually achieved. Consequently, there are four activities that must be performed:

1. Map the new as-is value Stream – Once again, observe the process where it takes place (Gemba Walks), build a new activities diagram and gather information about them.
2. Quantify the metrics with their new values – In order to evaluate the variation in process's performance, the metrics must be quantified with their new values.
3. Perform customer satisfaction surveys – With the results of these surveys it is possible to gain some insight about costumer's reaction towards the implemented changes.

4. Compare the new as-is state with the previously established possible to-be state – To understand if the possible to-be state was achieved there is the need to compare it with the new as-is state. Everything must be identical: the Value Stream Map, metric's values and user satisfaction level. Otherwise, there is the need to go back to the second phase and retake all the activities.

4.6. Act

When this phase is reached, it means that the process has improved accordingly to the plan. It is now time to define a set of standards to guarantee that the implemented changes will prevail:

1. Define new standards for the process – If new standards are not defined, the process will probably return to its previous state and it becomes harder to control it. If there is a new workflow it must be described in standards, as well as new values for the metrics or new roles and associated responsibilities.
2. Define a mechanism to periodically control the process's performance – Establish the periodicity for Gemba walks and metric's assessment.

5. Evaluation

In order to evaluate the proposed framework, it is being applied in a Portuguese Public Organization. The targeted process is the ITIL v3 Incident Management and the initial focus was the Service Desk, which is responsible for the first line of support. During the Initial Planning phase, a desirable sequence of activities for the process was defined, being represented in figure 3.

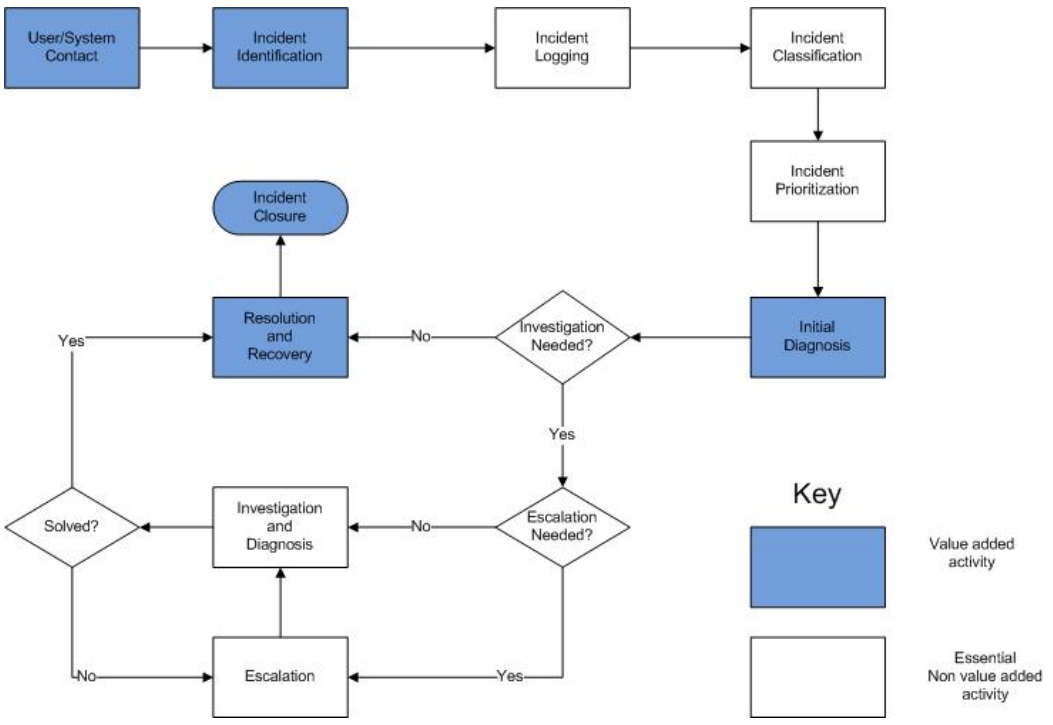

Figure 3 – ITIL v3 Incident Management Process

During the Problem Analysis phase the as-is state of the process was assessed being its sequence of activities described in figure 4.

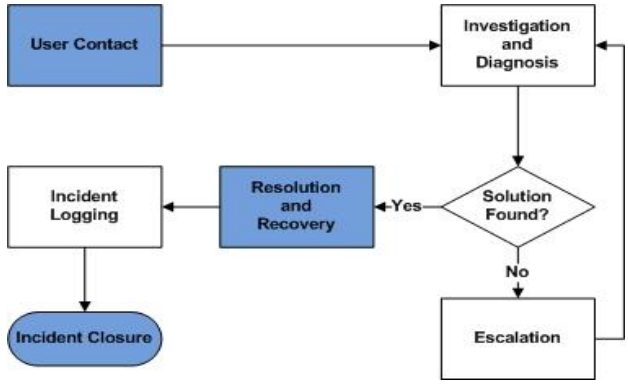

Figure 4 – Perceived Incident Management Process

The users can contact the service desk using phone, email or Windows Messenger. Additionally, there is a software application which is able to support the process as it is described in ITIL. The application is also able to automatically inform users, providing them feedback about their incidents. However, as it is possible to perceive, the process was still distant from its desirable state. The most relevant issue was the Incident Logging activity which was being performed only after incident resolution. In addition, only about 50% of the incidents were being logged. The consequences were enormous:

