Lean Service Implementation in Hospital:

A Case study conducted in “University Clinical Centre of Kosovo, Rheumatology department”

Authors: Lura Rexhepi and Priti Shrestha
Supervisor: Nils Wåhlin
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Abstract

The principle of Lean is to eliminate the waste from the system. The purpose of this study is to explore Lean implementation in service sector, especially in health care settings, by focusing on Lean tools and techniques, as well as critical success factors and challenges of Lean implementation.

Research literature for Lean was reviewed to gain understanding of its applicability in service sector. In service settings, non value added work that creates waste is more difficult to identify than in manufacturing. The categories of seven wastes are the same in service as in manufacturing, such as overproduction, defects, waiting, transport, inventory, over-processing and motion. There are several popular Lean tools and techniques, which will help to eliminate these seven wastes from the process. These were the tools identified within the hospital settings, such as value stream mapping, process mapping, five S’s, kanban, visual management and red tag techniques. Thorough analysis of literature was done to ensure the applicability and understanding of Lean in service setting, especially in health care settings.

Several literatures were reviewed to understand the critical success factors and challenges for implementing Lean in service sector. This research also covers the comparative study of secondary data of hospitals on Lean practices implementation and its benefits. Theoretical aspects of Lean tools and techniques findings from literature were compared and contrasted with the real investigation process in the University Clinical Center of Kosovo, rheumatology department.

The research design is a case study, which follows interpretivism and constructionism research philosophies. Qualitative study with the semi-structured interviews and observations were applied for data collection for the University Clinical Center of Kosovo, rheumatology department. Based on the interviews, current process for the rheumatology department was examined. Relevant and applicable Lean tools and techniques were recommended to improve the performance and reduce the waste.

The findings of the study validate that Lean applicability in rheumatology department is achievable. This is because the researchers identified various non value added activities in current processes, which should be eliminated. Then the study continues with discussion by suggesting simplified and standardized processes, which would increase patients’ satisfaction, and work efficiency in rheumatology department. After analyzing the data, researchers make some recommendations to implement Lean by highlighting some Lean tools and techniques, which are applicable to various hospitals, including rheumatology department in University Clinical Center of Kosovo.

Keywords: Lean Healthcare, Lean in Service, Lean Tools and Techniques, Critical Success Factors of Lean implementation, Challenges of Lean implementation, Process improvement
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Chapter 1: INTRODUCTION
The first chapter provides the introduction of the study. It begins with the background of the study to provide understanding on the topic. It follows with research question, as well as research objectives aimed to achieve this study. Moreover, definitions of the main concepts are explained, followed by the significance of the study. Then the delimitations are highlighted to know the scope of this study. A structure of the literature review is developed in order to organize the literature review process addressing the research question.

1.1 Background of the Study
In this modern world, there is rapid change in management which is affecting all organizations and managers (Burnes, 2004). Organizations are attempting to be more decentralized and transforming their traditional policies by implementing different strategic change tools for improvement of operations (Burnes, 2004; Kotter, 2007). As organizations are struggling to meet increasing competitive pressures and to remain competitive, many of them are embracing Lean, as a tool to improve their position. Lean is one of the quality initiatives that organizations apply to improve organizational performance by identifying waste and reducing costs from the operations. It is argued that companies could benefit by successful implementation of Lean. For example, Lean system can be helpful in maintaining long term customer satisfaction (Maleyeff, 2006).

Literature illustrates that Lean tool has become popular because of the efficiency shown in Japanese manufacturing companies (Womack, Jones & Roos, 1990, p. 188). The concept of Lean was first developed by Toyota executive “Mr Kiichiro Toyoda and Mr. Taiichi Ihno” by identifying different kind of wastes within the production system (Black & Miller, 2008, p. 4). However, nowadays, it has evolved as a management approach to improve all processes across the industry (Taleghani, 2010). Service operations are becoming significant in global economy because of increasing need and demand for quality services (Frozen Food Digest, 2002; Bowen & Youngdahl, 1998). Lean implementation improves employees’ productivity by 30%, which leads to quality of service to customers (The Staff of the Corporate Executive Board, 2010). However, despite this fact, companies are not offering quality services to customers (Piercy & Rich, 2009).

One reason that Lean has not been applied to a great extent in service industry is because there is organizational traditional thinking that it is related with production, as it was developed firstly for manufacturing purposes (George, 2003, p. 8). Appiotti and Bertels (2010) also highlighted that Lean behavior was only considered beneficial for manufacturing industries; however, nowadays, Lean is considered a simple tool applicable for all sectors. For example, financial companies develop Lean to increase the efficiency and productivity leading to customer satisfaction.

Despite the growing awareness of the need for Lean implementation in service sector, few studies have examined its effectiveness to strengthen their financial position. Subsequently, there are not many books and journals about best practices on Lean in service industry, where organizations could learn before applying this tool (Sarkar, 2009). De Souza (2009) also highlighted that even though there are several studies for Lean in the hospital settings, these studies do not have a strong base, and they significantly lack the analysis on implementation process of Lean tools and techniques.
To fill this gap, this research study aims to explore and understand Lean implementation process in service sector with the emphasis on the hospitals. In this context, the researchers will contribute to understand Lean tools and techniques, as well as the CSF’s and challenges that are faced while implementing them. After understanding Lean concept for implementation in service sector, based on review of literature and thorough analyses of the processes within rheumatology department in University Clinical Centre of Kosovo (UCCK), the researchers of this study provide some Lean tools and techniques recommendations to improve process efficiency.

1.2 Research Question
Academic research on Lean is focused mainly in production and its impact on company’s performance and process improvement; however, minimum attention has been given to Lean implementation process service sector. Therefore, the following research questions have been formulated:

“How is the implementation of Lean tools and techniques affected by critical success factors and challenges of Lean in service sector?”

After understanding Lean tools and techniques, as well as CSF’s, challenges and benefits of Lean implementation in service sector through literature review, the researchers will fit the empirical data for rheumatology department in UCCK hospital to understand the process improvements that can be made through Lean.

1.3 Objectives of the Study
This research will explore the case of rheumatology department in UCCK hospital. More specifically the research has the following objectives:

- To understand Lean tools and techniques applicable in service sector.
- To compare successful practices of Lean implementation in different hospitals and to understand how Lean concept can be applied as continuous improvement process.
- To identify CSF’s and challenges that companies face during Lean implementation.
- To identify the literature review outcomes with the real investigation within the rheumatology department in UCCK hospital.
- To recommend appropriate Lean tools and techniques applicable to various hospitals, including UCCK, rheumatology department in order to simplify and standardize the work processes.

1.4 Definitions of Main Concepts
It is significant to mention definitions of various concepts which are used in this study. Therefore, below are described the main concepts.

**Lean Production:** This concept was born from the success of Toyota Motor Corporation (Womack et al., 1990, p. 67), with the focus to reduce waste and use fewer resources compared to mass production system. Moreover, Emiliani (1998) agrees that Lean production objective is to reduce resources by eliminating non-value added activities. Lean production was expanded from the shop floor techniques to all manufacturing functions by involving the whole organization (Kollberg, Dahlgaard & Brehmer, 2006).

**Lean Thinking:** Lean thinking is about working more efficiently and faster by causing minimal wastes. It is created when organizations operate in thinking and
listening culture, where process design is developed by workers who deliver products or services (Atkinson, 2004). To develop Lean thinking, organization should communicate the successes that could be received from its implementation. Also, they should continuously try to identify waste, monitor the flow and focus on customers’ satisfaction (Melton, 2005).

✓ **Lean Services:** It is about eliminating waste from service processes in order to speed efficiency. Even though in services the waste can be tangible and intangible, the key challenge is to manage the intangibility of waste because of its difficulty to identify. Lean service has generated positive results also in retail, airline, hospital and finance (Piercy & Rich, 2009). After top management takes an action to implement Lean in service by changing behaviours and attitudes of employees, they should also empower and give more authority to them over decision making for process improvement within their responsible job areas (Maleyeff, 2006).

✓ **Waste:** It includes any activity that does not add value beside the minimum equipments, parts and employees, which are needed for the business (Slack, Chambers & Johnston, 2007, p. 465; Bicheno, 2004, p. 15). Similarly, George (2004, p. 28) identifies waste as anything that is not valuable for customers, for which is spent time, money and work. Waste occurs due to the way of operation of processes in organizations. Moreover, the search of waste in organizations does not have an end point (Emiliani, 1998).

✓ **Value added activities:** According to George (2004, p. 28), value added activities are those activities that add value from customers’ perspective, for which they are willing to pay. These activities are those that customers cannot perform themselves or cannot perform without substantial time and money (Maleyeff, 2006). Value added activities can be defined only by customers (Kollberg et al., 2006).

✓ **Non-value added activities:** These activities are the work which does not add value to the customers, for which they are not willing to pay; therefore, should be eliminated (George, 2004, p. 28). These activities exist because of the current structure of the system in organizations, and are considered wasteful (Maleyeff, 2006).

**1.5 Significance of the Study**
Following points support the relevance of this research:
- The first one is the growing importance of services from past few years, where companies are trying to improve by generating higher profit.
- The second reason is to improve companies’ financial position by eliminating waste and focusing on what customers’ value, rather what companies think is the best for them.
- The third reason is to increase companies’ knowledge and efficiency by changing the behaviour and attitude of all employees as a result of Lean thinking.
- The last one is the lack of studies done related to Lean implementation in service sector; therefore, with this study, researchers aim to enhance Lean applicability in service organizations.
1.6 Delimitations of the Study
The research is based on the empirical data from UCCK hospital, rheumatology department in Kosovo for Lean Healthcare implementation. This study does not cover other departments within UCCK hospital or other hospitals in Kosovo. However, secondary data of several other hospitals will be used as comparison to analyze the applicability of Lean. Therefore, it is not possible to generalize the results obtained from the hospital. The data analysis will be based on observation and semi-structured interviews with employees working in rheumatology department. The aim of this study is to answer the research question, rather than making generalizations with the real implementation of the theoretical Lean tools and techniques in UCCK hospital, rheumatology department.

1.7 Structure of the Thesis
Method and procedure of literature review
To be more familiar with the topic and to know the extent of research available for Lean implementation in service sector, different kind of sources has been used. The on-line databases from Umeå and Heriot-Watt Universities provided research results from various scientific journals related with Lean services. Some books related to Lean manufacturing and service sector have been reviewed as a starting point in the research process to understand better Lean concept. Also, due to the limitations in the research in Lean service sectors, practitioners’ reports and web pages were used to provide a stronger base for literature review. For Lean implementation in healthcare, practitioners’ reports were quite strong contributors. Particularly, NHS UK publication is believed to be the first one to use Lean in Healthcare (De Souza, 2009). They actively publish the articles with experience in NHS UK websites and also involve several universities for the research purpose. Thus, NHS UK is main contributor in creating knowledge for Lean healthcare.

From the review of literature, researchers identified key findings by comparing and contrasting different authors’ point of view. At the first stage of research, there were many research papers found about Lean concept, so the researchers narrow down the scope by using keywords related to the research question. Then the researchers selected most relevant research papers from different sources to conduct the literature review.

Structure of the Thesis
The thesis is structured in five chapters. The first one is introduction, with the aim of exploring and analyzing the background of the study, describing the research question and objectives of the study. Then it continues with the definitions of the main concepts, the significance of the study, as well as its delimitations. The second chapter is the systematic literature review in order to understand and be familiar more with the topic based on different point of views of the main contributors for Lean theories. It presents the background and the importance of Lean in service sector. It continues with understanding CSF’s and challenges from the implementation of Lean. Then it follows with Lean tools and techniques, as well as a comparative study of Lean implementation in hospitals. After this step, it includes benefits and criticisms from the implementation of Lean. Finally, it is summarized by proposing a research framework developed by researchers that will help toward successful Lean implementation in UCCK, Rheumatology department. The inverted pyramid structure was followed to derive the structure for the literature review, which is shown in Figure 1. Literature review is divided in five categories starting from the broader concept of the topic towards
narrowing the topic specifically to answer the research question. This approach was helpful also to categorize various theories and several authors’ arguments by relevant subtopics.

1. Background of Lean

2. Lean in Service Sector: 7 Types of Wastes

3. CSFs and Challenges of Lean Implementation in Service

4. Lean Tools and Techniques and Comparative Study of Lean Healthcare

5. Benefits of Lean Implementation in Service

Figure 1: Literature Review Structure
Source: Developed by the authors

The third chapter covers the research methodology. In this chapter, both theoretical and practical methodologies for the research have been explained. Theoretical methodology helps to understand the concept and approach based on several literatures. With the knowledge gained from the theoretical methodology, researchers derived the practical methodology that is applied for this research purpose. The fourth chapter is the findings and discussion, where researchers evaluate the current process and suggest the improvements with Lean tools and techniques. The final chapter includes conclusions and recommendations. Also, limitations and further areas for research are covered.
Chapter 2: LITERATURE REVIEW

The literature review is structured from broader context to more specific. The first section presents the main contributors of Lean concept by giving a background and explaining its principles. Then the study continues with the second section by explaining Lean in service sector, with elaboration of seven types of wastes. The third section emphasizes Lean implementation to understand CSFs and challenges that companies face while implementing. It follows by Lean tools and techniques as well as the comparative study of Lean in hospitals. Lastly, it provides some benefits and criticisms toward Lean. Then the fourth section includes the results of literature review, which are summarized by proposing a research model by researchers.

2.1 Background of Lean

2.1.1 A Brief History of Lean

Lean concept was introduced firstly by Krafjick in 1988 article "Triumph of the Lean Production System" in order to raise the idea of using less of everything to increase the efficiency and productivity in organizations. This means using less human resources, inventory, space, investment in tools and time spend to develop products (Womack et al., 1990, p. 13). Lean production is focused on identifying and eliminating non value activities in products and services in order to create value to customers. Lewis (2000) emphasize that Lean is considered a set of management principles for production with the aim of reducing waste (muda called by Japanese). Lean involves different techniques of design, such as leadership to direct the process that involves multi-skilled employees; teamwork to assign workers from different functions in groups; communication to resolve critical design trade-offs and prioritize resources; and simultaneous development that involves a process with less tools, inventory and human resources (Womack et al., 1990, p. 113-117).

The founder of Toyota Motors, “Kiichiro Toyoda” was highly influenced by Henry Ford theory on the mass production strategy. Toyoda could not adapt mass production strategy from Ford Company due to economic situation in Japan after the World War II, where the demand for mass produced vehicle was low (Dale & Lwaarden, 2007; Petersson, Johansson, Broman, Blucher & Alsterman, 2010, p. 28). This situation led to the development of Toyota Production System (TPS), which emphasized on process to build several models of both cars and trucks in small volume with low investment, as well as minimizing the cost with Just-in-Time (JIT) and even shortening the lead time. This theory helped Toyota to minimize cost, maintain the quality and provide several models to satisfy different customer requirements (Slack et al., 2007, p. 465; Melton, 2005; Dale & Lwaarden, 2007; Petersson et al., 2010, p. 28).

TPS was the beginning of Lean practices in manufacturing, which was developed further to reduce and eliminate waste in the processes within the organization (Holweg, 2007; Womack et al., 1990, p. 259; Melton, 2005; Dale & Lwaarden, 2007; Petersson et al., 2010, p. 28). Figure 2 shows the TPS House as a symbol of Lean (Balle & Regnier, 2007, p. 34), which was created by “Taiichi Ohno and Eiji Toyoda” (Pascal, 2002, cited in The U.S. Environmental Protection Agency). The roof represents the goal of Lean to eliminate waste in process by offering quality products and services to customers. In the center of the house is the culture of continual improvement that involves all employees of the organization. In both sides of the house are two elements of TPS, such as JIT with
the aim to eliminate waste by planning and controlling operation to meet customers’ demand, as well as Jidoka (built in quality) to detect the problems immediately in order to fix them easier (Slack et al., 2007, p. 465). Finally, the foundation is the standardization of the process. The House of Toyota was helpful to visually explain TPS to employees (Pascal, 2002, cited in The U.S. Environmental Protection Agency).

Manufacturing companies started to implement Lean by adapting similar practices in service departments within the organization because of positive results from Lean practices. In the study made by Levitt’s (1976, cited in Bowen & Youngdahl 1998), it was shown that service sector could truly benefit from the adaptation of the theories developed for manufacturing sector. Also, Bowen and Youngdahl (1998) supported this argument by pointing out that in service sector, people valued faster service and Lean helped to eliminate waste from the value chain helping customer to receive the service immediately.

2.1.2 The Five Lean Principles
Organizations should focus on continuous improvement by using the five Lean principles to improve their operations (Loughrin, 2010). These principles are described by Womack and Jones (1996, cited in Bicheno 2004, p. 10-11) and Melton (2005), such as specifying the value, the value stream, flow, pull and perfection, which are discussed in the following:

- The first one is specifying the value from point of view of customer. Manufacturing companies are likely to offer products that are convenient for manufacturers, rather than focusing on producing products that customers’ will value (Womack & Jones, 1996, cited in Bicheno, 2004, p. 10; Melton, 2005). Therefore, they are challenged to develop product portfolio based on understanding customers’ requirements, which leads to meet Lean principle to specify values (Melton, 2005).
- The second one is the value stream, which means organizing processes from raw materials to final customer based on the viewpoint of customers, rather than what departments want (Womack & Jones, 1996, cited in Bicheno, 2004, p. 10; Melton, 2005).
- The third principle is about creating value flow that has to do with processes, people and culture (Melton, 2005), and it is used to reduce delays of value added activities and eliminate non value added activities.
• The fourth principle is leverage pull, which means elimination of excess production by focusing on the demands of customers.

• The fifth principle is seeking perfection, which involves increasing quality, as well as producing what customers want, when they want, with a reasonable price and with no waste (Womack & Jones, 1996, cited in Bicheno, 2004, p. 11). This means that improvement cycle should be continuous and it should never end (Melton, 2005).

These are the five principles originally developed in manufacturing, but they can also be applied in service. Figure 3 shows the five principles, which are adapted for healthcare. The second principle is the most important one, which emphasizes identification of the process that creates value for customer that can be achieved through “the value stream” in manufacturing and “Patient Journey” in healthcare. Remaining principles in service are the same as in manufacturing sector (Westwood, James-Moore and Cooke, 2007).

Figure 3: The Five Principles of Lean
Source: Westwood et al. (2007, p. 4)

2.2 Lean in Service Sector
In organizations, 80% of the costs come from product design which includes services, such as finance, human resources and product development, while costs from manufacturing labor comprise only 20%. This leads to higher costs caused by services and with increasing competition, it will lead to loss of customers, which are more apparent in services than in manufacturing (George, 2003, p. 3). To keep customers satisfied, companies are trying to increase the service quality by integrating Lean principle in order to reduce costs and increase profitability (George, 2003, p. 3; Bowen & Youngdahl, 1998).

Lean concept is a way to identify where the value is in the process, eliminate the waste within the process and create value to the customer. This concept shows that Lean is applicable in any organization, since the goal of organization is to create value to end customer (Womack & Jones, 1994, cited in Piercy & Rich, 2009). One development of Lean beyond manufacturing was application of Lean in the supply chain management. This helped the organizations to develop closer relationship with suppliers by sharing more information, increasing innovation and lowering the costs (Hines, 1996, cited in Piercy & Rich, 2009).

Lean in service is applicable to organizations that have limited information and face interruption on task performance. The services encounter high costs with slow processes because of non value added activities, which lead to poor quality and low customer satisfaction. There is service complexity, which occur in Work in Progress (WIP) and cause delays. Examples of WIP are reports necessary to complete, unchecked e-mails, necessary phone calls to make and sales orders. This slow process is due to the 20% of activities that cause delay of 80% (George, 2003, p. 13).
Also, Lean service has shown great success in healthcare system. Healthcare system has adopted Lean by analyzing the flow of activities and making improvement through process mapping techniques, as well as identification and reduction of waste (Swank, 2003; Jones & Mitchell, 2006; Towill & Christopher, 2005; Esimai, 2004; Massey & Williams, 2005, cited in Piercy & Rich, 2009).

There are several characteristics of Lean service proposed by Bowen and Youngdahl (1998), which are shown in Table 1. Some of them involve reducing the performance tradeoffs between the objectives of organization and customers; reducing set-up time and applying JIT; increasing customer involvement and offering training to employees and customers; as well as investing on people because they can make a difference in the business. Therefore, by focusing on Lean service, organizations give greater attention to the investment of people, rather than equipments (Bowen & Youngdahl, 1998).

### Table 1: Lean Service characteristics

<table>
<thead>
<tr>
<th><strong>Reduction of performance tradeoffs</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations goals of both internally-focused efficiency and customer-defined flexibility</td>
</tr>
<tr>
<td><strong>Flow production and JIT pull</strong></td>
</tr>
<tr>
<td>Minimize set-up time allowing for smoother flow</td>
</tr>
<tr>
<td>JIT levels of both input and output</td>
</tr>
<tr>
<td><strong>Value-chain orientation</strong></td>
</tr>
<tr>
<td>Apply service blueprinting and value analysis to eliminate non-value-added activities</td>
</tr>
<tr>
<td><strong>Increased customer focus and training</strong></td>
</tr>
<tr>
<td>Involve the customer in the design of the service package</td>
</tr>
<tr>
<td>Train employees in customer service skills and behaviours</td>
</tr>
<tr>
<td>Train customers in how to contribute to quality service</td>
</tr>
<tr>
<td><strong>Employee empowerment</strong></td>
</tr>
<tr>
<td>Invest significantly in employees (skills, teambuilding, participation)</td>
</tr>
<tr>
<td>Empower employees to leverage customers’ value equation (benefits divided by price and other “costs”)</td>
</tr>
</tbody>
</table>


Lean in service sector is essential to add value to customers by providing services with higher quality and speed the process by using fewer, but right resources. There is a need to analyze the non value added activities to reduce the cost and complexity. Employees should identify the waste and hidden costs caused in different steps of processes, which might involve reorganization of companies by less capacity, material and people to perform the work more efficiently (George, 2003, p. 6). Also, organizations should focus on value added activities from customers’ perspective. In this way, they will understand better the customers’ needs and how much they are willing to pay to increase quality of service (George, 2003, p. 28).