1. It was impossible to prioritize pending incidents
2. There was a policy of First In, First Out
3. Users had no feedback about their incidents
4. There was the risk to miss incidents

During the brainstorming sessions, it was defined that those were the first aspects to be improved. Therefore, a possible to-be Value Stream was defined, including the Incident Logging activity right after the User Contact and a 100% percentage of logged incidents. Through Gemba Walks it was possible to understand why the Gap between the as-is and the possible to-be state existed. It was a typical situation of change resistance, were the service desk elements were not performing the process as they were told to. During the following brainstorming sessions, which included Service Desk elements, it was decided that there was the need to create a new role: the Scheduler. Its responsibilities would be to answer the phone, read the email, log the incidents and assign them to a technician in order to be solved.

5.1. Results

The changes were implemented in February of 2009 and the results were immediate. The incidents started to be logged right after user contact and nowadays 100% of the incidents are logged. Moreover, the average number of emails in the inbox decreased from an average of 4 into 0. This means that users are getting a faster response to their problems. The scheduler is also able to perceive the resolution state of each incident, being capable of distribute the workload more effectively among the Service Desk elements.

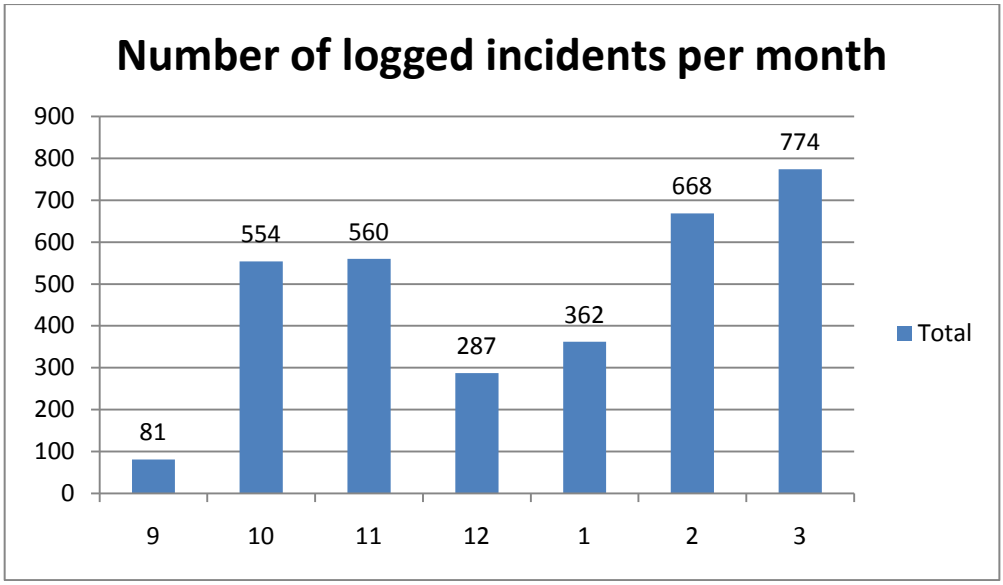

Figure 5 – Chart representing the number of logged incidents per month

Figure 5, represents the number of logged incidents since September of 2008 until March of 2009. As it can be seen, the number of logged significantly increased in February and March.

5. Conclusions

After analyzing the related work and the results obtained with this framework, it becomes clear that Lean can effectively be used to improve IT processes. Several iterations of this framework should be performed in order to introduce small changes in each one. If one tries to improve everything at once, it is more likely to fail, as the risk and the people's resistance to change will be higher. Performing the purposed brainstorming sessions contributes to reduce the resistance to change as everyone has the opportunity to contribute to the definition of the solutions to implement. Moreover, it is a way to improve IT processes in a way that meets costumer's needs and expectations.

References

Developing the Business Value of ITIL 2006 Survey Results (2006). *Greenever Systems Inc*.

Fillingham, David (2008). Making Lean Thinking Work in the NHS. *Health Service Journal*

ITIL v3 - Continual Service Improvement (2007). *OGC*

Reiner, Lynn (2007). ABC An introduction to the IT Infrastructure Library. *CIO.com*

Laudon, Jane P. (2007). Management Information Systems: Managing the Digital Firm 10/E. *Prentice Hal*.

Nand, Rohit, Changanty, Subbarao (2008). Infosys - Applying Lean to the ITIL v3 Event Management Process. *itSMF UK Conference*

Parry, Stephen (2004). Managing and Measuring for Value. *Cranfield School of Management*

Peters, Alexander (2008). Applying Lean Thinking to IT – CIOs Must Change IT's Workaround Culture to Stimulate Innovation. *Forester*

Peynot, Richard (2006): Firms must take ITIL Beyond IT Operational Goals – Service Providers Can Help With Change Management Issues. *Forester*

Sayer, Natalie J. and Williams, Bruce (2008). Lean for Dummies. *Wiley Publishing*

Schonberger, Richard (2007). Best Practices in Lean Six Sigma Process Improvement – A Deeper Look. *Wiley Publishing*

Van Bon, Jan, Pieper, Mike, Veen, Annelies van der (2006). Foundations of IT Service Management, based on ITIL. *itSFM-NL*