### 2.2.1 The Seven Types of Wastes in Service Sector

The key point for Lean theory is the elimination of all the waste within the processes (Melton, 2005). Waste includes activities which do not add value to customers and organizations. For them, waste is a cost that they are not willing to pay. It is important to increase the awareness of employees on the concept of waste, as well as on the ways to identify and reduce waste. Fujio Cho of Toyota identified the seven types of wastes (Slack et al., 2007, p. 465), for which the companies face difficulties in identifying and reducing them (Melton, 2005).
To get a better understanding of the wastes in any organization, the seven types of wastes can be described in terms of manufacturing and service environment. Table 2 is developed by researchers by combining different authors’ viewpoints. Firstly, the seven types of wastes are identified and described to let the reader understand the meaning in terms of manufacturing and service perspective. Then it follows with some examples in different kind of organizations. After explaining the seven types of wastes, another new waste in service is described followed with examples.

<table>
<thead>
<tr>
<th>Waste</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Over processing | **Manufacturing perspective:** It means organizations use big machines, which are not efficient with low quality that causes defects. So, organization should focus on long term and purchase smaller and simpler machines that fit to the capacity needed based on customers’ demand (Bicheno, 2004, p. 17).  
**Service perspective:** It includes excess costs with attempt to add more value to service than is needed to satisfy customers (George, 2003, p. 259). | ✓ The variation between operators, which causes the machine to be used for several lines (Bicheno, 2004, p. 18).  
✓ If a store wraps clothing item in a layer of tissue, this might work in boutique that target high income people, but not in retail stores where people want to pay as less as possible (George, 2003, p. 259).  
✓ In healthcare, acquiring numerous test samples from patients, which are unnecessary (Petersson et al., 2010, p. 93). |
| Transportation | **Manufacturing perspective:** It is the movement of materials which is not needed, because their chance to get damaged and deteriorated increases (Bicheno, 2004, p. 17).  
**Service perspective:** It means the movement of materials and information, which should be reduced for activities that do not add value, or are related to occurrence of waiting time and queues that dissatisfy customers (George, 2003, p. 260). | ✓ The movement of materials on and off site without a need; and movement of intermediate product in the site (Melton, 2005).  
✓ In banks, many people face the problem of transportation because they have to collect materials and information by asking different people until they reach the right person (George, 2003, p. 260).  
✓ In healthcare, it can be the distance of transport of test samples because of the centralized resources in organizations (Petersson et al., 2010, p. 92). |
| Motion | **Manufacturing perspective:** It happens when there are unnecessary movement of people and machines (Bicheno, 2004, p. 17).  
**Service perspective:** It does not add value to services, because it only takes additional time and cost related to unnecessary movement of employees. The motion is very hard to measure in service sector (George, 2003, p. 260) | ✓ Double handling of materials in the organizations (Bicheno, 2004, p. 17).  
✓ People have to go from one computer to another to complete a task (George, 2003, p. 260).  
✓ Searching for people and equipments which are placed within long distance (Petersson et al., 2010, p. 94). |
<table>
<thead>
<tr>
<th>Waste</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory</td>
<td>Manufacturing perspective: It involves the over existence of raw materials,</td>
<td>✓ The excess of inventory compared to the quantity that was specified (Bicheno, 2004, p. 18).</td>
</tr>
<tr>
<td></td>
<td>WIP and finished goods in organizations. This is considered waste because of</td>
<td>✓ Large warehouse occupied with inventory in the site (Melton, 2005). When employees are</td>
</tr>
<tr>
<td></td>
<td>the excess of cost spend on them (Bicheno, 2004, p. 18).</td>
<td>unable to provide services according to customer’s requirements due to lack of supplies (</td>
</tr>
<tr>
<td></td>
<td>Service perspective: It means using excess inventory instead of what is</td>
<td>✓ Providing substitute of products or services, not what was asked by customers (Bicheno,</td>
</tr>
<tr>
<td></td>
<td>actually required to provide service to customers. This should be avoided</td>
<td>2004, p. 20).</td>
</tr>
<tr>
<td></td>
<td>because it does not add value to customers and involves higher cost of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>waiting. This kind of waste is usually a result of overproduction (</td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td>Manufacturing perspective: It is considered an enemy of flow, because</td>
<td>✓ Operators or employees waiting for something; materials waiting in a queue; and late</td>
</tr>
<tr>
<td></td>
<td>materials and components do not move as a result of waste (Bicheno, 2004,</td>
<td>delivery (Bicheno, 2004, p. 16).</td>
</tr>
<tr>
<td></td>
<td>p. 16).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Service perspective: It involves a delay in one activity, which causes a</td>
<td>✓ Waiting in the meeting for people who show up late, which lead to irritation and loss of</td>
</tr>
<tr>
<td></td>
<td>delay in the following activity. The value stream mapping technique is</td>
<td>time in which work could be performed (Petersson et al., 2010, p. 91).</td>
</tr>
<tr>
<td></td>
<td>useful to identify process delays. Organizations can analyze the waiting</td>
<td>✓ In healthcare, patients waiting in the queues (Petersson et al., 2010, p. 91).</td>
</tr>
<tr>
<td></td>
<td>time by looking at each activity in the process to identify delays (George,</td>
<td></td>
</tr>
<tr>
<td>Defect</td>
<td>Manufacturing perspective: It involves any waste which involves costs</td>
<td>✓ Rework, customers’ complaints, or even lose of customers (Bicheno, 2004, p. 18).</td>
</tr>
<tr>
<td></td>
<td>Service perspective: It happens when services are not performed within</td>
<td>✓ A lack of information or inaccurate process of documentation can cause delays which</td>
</tr>
<tr>
<td></td>
<td>specification of customers. Some of the services are not costly to correct</td>
<td>dissatisfy customers (George, 2003, p. 261).</td>
</tr>
<tr>
<td></td>
<td>mistakes, but organizations should consider that they might also lose</td>
<td>✓ In healthcare, infections that patients get due to lack of hygiene and poor treatment</td>
</tr>
<tr>
<td></td>
<td>customers (George, 2003, p. 261).</td>
<td>(Petersson et al., 2010, p. 95).</td>
</tr>
<tr>
<td>Overproduction</td>
<td>Manufacturing perspective: It involves producing too much, or just in case</td>
<td>✓ The area of space that is needed and used in the warehouse (Melton, 2005).</td>
</tr>
<tr>
<td></td>
<td>it is needed without being focused on customers’ demand. This leads to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>excessive lead times and deterioration of products (Bicheno, 2004, p. 16).</td>
<td>✓ Entering unnecessary information for organization (Petersson et al., 2010, p. 91).</td>
</tr>
<tr>
<td></td>
<td>Service perspective: It means the excess production of service outputs</td>
<td>✓ In healthcare, patients are admitted to the hospital and they wait because there is no</td>
</tr>
<tr>
<td></td>
<td>(George, 2003, p. 262). This happens because organizations produce more</td>
<td>time to give them service till later (Petersson et al., 2010, p. 91).</td>
</tr>
<tr>
<td></td>
<td>services than customers want.</td>
<td></td>
</tr>
<tr>
<td>Untapped</td>
<td>Service perspective: It happens when organization do not use the</td>
<td>✓ The loss of skilled employees that could contribute for organizational improvement</td>
</tr>
<tr>
<td>competence</td>
<td>competence of workforce and their creativity (Petersson et al., 2010, p. 95)</td>
<td>(Petersson et al., 2010, p. 95).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Not using the creativity of people; not paying attention to ideas of employees, but only</td>
</tr>
</tbody>
</table>
2.3 Lean Implementation

Lean is very important concept in organizations because it involves broad understanding, high commitment and deep analysis of problems. More and more organizations are implementing Lean in long term basis to improve quality, and also to reduce costs, fast delivery and efficient queue times. To succeed in Lean implementation, a committed management is necessary to give support to the organizations. Also, an external support might bring a new way of thinking and transfer knowledge to organizations by recommending the areas that Lean application is necessary. External support might be helpful in short term to increase the knowledge of organizations toward Lean; however, the organizations should not be dependent on them because it is a continuous progress that last long (Petersson et al., 2010, p. 167-169). Therefore, organizations should be aware that Lean cannot be implemented overnight. There is a need to work continuously to reduce waste and increase commitments by looking at opportunities and limitations (Petersson et al., 2010, p. 17).

An example is Toyota that implemented Lean in 1950s and still continues to reduce waste (Petersson et al., 2010, p. 170). This is the reason it is important to understand further the CSF's and challenges of Lean implementation, as well as its tools and techniques and comparative study of hospitals for Lean practices. After this are described benefits can be generated from Lean implementation.

2.3.1 Critical Success Factors of Lean Implementation

Abdullah, Uli and Tari (2008) emphasized on the importance of having these four factors to drive the positive impact on quality improvement which are Management commitment, Employee involvement, Training & education and Reward & recognition. All these factors were originally contributed by the quality guru’s Deming and Juran (Deming, 1982; Juran, 1982, cited in Abdullah et al., 2008).

One of the CSFs that affect Lean implementation at great extent in manufacturing is management support (Alavi, 2003; Bamber & Dale, 2000; Boyer & Sovilla, 2003; Parks, 2002; Womack & Jones, 1996, cited in Worley & Doolen, 2006). Top management should give greater efforts in encouraging all employees for change by introducing the importance of Lean concept (Atkinson, 2004; Boyer & Sovilla, 2003, cited in Worley & Doolen, 2006). Also, top management commitment is important to give support to low level employees and convey consistent information about Lean (Crute, Ward, Brown & Graves, 2003). Another CSF is increased communication between employees, as well as within the management and employees, which will benefit Lean implementation. Effective communication is a necessity in Lean manufacturing between all value streams (Atkinson, 2004; Worley & Doolen, 2006). Supporting this argument, clear and effective communication as success factor for Lean implementation in service is helpful by sharing the success stories of Lean implementation or with constant feedback from employees to top management for process improvement (Cotte, Farber, Merchant, Paranjkas, & Sirkin, 2008). However, Worley and Doolen (2006) emphasize on combination of both management support and communication to implement Lean successfully. Furthermore, a clear communication plays important role in keeping strong customer-supplier relationship, where there are clear responsibilities of employees involved for products and services, and those in charge for responding to various problems and concerns (Spear & Bowen, 1999).

Based on Deloitte MCS Limited (2010), in a research on hundred companies in service sectors, these were the step by step CSFs for Lean implementation, such as trust in
organization that Lean implementation will be successful; link of Lean with the strategic objectives to properly utilize Lean resources; application of Lean in all functions; and creating a Lean culture within organization for improvement. Overall, emphasis is given to building the trust for Lean through culture change within the service organization in similar way as in manufacturing. To further emphasize on the trust that can be built within the organization, Chakrabarty and Tan (2007) suggest that companies should start measuring success of quality implementation in financial terms, and then it will be easier for management to communicate and show employees the importance of quality measures. Also, Deloitte MCS Limited (2010) suggests linking Lean with strategic improvement to focus on the objectives that are more critical to the organization. Thus, to get the best results of Lean management support and vision towards Lean practices, it is a must to create Lean culture within the employees.

Appiotti and Bertels (2010) also contributed in the literature of CSF’s for Lean, specifically for the financial service companies by identifying these factors: the importance of focusing on strategy, identifying customers’ requirements and values, measuring the valuable factors to understand the success of Lean implementation, simplifying the process and understanding the system before making changes. Appiotti and Bertels (2010) emphasized that in financial service, companies try to apply Lean processes, which are similar to manufacturing processes; however, this is not the right approach because Lean should be applied in the area where it has a strategic importance. This way, companies can enhance the core competences to gain the competitive advantage by enhancing the process, which will in turn save money and build customer trust.

Cotte et al. (2008) emphasize on making changes by breaking down processes to understand them easier, which will also motivate the employees. In similar context, Westwood et al. (2007) emphasize on making small changes within the process to improve, such as in case of NHS UK, where an emergency doctor used to waste time searching for the prescription pad, but now prescription pad is attached in the doctor’s desk. Even making Lean as part of the organizational culture, it has been followed by NHS UK with the implementation of Lean support team, who is responsible to educate and train employees on Lean. Applying Lean is bringing new changes to the organization, which requires involvement and commitment from all employees. Cotte et al. (2008) point out that without employees’ ground level involvement, problems can only be solved at the surface level since these employees have more knowledge about the detail processes and work flow. Also, Lean focus is to identify the root of problems so that they will not happen again. With similar context, Westwood et al. (2007) highlighted that Lean is implemented in organizations from top management vision, but success comes with the involvement of both top management and employees from all levels.

With the understanding of these factors before Lean implementation, it will help to materialize the benefits and also to create Lean culture. Table 3 summarizes the key CSF’s in both manufacturing and service sector.
Table 3: CSF’s of Implementation of Lean

<table>
<thead>
<tr>
<th>Authors</th>
<th>Journal</th>
<th>Industry</th>
<th>Identified CSF’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdullah et al. (2008)</td>
<td><em>The Total Quality Management</em></td>
<td>Manufacturing</td>
<td>Management commitment; Employee involvement; Training &amp; education; Reward &amp; recognition</td>
</tr>
<tr>
<td>Worley and Doolen (2006)</td>
<td><em>Management Decision</em></td>
<td>Manufacturing</td>
<td>Management support; Communication</td>
</tr>
<tr>
<td>Deloitte MCS Limited (2010)</td>
<td><em>Deloitte LLP</em></td>
<td>Service</td>
<td>Link of Lean with the strategic objectives to properly utilize Lean resources; application of Lean in all functions; and creating a Lean culture within organization for improvement</td>
</tr>
<tr>
<td>Appiotti and Bertels (2010)</td>
<td><em>Journal of financial transformation</em></td>
<td>Service</td>
<td>Strategic focus is critical; understand the world from the Customer’s point of view; Measure what matters; Making it simple prior to automating and master the process before outsourcing</td>
</tr>
<tr>
<td>Cotte et al. (2008)</td>
<td><em>BCG Publication</em></td>
<td>Service</td>
<td>Choose strategic customer centric projects; Think big but start small; Involve everyone from top managers to line workers; Trailer your approach to your culture; Assign dedicate, experienced resources, use metrics to drive performance and communicate communicate communicate</td>
</tr>
<tr>
<td>Westwood et al. (2007)</td>
<td><em>NHS Institute for Innovation and Improvement</em></td>
<td>Service</td>
<td>Small changes; Involving all staff; Motivate staff; Executive support and involvement; Dedicated Lean support; Rapid improvement events</td>
</tr>
</tbody>
</table>

Several authors agreed that the management involvement and commitment are important aspects in both manufacturing and service for Lean and any other quality practices implementation (Abdullah et al., 2008; Worley & Doolen, 2006; Cotte et al., 2008; Westwood et al., 2007).

2.3.2 Challenges of Lean Implementation

Even though Lean has shown great success in manufacturing, there are challenges they face during implementation. Worley and Doolen (2006) point out that it is hard to persuade workers in the organization to change their thinking in order to focus on customer value and waste identification, because they might be resistant to new tools, such as Lean. Moreover, delivering smaller amount of parts will be difficult for suppliers to apply JIT concept. Also, customer order forecast might not be the amount of products they want, which cause an excess of inventory for organizations (Womack & Jones, 1994, cited in Worley & Doolen 2006).

The main challenge is the lack of standardized process within the service industry. Sarkar (2009) points out that it is more difficult to identify processes within the service, because they are not as evident as in manufacturing. Also, due to the size and complexity, it is difficult for organizations to deal with processes to minimize the waste. Therefore, processes should be documented in order to keep track of the performance continuously. George (2003, p. 256) also emphasizes the importance of following a procedure to keep track of process for services. For example, in Bank of America, there is no documentation of the process, and when employees need something, they have to
contact the person who has highest experience. Furthermore, Grove, Meredith, MacIntyre, Angelis, and Neailey (2010) discuss the challenge of process variability in the health visiting service. It was hard to find fixed processes, which made it difficult to apply the value stream mapping and there were various stakeholders, who were not all supporting Lean principle.

Beside these, there are other Lean challenges related to people, which lead to complexity of processes. Sarkar (2009) emphasize that Lean should engage all people from organization. This involves strategic changes because of the hierarchy’s barriers. It requires low level of organization to be more empowered as they are the ones working in the operation, who can identify the waste easier. Even Aherne (2007) agrees that in the healthcare while implementing Lean practices, the main challenge is empowering and providing the relevant training to the staff. Another challenge is that employees cannot keep track of process since they are not able to measure the time needed for different work items as there is uncertainty in task completion (George, 2003, p. 256). This happens because employees have control over their structure of tasks, which is the reason why processes are hard to define in service industry. However, employees should be aware that working by standardizing processes will give them more freedom and empowerment, as well as they will receive information about change management (George, 2003, p. 256).

Sarkar (2009) mentions the importance of managing employees’ behavior and actions because Lean applicability depends on their mood in every day work; therefore, there is need to avoid their mistakes in processes. Employees of NHS UK faced challenge because of lack of effective communication and leadership. There was no proper collaboration between middle managers and low level of organization, because they did not develop strategic planning on how to implement Lean (Grove et al., 2010). Aherne (2007) also highlighted that in NHS UK, the challenge was to get the support from the government and support for the program from the management. Beside these, in service processes, the interaction of people has more significance, so they should not be treated as machines. For example, it is less complicated to reduce setup time in machine than reduce the time of call for sales employees (George, 2003, p. 257). Table 4 summarizes the key challenges in both manufacturing and service in various industries while implementing Lean.
### Table 4: Challenges of Implementation of Lean

<table>
<thead>
<tr>
<th>Authors</th>
<th>Journal/ Book</th>
<th>Industry</th>
<th>Identified Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worley and Doolen (2006)</td>
<td><em>Management Decision</em></td>
<td>Manufacturing</td>
<td>Resistance to change, Difficulty for supplier to apply JIT concept, when acquiring small amounts of parts</td>
</tr>
<tr>
<td>Sarkar (2009)</td>
<td><em>Six Sigma IQ</em></td>
<td>Service</td>
<td>- Processes are not visible; Processes are large and complex; Processes are people Intensive; Processes are technology dependent; Very little books of knowledge for service Lean; Concept of pull and flow; Processes cut through vendors</td>
</tr>
<tr>
<td>Grove <em>et al.</em> (2010)</td>
<td><em>Leadership in Health Services</em></td>
<td>Service (Healthcare)</td>
<td>- Process variability; Understanding of Lean; Limited communication and leadership; Target focused; <strong>Defining waste</strong>; who is the customer and what do they value</td>
</tr>
<tr>
<td>Adherne (2010)</td>
<td><em>Nursing Management</em></td>
<td>Service</td>
<td>- Empowering and providing the relevant training to the staff - Support from the government - Management support</td>
</tr>
<tr>
<td>George (2003)</td>
<td><em>Lean Six Sigma for Service</em></td>
<td>Service (Healthcare)</td>
<td>- Process variability; People are not machines</td>
</tr>
</tbody>
</table>

Several authors agreed that identifying process that causes the waste is the biggest challenge in service setting for Lean implementation (Sarkar, 2009; Grove *et al.*, 2010; George, 2003).

#### 2.3.3 Lean Tools and Techniques

Lean tools and techniques for service sector are developed from the adaptation of manufacturing sector. There are different Lean tools and techniques that organizations can apply, but below are few that are applicable in the service sector.

##### 2.3.3.1 The Five S's (Sort, Set, Shine, Standardize and Sustain)

According to Gapp, Fisher and Kobayashi (2008), Five S's (5S) is a tool, which involves Japanese acronyms of seiri (organization), seiton (neatness), seiso (cleaning), seiketsu (standardization) and shitsuke (discipline) as shown in figure 4. The aim of 5S is to contribute to the management practice to create better workplace by reducing workload of employees and errors in processes, neatness to create healthier atmosphere and providing training and education to employees to enhance their quality and productivity. By implementing 5S, companies can change employees’ behavior and contribute to productivity, quality and safety (Gapp *et al.*, 2008; Bicheno, 2004, p. 52).
Morrow and Main (2008) and Bicheno (2004, p. 52) agree that 5S is simple and helpful tool to create Lean culture within an organization. Sort emphasizes on putting the material that is part of final product or service in right order (Morrow & Main, 2008). Bicheno (2004, p. 52) suggest that organizations should try to analyze different items, and throw those that are not used. Sort should be performed in a regular basis, every six months depending on the organizations. Set is giving label, because it is easier and faster to find (Morrow & Main, 2008). Everything should be in its place and it is easier to find from the standardized locations (Bicheno, 2004, p. 52). Shine is about keeping the workplace clean and tidy (Morrow & Main, 2008; Bicheno, 2004, p. 52). In some organizations, cleaning is adopted everyday for five minutes, so in the end of the week, everything looks tidy (Bicheno, 2004, p. 52). Standardize is to set up the standard process within the organization to enable employees to follow that process while working (Morrow & Main, 2008; Bicheno, 2004, p. 52). Sustain is reviewing all the above processes and updating on continuous basis (Morrow & Main, 2008; Bicheno, 2004, p. 52). It involves everyone in organizations with the aim to make future improvements (Bicheno, 2004, p. 52).

Manos, Sattler and Alukal (2006) highlight an example of 5S used in anatomic pathology department, which showed tremendous improvements of reduction of floor space usage by 40% and increase of storage space by 17% leading to improvement in satisfaction of employees and patients. Fillingham (2007) also highlight benefits from 5S tool in Boston Hospital. For one week, they made seventy one improvements in resuscitation room, which led to reduction of clinical incidents and errors, as well as increase in employees’ morale.

2.3.3.2 Kanban
Kanban is controlling device used as a signal to control the release of materials in operation. In this way, organizations know when to acquire more materials from suppliers (Slack et al., 2007, p. 480). This also provides visual signal that helps organizations to have products according to customers’ needs (Melton, 2005). This is used to improve the final delivery of products and services. An example of Kanban in the service sector is when employees who face problems with customers, instantly give a sign to supervisor for help. In hospital, this tool can be used in medicine stocks to carry lesser inventory (Morrow & Main, 2008).
In hospital setting, Kanban is also helpful to notify the completion of the process to send another patient or even medicine supply. The advantage of placing the Kanban system will help to find the necessary equipments, medicines or supplies within less time (Poole, Hinton & Kraebber, 2010). In Figure 5 is shown an example of the two-bin Kanban, so that temporary or permanent staff can find these supplies easily whenever required. Kanban is simple and effective tool to manage huge inventory that hospital normally carries out.

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>IV supplies/needles</td>
<td>![IV symbols]</td>
</tr>
<tr>
<td>Yellow</td>
<td>Urinary supplies</td>
<td>![Urinary symbols]</td>
</tr>
<tr>
<td>Brown</td>
<td>GI / Ostomy supplies</td>
<td>![GI/ostomy symbols]</td>
</tr>
<tr>
<td>Blue</td>
<td>Respiratory supplies</td>
<td>![Respiratory symbols]</td>
</tr>
<tr>
<td>Orange</td>
<td>ADL supplies</td>
<td>![ADL symbols]</td>
</tr>
<tr>
<td>Green</td>
<td>Dressing supplies</td>
<td>![Dressing symbols]</td>
</tr>
<tr>
<td>White</td>
<td>Miscellaneous</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5: Example of supply room color code system
Source: Poole et al. (2010, p. 53)

2.3.3.3 Fishbone diagram (Ishikawa diagram)
This is also called cause and effect diagram, which is quite helpful to identify the root cause of the problem. Organizations face several problems, and in case decisions are made without understanding the root cause of the problem, then the problem will reoccur which will cost additional time and money for the company. Thus, it is helpful to use the fishbone diagram to solve problem by identifying the root cause (Morrow & Main, 2008). Taner, Sezen and Antony (2007) discuss a case of repetition of unnecessary laboratory tests in healthcare industry. This is because it involved a delay in getting the results from the doctor, as well as rework. The development of fishbone diagram helped to identify the root cause of the problem and eliminate number of laboratory tests.

2.3.3.4 Value Stream Mapping
According to Kollberg et al. (2006) and Manos et al. (2006), value stream mapping is a tool that helps to map all the actions in process by analyzing the flow in order to identify and reduce non value added activities. This tool is used to understand the process flow within the whole organization. To develop final product or service, information and material will be required. By understating this process flow in detail, it will help to identify the waste that occurs within the process. To get the best results and accurate value stream map, organizations should develop it by involving people who are responsible for those activities (Morrow & Main, 2008).

Value stream mapping is important tool, which involves frontline staff in the process of problem identification and coming up with solutions (Fillingham, 2007). For example, in hospital, it involves mapping all activities by analyzing the whole process from the
moment patient comes until the treatment is finished (Kollberg et al., 2006). According to Fillingham (2007), in trauma service in Boston hospital, they created a team of doctors, nurses, therapists, managers and patients, who were responsible to map patients’ journey in detail. They realized that they are offering poor service, because of identification of many non value added activities, errors and duplication. It took nine months to make all improvements through different projects, by ensuring senior leadership support, standardizing the work, setting equipments and information in their place, reducing the length of patients’ stay by 33% and reducing paperwork by 42% (Fillingham, 2007).

In Figure 6 is the example of Wirral hospital, which is helpful to understand better the value stream mapping in the hospital setting. With this value stream mapping, hospital was able to see that for 100 minutes of treatment, patients spend 610 minutes of their time and hospital spend 330 minutes of time. This example clearly illustrates the amount of waste generated within the hospital due to complex processes (Jones & Mitchell, 2006). Thus, in hospital setting, value stream is helpful tool to streamline the processes that are not value added.

![Figure 6: The value stream mapping examples from Wirral Hospital](image)

Source: Jones and Mitchell (2006, p. 9)

### 2.3.3.5 Process mapping

Process map shows the complete picture of the process flow starting from the input to all the steps that will lead to outputs. The simplest example of the process map is the “Road Map.” It also provides the information about the main steps and it helps to identify the bottleneck to improve the process. This is the best tool for the continuous improvement within any workplace (Anjard, 1998). Some of the applicability in hospital setting is summarized in the Table 5. Waiting time is the most frequent problem from patients’ perspectives in any given hospital. Process mapping helps to identify activities which are non value added or create a bottleneck. With proper use of process mapping, hospitals can reduce the waiting time for the patients and increase the performance (Staccini, Joubert, Quaranta, & Fieschi, 2005).
2.3.3.6 Visual Management
Visual management was developed in manufacturing to enable faster and effective communication. Visual control is considered as a powerful tool in manufacturing, but due to its effectiveness, even service sector started to implement it (Parry & Turner, 2006). This tool is effective to improve the communication and to provide the useful information through lights and signs to customers. There are two types of visual management tools: visual control and visual display. These days, banks use the number tag dispenser, and then the number will display, which is example of visual control that helps customer to know how long they have to wait for their turn. Visual display involves charts and diagrams, which are used to get the message to employees or customers (Morrow & Main, 2008).

2.3.3.7 Red Tag Technique
This tool is used to communicate among the team on the objects that are not required or do not work. It is necessary to agree which one to categorize in red tag, where to store these unnecessary items and how long to hold them (Morrow & Main, 2008). This is one of the effective methods to sort the unnecessary objects within the workplace.

2.3.4 Comparative Study of Lean Healthcare Practices in Hospitals
In this section, researchers describe some of the real examples as a comparative study of Lean healthcare practices in several hospitals.

“In less than three years, using techniques adapted from the Toyota Production System, the Pittsburgh Regional Healthcare initiative slashed the number of reported central line-associated bloodstream (CLAB) infections by more than 50%” (Spear, 2005).

Even though the implementation process in service is complicated, in healthcare, there are several process improvements that can be achieved with Lean, such as “waiting time reductions, separating, patient pathways in interactive value streams” (Young et al., 2004; Young, 2005, cited in De Souza, 2009). With the successful implementation, the benefits that will be generated to the hospital and patients are quite valuable and significant.
Understanding Lean healthcare practices is important in hospitals by highlighting the changes in the processes with Lean implementation and also, the advantages that these changes generate. Bowen and Youngdahl (1998) provide an example of the implementation of Lean healthcare in Shoudice hospital. This hospital applied Lean for the treatment of patients for Hernia. This implementation started from the admission process, which can be completed online. The way the hospital operates is by trying to emphasize on the patient to do their own tasks, such as shave the operating body area, mark where to operate, walk with doctors’ help to wheelchair immediately after operation and so on. Even though these tasks are minor, these are helping the patients for faster recovery and free up the nurses and doctors’ time for the valuable tasks. This hospital is also recognized for the fastest Hernia recovery compared to the other Hernia hospitals (Bowen & Youngdahl, 1998).

Jones and Mitchell (2006) provided another Lean implementation example of Flinders Medical Centre (Australia) in emergency department. This medical centre used to struggle to handle the emergency department patient due to the complex process. Patients used to be divided into five urgent categories based on the “Triage System” and for each category, patients were supposed to meet doctors in certain timeframe. This system was creating the waste of patients’ time and also the life risk in emergency department. In the year 2003, around 1000 patients waited for 8 hours to get the treatment. To resolve this problem, Lean Healthcare was implemented by creating two departments based on the value stream, which were patients who can be treated immediately and patients who have to be admitted. This change in process led to 25% reduction in the patients’ waiting time and this simplification in process also created lesser pressure to the staff.

In Virginia Mason Medical Center (VMMC), several Lean tools and techniques were applied, such as “3P, Standard work, Value stream, Takt Time, mistake-proofing and load leveling”. Load leveling was to create flow of patients from one to another while scheduling appointments. This resulted in the hospital to maximize staff efficiency, flow in patients resulting higher number of patients and also ability to allocate more time for operations. Aside from this, radiation oncology also tries to maximize the treatment by placing chair outside the treatment room, which enables good utilization of this treatment room and also helps to reduce the patients’ waiting time. Overall, with this implementation, VMMC was able to reduce the patients’ waiting time by 14%, increase the number of treated patients by 57% and reduce walking for staff to complete the job by 61% (Black & Miller, 2008, p 169).

In Table 6 is summarized the comparative study for Lean healthcare implementation in these hospitals.
### Table 6: Comparative Study for Lean Healthcare Implementation in Several Hospitals

<table>
<thead>
<tr>
<th>Hospital Name &amp; Authors</th>
<th>Measures taken as Lean healthcare Practices</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| **Shouldice Hospital, USA** (Bowen & Youngdahl, 1998) | - Patients involvement starting from the application and selection  
- Patients shave them self for operation  
- After surgery patient walk with the help from the doctor and walk to wheel chair  
- Recovering Patients provides trainings to new patients  
- Emphasize on two way communication | - Faster recovery rates for patients  
- Lower cost with patient being involved  
- Patient helping themselves help nurses and doctors to work on more important task which is counseling and surgery |
| **Flinders Medical Centre Adelaide, Australia** (Jones & Mitchell, 2006) | Emergency department divided in two value streams  
- Patients who can be treated and discharged more or less immediately  
- Patients who need to be admitted into a ward for further treatment | - Average emergency department waiting times fell by 25 per cent  
- Patients’ number leaving the department without seeing a doctor fell by 41 per cent.  
- Less pressure to staff |
| **Virginia Mason Medical center** (Black & Miller, 2008, p 169) | - Applied several lean tools and techniques such as 3P, Standard work, Value stream, Takt Time, mistake-proofing and load leveling  
- Load leveling was to create flow of patients from one after another  
- In Radiation oncology maximize the treatment by placing chair outside the treatment room | - Reduce the patients waiting time by 14%  
- Increase in treated patient’s number by 57%  
- Reduce walking for staff to complete the job by 61% |

#### 2.3.5 Benefits of Lean Implementation

The main improvements with Lean were related to the reduction of lead times for customers, less usage of inventory, more efficient use of processes, knowledge management improvement, cost savings and reduction in rework (Melton, 2005).

Other benefits from Lean are achieving competitive advantage, improving financial position, improving services, increasing quality and process standardization (Sohal & Egglestone, 1994). Melton (2005) discussed the case of process industries, where the problems were the lack of flow in process with full of WIP and functional behavior with no person responsible for delivery orders in supply chain. With Lean implementation, there were many improvements, such as decrease of cycle time in supply chain by 50%, improved customer order accuracy by 25% and inventory reduction from manufacturers by 30%. Furthermore, the implementation of Lean reduced functional barriers. In a study of manufacturing companies in Australia, Sohal and Egglestone (1994) discuss that 74% of them experienced structural changes by flattening their structure due to the implementation of Lean. Moreover, other changes that brought benefits were reducing the workforce, hiring multi tasks employees, as well as employee empowerment, which increased their autonomy.

Some positive factors are the increased employees’ competence, faster work completion, reduced frustration with improved customer satisfaction and financial benefits to the organization (Petersson et al., 2010, p. 18). Hanna (2007) also discusses that Lean helps organizations to change their way of problem solving capabilities and standardization. Moreover, it encourages empowerment of employees, and enables
organizations to achieve competitive advantage with high quality, faster delivery time and delivery reliability (Petersson et al., 2010, p. 18).

Financial services also benefited from Lean implementation. Atkinson (2004) gives an example of financial services that benefited from Lean. Their goal was to simplify the credit approval process in order to improve customers’ service. The problem was the complex process that included many steps. The time to complete the process was reduced by 60% by eliminating fourteen steps. Frost (2007) discussed about a bank that simplified the forms for loan approval by three days, which improved quality and added value to customers. Reichert et al. (2008) also talk about a bank in which customers had to wait four days for loan approval, and this was transformed to immediate approval. In similar context, in one project a bank benefited from Lean by reducing the walking of employee by 2.2 miles (Frost, 2007).

Healthcare services have benefited from Lean tools, such as mapping techniques and waste reduction. These tools were helpful to identify activities that did not add value to the processes (Piercy & Rich, 2009). Westwood et al. (2007) highlighted these specific benefits from Lean implementation in the hospitals which are “Patient flow improved, Patients treated faster, Best use of capacity, Cost savings, Waste reduced, Shorter waiting times, Reduced length of stay, Increased productivity, More patients treated, Safer and more reliable services, Standardized procedures and equipment and Improved staff morale”. All these benefits helped the hospital to provide the quality services more efficiently. These Lean improvements should be done on continuous basis to sustain in the long term. In similar context, Massey and Williams (2006) point out an intensive executive training programme for senior managers to make Lean transition in NHS UK. This brought benefit to the company because it was about business techniques, performance and managing change. Also, this training increased senior managers’ commitment and their willingness to initiate change in organizations.

Table 7 summarizes these benefits in both manufacturing and service in various industries with Lean implementation.
Table 7: Benefits of Lean Implementation

<table>
<thead>
<tr>
<th>Authors</th>
<th>Journal/ Book</th>
<th>Industry</th>
<th>Identified CSF’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melton (2005)</td>
<td><em>Chemical Engineering Research and Design</em></td>
<td>Manufacturing</td>
<td>- Reduction of lead times for customers, <strong>more efficient use of processes</strong>, knowledge management improvement, cost savings and reduction in rework</td>
</tr>
<tr>
<td>Petersson et al., (2010)</td>
<td><em>Lean-Turn deviations into success!</em></td>
<td>Service</td>
<td>- <strong>Increased employees' competence</strong>, faster work completion, reduced frustration with improved customer satisfaction and financial benefits to the organization</td>
</tr>
<tr>
<td>Hanna (2007)</td>
<td><em>Journal of financial transformation</em></td>
<td>Service</td>
<td>- Problem solving capabilities and <strong>Standardization</strong></td>
</tr>
<tr>
<td>Piercy &amp; Rich (2009)</td>
<td><em>European Journal of Marketing</em></td>
<td>Service</td>
<td>- To identify activities that did not add value</td>
</tr>
<tr>
<td>Westwood et al. (2007)</td>
<td><em>NHS Institute for Innovation and Improvement</em></td>
<td>Service</td>
<td>- Patient flow improved, Patients treated faster, Best use of capacity, Cost savings, Waste reduced, Shorter waiting times, Reduced length of stay, Increased productivity, More patients treated, Safer and more reliable services, <strong>Standardized procedures</strong> and equipment and <strong>Improved staff morale</strong></td>
</tr>
<tr>
<td>Massey and Williams (2006)</td>
<td><em>Leadership &amp; Organization Development</em></td>
<td>Service</td>
<td>- Increased senior managers’ commitment and willingness to initiate change</td>
</tr>
</tbody>
</table>

Several authors agreed in two benefits from Lean implementation, where one is related with people that Lean will increase the morale and competence of the staff and another benefit is related with process that is standardization of process or procedures which will increase the efficiency (Melton, 2005; Sohal and Egglestone, 1994; Petersson et al., 2010, p. 18; Hanna, 2007; Westwood et al. 2007).

2.3.6 Lean Criticisms

Even though Lean implementation has shown great results in many organizations, there are some criticisms. According to Hines, Holweg and Rich (2004), it was claimed by Garrahan and Stewart (1992) and Williams et al. (1992) that Lean does not give enough considerations to people. Therefore, to have successful implementation of Lean for any industry, it is crucial to motivate and empower employees, including shop floor workers, who play significant role in identifying waste. The companies faced a challenge to cut the excess of workers from production system in order to keep continuous improvement (Womack et al., 1990, p. 259). That is why Lean production is criticized compared to mass production for employees, as before they did not have to think about their work and making improvement, while now they are more stressed and are facing challenges to identify waste continuously (Womack et al., 1990, p. 101).
Also, Chen, Lindeke and Wyrick (2010) highlight that the focus of companies in short term benefits disregards the advantages in the long run. This is because they are hesitant to spent time and make investment in innovation as the return is hard to quantify in monetary terms; therefore, those ideas might be seen as waste. Worley and Doolen (2006) agree that if management does not support investment in Lean implementation, it can reduce the efforts of employees toward innovative ideas for improvements. Also, according to Womack et al. (2007, cited in Chen et al. 2010), the time was crucial for generating ideas between team to make improvements. Companies do not implement Lean properly, because they try to reduce cost by cutting the workforce, and giving multiple tasks to the remaining employees.

By implementing Lean, organizations keep the best employees, who feel motivated to work harder as they are most respected people in the organization. However, their innovation decreases because of high stress that they experience in the work. Also, they fear of losing job as organizations require more achievement with fewer workers (Chen et al., 2010). Lean concept is criticized as being misleading because it has to do with elimination of workforce and their autonomy in doing their job (Moody, 1997, cited in Stewart 1998; Rinehart et al., 1997; Robertson, 1992; Williams et al., 1992; Yates et al., 1998). Another pitfall of Lean discussed by Chen et al. (2010) is the elimination of excess inventories in order to reduce waste, because there are cases of delays or defective products from suppliers, which dissatisfies customers. Moreover, when companies try to change technologies to produce products and services that customers want, they can end up with disruptive technology, which is valued by customers only in short terms. Indeed, reducing only the costs does not mean that the companies can be sustainable in long run. Therefore, when implementing Lean, they should focus also on market demands and technology trends in order to be competitive and innovative continuously (Chen et al., 2010).

2.4 Proposed Research Model

With the clear understanding of the literature for Lean implementation, the researchers derived a research model in Figure 3. For Lean implementation process, understanding Lean tools and techniques is not sufficient since there are several factors within the organizations that will be impacting this process. Two crucial aspects are related to understanding the CSF’s and Challenges of Lean implementation. This helps the companies to work on improving the main CSF’s and also to reduce the main challenges along Lean implementation process, which will lead to success. Also, to maximize the benefits from Lean implementation, the literature review findings suggest that companies should focus on the main Lean challenge, which is to identify process within the service that leads to waste, as well as the main CSF, which is management involvement and commitment. Only with the successful implementation process, actual benefits could be realized. The research model shown in Figure 7 is helpful to implement Lean in UCCK, rheumatology department.
Figure 7: Research Model based on the Literature Findings
Source: Developed by the authors
Chapter 3 RESEARCH METHODOLOGY
This section presents the theoretical and practical methodologies of the research method. Theoretical methodology is subdivided into three sections. The first section provides overview on the philosophical perspectives for the research process. The second section provides the introduction to induction and deductive research approaches. Third section provides an understanding of qualitative and quantitative research, as well as case study research. Practical methodology is subdivided into six sections. The first section gives a brief on the data collection methods used for this research and then it continues with non-probability sampling in the second section. Then the third section includes the theoretical approach to data analysis by categorizing data into the right order. Fourth section provides a brief on the interview method that has been used for this research. Then, fifth and sixth sections elaborate on the quality criteria to evaluate research, as well as ethical considerations.

3.1 Theoretical Methodology
3.1.1 Research Philosophy
Research philosophy is about the nature and the growth of knowledge in a specific discipline. It is also concerned with the idea of how the researchers make assumptions based on their views. In the following, there are two types of research philosophy, such as epistemological and ontological considerations (Saunders, Lewis & Thornhill, 2009, p. 107).

3.1.1.1 Epistemological Considerations
Epistemology is type of research philosophy, which is concerned with the nature of knowledge that is acceptable in social world. There are three types of epistemology, such as positivism, interpretivism and realism (Bryman & Bell, 2007, p. 16; Saunders et al., 2009, p. 112).

Positivism takes epistemological position, which considers the scientific model as best approach to the study of social reality. It is related to deductive approach in a sense that hypothesis is tested within existing theory. Furthermore, it is also linked to inductive approach, where knowledge is achieved by gathering data (Bryman & Bell, 2007, p. 16).

Realism is philosophy position related to scientific practice (Saunders et al., 2009, p. 114). It supports positivism for the considerations of natural sciences for the data collection approach. There are two forms of realism, which include empirical realism and critical realism. Empirical realism implies understanding the reality by appropriate methods, from what people experience through senses. On the other hand, critical realism means understanding the social world is possible by identifying structures to create events and discourses, from what people experience are sensations (Bryman & Bell, 2007, p. 18; Saunders et al., 2009, p. 115).

Interpretivism contrasts the positivism by criticizing the scientific model in the study of social world. According to interpretivism, study of social world should be focused on uniqueness of humans and their behaviors (Bryman & Bell, 2007, p. 17). It is crucial to increase the importance of people by understanding that research is conducted by people, not objects. People interpretation depends on their social roles. This philosophy position is common to business and management research, because of the complexity and uniqueness of business situations (Saunders et al., 2009, p. 116).
In this study, the researchers followed the research philosophy of interpretivism, which is supported by the distinctiveness of UCCK, as a special business situation associated with the lack of generalizations.

### 3.1.1.2 Ontological Considerations
Ontology is concerned with nature of social entities, where the researchers should make assumptions regarding the operations of the world. There are two aspects of ontology, such as objectivism and constructionism (Saunders et al., 2009, p. 110).

**Objectivism** means that social entities deal with social actors by external facts, which are beyond their influence (Bryman & Bell, 2007, p. 22). This aspect of ontology considers similarity of management in all organizations due to the structural aspects (Saunders et al., 2009, p. 110).

**Constructionism** occurs when social entities are seen as social constructions, which are created from perceptions of social actors (Bryman & Bell, 2007, p. 22). This aspect of ontology is also called subjectivism by Saunders et al. (2009, p. 111), which highlight the interpretivist philosophy to enable the researchers to understand the actions of social actors by exploring subjective meanings.

Constructionism was followed in this study, because it is focused on the perceptions and actions of the researchers, which is also linked to the interpretivist philosophy.

### 3.1.2 Research Approach
Research approach is divided into two categories, which are deductive and inductive. Below is a background in these topics based on several academic perspectives.

**Deductive Research Approach:** In the deductive theory, researchers start with the theoretical aspects by deducing a hypothesis, based on which data is collected, leading to either rejection, confirmation or revision of the theory (Bryman & Bell, 2007, p. 11; Trochim, 2006). Based on this approach, a clear theoretical part should be developed in order to test data collection (Saunders, Lewis & Thornhill, 2003, p. 86). This research deals with the application and examination of the academicians’ theories in the real world. It is also applicable and popular in consultancy companies (Lancaster, 2005, p. 20).

**Inductive Research Approach:** The inductive research process follows with the empirical data analysis leading to the research hypothesis, which is concluded with a theory (Bryman & Bell, 2007, p. 14; Trochim, 2006). Researchers doing the inductive research will try to find sort of behavior/logic in the observation to come up with conclusion. The observation of this research is not gathered in structured manner.

The research approach followed in this study is inductive research approach. Researchers collected data based on observation and semi-structured interviews in UCCK. Interview guide were prepared in advance to conduct semi structured interview. Thus, it was not fully inductive research approach followed for this research. However, this enabled the researchers to do the data analysis to understand the process and pattern, which will lead to application of the framework.
3.1.3 Research Strategy

Saunders et al. (2009, p. 141) highlight the importance of right research strategy selection, not only the name and category of research strategy. Researchers followed this principle by providing firstly the theoretical background to understand the qualitative and quantitative research strategies, which then led to selection of the right research method.

**Quantitative research:** This research method emphasize on finding the accurate answer for the research hypothesis with the use of the statistical tools. It is compiled in advance with the defined steps, which are followed throughout the research process, as well as with the specific objective for data collection as the most important criteria in quantitative research (Rubin & Babbie, 2010, p. 34). Also, this research method emphasizes the deductive approach to test theory, and its focus is on the research philosophy of positivism (Bryman & Bell, 2007, p. 28).

**Qualitative research:** This method strategy emphasizes more on analysis based on words rather than quantifying data numerically. Its focus is on inductive approach to generate a theory, as well as the research philosophy of interpretivism (Bryman & Bell, 2007, p. 28). This research is about finding answer and meaning from analysis of human behavior. This is the reason qualitative research is flexible in terms of structure and procedure for the data collection, which provides the researcher flexibility to adapt based on the findings of the observation or circumstances (Rubin & Babbie, 2010, p. 34).

Bryman and Bell (2007, p. 28) mention that both the quantiative and qualitative research follow different methods to fulfill different strategies and purposes for doing the research, associated with even different theoretical concepts. Table 8 helps to understand the difference of concept and application of these two research strategies. Depending on the research purpose and theoretical approach, the right research strategy should be selected.
## Table 8: Contrasting Quantitative and Qualitative research

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aims</td>
<td>Precision</td>
<td>Deeper understands</td>
</tr>
<tr>
<td></td>
<td>Testing Hypothesis</td>
<td>Generating hypothesis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discovery</td>
</tr>
<tr>
<td>Theoretical approach most commonly employed</td>
<td>Deductive, Testing of theory</td>
<td>Inductive, Generation of theory</td>
</tr>
<tr>
<td>and principles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nature of data emphasized</td>
<td>Numbers</td>
<td>Words</td>
</tr>
<tr>
<td>Types of design methods commonly used</td>
<td>Experiments</td>
<td>Ethnography</td>
</tr>
<tr>
<td></td>
<td>Quasi-experiments</td>
<td>Case studies</td>
</tr>
<tr>
<td></td>
<td>Single-case design</td>
<td>Life history</td>
</tr>
<tr>
<td></td>
<td>Surveys</td>
<td>Focus group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Particular action research</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grounded Theory</td>
</tr>
<tr>
<td>Data gathering instruments emphasized</td>
<td>Close ended items in questionnaires and scales</td>
<td>Open ended items and interviews and probes</td>
</tr>
<tr>
<td>Ontological orientation</td>
<td>Objectivism</td>
<td>Constructionism</td>
</tr>
</tbody>
</table>

Source: Rubin and Babbie, (2010, p. 36); Bryman and Bell, (2003, p. 25)

With the understanding of the research strategy, the qualitative research is useful in this study. As Rubin et al. (2010, p. 36) suggested, several methods, such as ethnography, case studies, focus group and others can be followed in qualitative research. In this study, a case study research may fit the best. Therefore, in the following is the understanding of the case study research.

**Case Study Research:** Case study involves a detailed analysis within a case. It may be used within the office settings with emphasis on the thorough analysis of the given work (Bryman & Bell, 2007, p. 62). There are two types of case studies. The first type is when there is limited number of cases to come up with general conclusions. The second one is when the focus is in a single case, deriving specific conclusions (Gummesson, 2000, p. 84). This study is based on the second type as it involves a single case. In qualitative research strategy, case study is based on inductive approach (Bryman & Bell, 2007, p. 63). Saunders et al. (2009, p. 146) explained the case study research in simplest terms, which enable researchers to answer the “Why, What and How” research questions (Bryman & Bell, 2007, p. 62).

There are five factors that are important for case study which are (i) Research questions of study (ii) Research proposal based on the objective of the research (iii) Analysis of case data (iv) Linking case analysis with the research objectives (v) Interpret the findings (Yin, 1994, p. 20, cited in Tellis, 1997). Also, Saunders et al. (2003, p. 93) admit that a well designed case study is a good way to investigate the applicability of the existing theory, which can even lead to challenges and reconstruction of new theory.

With understanding of the theoretical principles, researchers will follow the qualitative research strategy with a single case study research in UCCK, rheumatology department. A detailed analysis has been conducted to investigate the applicability of current Lean tools and techniques in UCCK, rheumatology department.
3.2 Practical Methodology

3.2.1 Conceptual Research framework
This conceptual research framework has been developed to approach the analysis in a structured manner. The first step is divided into two parts related with literature review. Part “a” is done to understand CSF’s and challenges and part “b” covers Lean tools and techniques, as well as the comparative analysis of Lean practices in hospitals. The second step is to review current practice and process from empirical data. The third step is to do the data analysis that will be captured in findings and discussion, which will lead to proposing of Lean tools and techniques.

All three steps of framework in Figure 8 are briefly discussed in following:

- **Literature Review**
  Review of literatures, such as books, journals, research reports and websites, was conducted to identify the CSF’s and challenges with particular attention given to Lean implementation in service settings. Lean tools and techniques that are applicable in hospital were reviewed. In brief, the following are the identified CSF’s and challenges, as well as Lean tools and techniques based on literature from several authors.

  - **CSF’s** → Management involvement and commitment
  - **Challenges** → Identifying process that leads to wastes

- **Understanding Practice and Process**
  For implementation of Lean tools and techniques, it is important to understand current practice and process from empirical data, which will be another step that researchers have to follow to answer the research question. The methods that will be used for data collection are semi structured interview and observations.

- **Recommending Lean tools and techniques**
  From the information that will be obtained from the interviews, the data will be analyzed in order to recommend appropriate Lean tools and techniques. This will be discussed further in Chapter 4.

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**Figure 8: Framework for research approach**
Source: Developed by the authors
3.2.2 Data Collection Methods

To understand Lean implementation in hospital settings, researchers used primary data. In the qualitative research strategy, for empirical data collection, there are several methods that can be used, such as, interviews, questionnaires, observation and documentary analysis (Saunders et al., 2009, p. 146). Figure 9 illustrates the data collection method that was followed for this research. First of all, the researchers contacted the chief of rheumatology department in UCCK through email to ask for permission to collect the data there (Appendix 1). As the researchers received positive response, one of them went to Kosovo to conduct interviews. The date and time for informal meetings were arranged through telephone. After that, visits to UCCK to conduct interviews were accompanied with researcher’s observation in UCCK. The semi structured interviews were addressed to Medical Doctors and Nurses, working within the rheumatology department of UCCK hospital.

![Data Collection Method Diagram]

Figure 9: Data Collection Method
Source: Developed by the authors

3.2.3 Non-Probability Sampling

Non-probability sampling is when it is not known the probability of the selection of samples from population. There is no estimation based on statistics of population. It involves three types of samples, such as convenience sample, snowball sample and quota sample (Saunders et al., 2009, p. 233). Convenience sample occurs when there is accessibility of data. This sample is sometimes criticized because of the lack of generalization of findings (Bryman & Bell, 2007, p. 198; Saunders et al., 2009, p. 241). In snowball sampling, the main challenge is to make the initial contact (Saunders et al., 2009, p. 240). When the researchers establish the first contact with some people, then they help to identify further potential contacts. However, the researchers should be careful when using this sample, because it might not be representative of population (Bryman & Bell, 2007, p. 200). Quota sampling is used for interviews surveys by combining the data collection from various interviewees in a large population (Saunders et al., 2009, p. 235). The researchers select a sample that reflects population, who has different gender, ethnicity, age and residence. Usually, people who are willing to participate are asked to contribute in the study (Bryman & Bell, 2007, p. 201).
Convenience and snowball samples were used in this study. Convenience sample was used because of one of the researcher has relatives in UCCK, which made it easier to access a detailed data for rheumatology department. Detail information regarding processes was required for this research and having internal contact within the department was quite beneficial. Also, snowball sampling was used because the chief of rheumatology department was the initial contact, who suggested other potential participants in relation to the study to answer the research question.

3.2.4 Theoretical Approach to Data Analysis

Saunders *et al.* (2009, p. 491) highlight several ways to analyze the qualitative data. However, in broad context, the qualitative analysis can be categorized into two approaches; (i) formal approach, which is well structured and follows certain procedure or framework (ii) not that well structured, where interpretation depends on researchers. In this study, researchers follow less structured approach to analyze the data.

The qualitative data analysis process can be followed only after sorting the data into manageable and interpretable way. To do this, the collected data has to be transformed into systematic order. Saunders *et al.* (2009, p. 492) suggest transforming process which includes:

- **Categorising data:** In this process, data is sorted into significant categories from the data or the theoretical framework. This process will provide the structure to the research process (Saunders *et al.*, 2009, p. 492).

- **Unitising data:** This is the selection process, where data is reduced, arranged or rearranged and labeled based on the research objective to ensure that it is structured and manageable (Saunders *et al.*, 2009, p. 493).

- **Recognising relationships and developing categories:** In this process of analysis, the reorganized data is to find the patterns and relationship, which may again change the categories, leading to further data rearrangement (Saunders *et al.*, 2009, p. 494).

- **Developing testable propositions:** This is the final step of the process, where the relationship of categories is identified, which will help to test the hypothesis leading to the conclusion (Saunders *et al.*, 2009, p. 494).

In the similar aspects, researchers categorized the interview guide based on Lean tools, which were helpful to sort the data to answer the research question. The interview guide interpretation by the researchers was sorted, rearranged and structured several times. The final two steps of recognizing relationship and developing categories, as well as concluding will be followed in Chapter 4.

3.2.5 Interview

3.2.5.1 Types of Interview

Interviews are useful to collect information based on research question of the study. There are different types of interviews, such as structured interviews, semi-structured interviews and unstructured interviews (Saunders *et al.*, 2009, p. 318).

**Structured interviews** involve questionnaires based on a predetermined set of questions (Saunders *et al.*, 2009, p. 320; Bryman & Bell, 2007, p. 473).

**Semi-structured interviews** do not involve standardized questions. Some questions might be added and some eliminated due to the organizational context (Saunders *et al.*, 2009, p. 320). The order of the questions might not be the same as outlined, because it
might change based on the discussion. Also, note taking and recording the data during the interviews are used (Bryman & Bell, 2007, p. 474).

**Unstructured interviews**, also called in-depth interviews, involve informal communication, which enable the researchers to get detailed information about the area of interest. This type of interview is also non-standardized, but clear questions related to the aspects of interest should be developed (Saunders et al., 2009, p. 321).

Semi-structured and unstructured interviews are used in this study. This is because there was changing order of the questions based on the flow of the discussion and the researcher was able to record the interviews. Also, the interviews were informal, enabling the researcher to explore in-depth information related to the study.

### 3.2.5.2 Interview Guide
Saunders et al. (2009, p. 320) mentioned that semi-structured and in-depth, or non-standardized method of interviews are used for qualitative research, which helps to gather information by answering not just the “what” and “how” questions, but also the important aspects on “why”. Supporting this argument from Saunders et al. (2009, p. 320), the information required was in-depth and about the internal processes; thus, the exploratory study was followed by the researchers. Exploratory research is used to have better understanding of the problem in the area where there are few studies available. As in this study, extensive interviews were done to comprehend the process (Hart, 1998, p. 47).

Interview guide was categorized for medical doctors and nurses. This was to ensure the right questions are addressed based on their job responsibilities. Interview guide provided the framework for the interview. Even though questions were set in advance, semi-structured interview approach was followed which was helpful to modify, rephrase or even skip some questions when interviewer felt were irrelevant depending on the actual circumstances (Bryman & Bell, 2007, p. 474).

The interview guide was reviewed and approved by the supervisor to ensure the questions will serve to answer the research question. Open questions provide the flexibility to the interviewee to provide in-depth details (Grummitt, 1980, cited in Bryman & Bell, 2007, p. 262). This is the reason interview guide consists mostly open questions and only two related with CSF’s and challenges were designed as closed questions to narrow the possible answer to the findings from the literature review.

The first interview guide is for the medical doctors, which is categorized into six sections. First section “A” starts with the introductory questions containing background information about the interviewees and background information on UCCK hospital. This is important section to steer the discussions between interviewer and interviewee. The second section “B” begins with the questions on the current process and practices for quality and it is followed by understanding of the work process in UCCK hospital in third section “C”. After this, section four “D” covers the understanding of patients’ journey for inpatients, outpatients and emergency patients and in section five “E,” questions provide answer to understand the CSF’s and challenges of implementing quality practices. Final section “F” covers the questions on the possibility of Lean implementation in the rheumatology department. The actual interview guide can be
found in Appendix 2. Only few of the relevant sections were addressed to nurses and the interview guides are in Appendices 3 & 4.

3.2.5.3 Conduction of the Interviews

Interviews conducted by the researcher were face to face, which were held on one-to-one basis. A total of five semi-structured interviews were held and while conducting interviews, interviewer clarified to interviewee any unclear questions and tried to make interviewee in ease to answer the interview questions. All interviews were held in the UCCK rheumatology department due to importance of understanding the process for Lean implementation. This was equally valuable for the researcher since the observation was another important aspect of the data collection.

To ensure the effectiveness of the empirical data collected from the interviews, the researchers considered that interviewees should have a basic understanding on Lean tools and techniques. This is the reason interviewer provided a brief introductory material on Lean healthcare tools and techniques to all interviewees prior to starting interviews, which can be found in Appendix 5.

As Bryman and Bell (2007, p. 264) suggested, researchers asked for the permission to record in advance. This is because the interviews were held in Albanian language, and also the processes in the hospital settings were new to the researchers, so some medical terms used during the meeting were not quite clear. Thus, recording some part of the interviews was helpful to compile the answers of the interviews.

Table 9 summarizes the interviews that were conducted for this study by including their positions at UCCK, initials of the name, their years of work experience, as well as the date and length of the interviews.

<table>
<thead>
<tr>
<th>Interview #</th>
<th>Position of the Participants</th>
<th>Initials of Name</th>
<th>Experience in UCCK</th>
<th>Interview Date</th>
<th>Interview Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview 1</td>
<td>Chief of rheumatology department</td>
<td>S.R.</td>
<td>30 years</td>
<td>November 19, 2010</td>
<td>1 hour and 25 minutes</td>
</tr>
<tr>
<td>Interview 2</td>
<td>Specialist in rheumatology</td>
<td>I.B.</td>
<td>25 years</td>
<td>November 24, 2010</td>
<td>50 minutes</td>
</tr>
<tr>
<td>Interview 3</td>
<td>Residence in internal medicine rheumatology</td>
<td>M.R.</td>
<td>3.5 years</td>
<td>November 22, 2010</td>
<td>1 hour and 10 minutes</td>
</tr>
<tr>
<td>Interview 4</td>
<td>Nurse for outpatients in rheumatology department</td>
<td>H.B.</td>
<td>35 years</td>
<td>November 25, 2010</td>
<td>33 minutes</td>
</tr>
<tr>
<td>Interview 5</td>
<td>Main Nurse of rheumatology department</td>
<td>N.H.</td>
<td>35 years</td>
<td>November 25, 2010</td>
<td>38 minutes</td>
</tr>
</tbody>
</table>

Source: Developed by the authors

To be familiar with the profile of interviewees, in the following, there is a brief background of the participants.

**Interview 1**: “I am MD, PhD and Chief of Rheumatology Department in Internal Medicine with sub-specialization in rheumatology in UCCK. Also, I work as a professor of internal medicine in the Faculty of Medicine in the public University of Prishtina and private university Rezonanca. I am an author of text book “Rheumatology,” which is dedicated for students in medicine field. Furthermore, I work part time in my private
Interview 2: “I am MD and PhD in Internal Medicine with sub-specialization in rheumatology in UCCK. Furthermore, I work part time in my private clinic in Kosovo. Also, I attend different symposiums and congresses within and outside Kosovo” (Interview 2).

Interview 3: “I am residence in the field of internal medicine in rheumatology in the end of third year. The residents are medical doctors under supervision with the aim to be specialists and have a license to work. For example, to be specialist in rheumatology, I have to complete internal medicine residency for 4 years, and sub-specialization in rheumatology for 2 years. I also work as a physician in private clinic Rheuma in Kosovo for five years. Beside these, I participate in scientific works in the field of Rheumatology. I am a member of the multi-centric project QUESTRA and participate in congresses, such EULAR” (Interview 3).

Interview 4: “I have long working experience in UCCK as a nurse for 35 years. My work is mostly related with outpatients; however, before I worked also in emergency center. Furthermore, I prepare monthly reports analysis for patients, which involves, for example the comparison of the number of patients during the summer and the winter” (Interview 4).

Interview 5: “I am the main nurse of rheumatology department in UCCK. I participate in different professional seminars continuously, in order to be updated with new knowledge and ways of patients’ treatment” (Interview 5).

Table 10 summarizes the observations that were conducted for this study by including the place, date and length of the observations.

<table>
<thead>
<tr>
<th>Observations</th>
<th>Place</th>
<th>Date of Observations</th>
<th>Length of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation 1</td>
<td>Specialist Clinic in Rheumatology</td>
<td>November 22, 2010</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Observation 2</td>
<td>Waiting area for patients</td>
<td>November 22, 2010</td>
<td>5 minutes</td>
</tr>
</tbody>
</table>

Source: Developed by the authors

3.2.6 Quality Criteria to Evaluate Research

Bryman and Bell (2007, p. 411) noted that “Trustworthiness and Authenticity” as two evaluating criteria to review the qualitative research. Authenticity considers the political impact of the research (Bryman & Bell, 2007, p. 414). Furthermore, trustworthiness can be further divided into four criteria.

Credibility: Bryman and Bell (2007, p. 411) describe this as “multiple accounts of social reality is especially evident in the trustworthiness criterion of credibility”. Researchers are supposed to validate the acceptance of the research by submitting the
research findings to the interviews of UCCK. This technique is called respondent validation, which is part of the process for the internal validation. This will ensure that interpretation and findings that were generated by the researchers match the interviewees’s perspectives.

**Transferability:** One of the attributes of the qualitative research is that it is carried out in small group of people; thus, the findings generated may be limited only in the context of research area. This is the reason qualitative research does not have the transferability aspects (Bryman & Bell, 2007, p. 413). However, the research findings and learning can be transferable in the context of the hospitals or service settings.

**Dependability:** This criteria emphasizes on keeping the record of all the research materials including the recorded data, problem formulation, selection of interviewees, interview guide and so on. Also, to meet the trustworthiness criteria, auditing approach is suggested even though it is not a popular method. In this method, peers will do the detail audits to ensure the research meet the trustworthiness (Bryman & Bell, 2007, p. 414). For this study purpose, to meet this dependability criteria, auditing approach was carried out.

**Confirmability:** Bryman and Bell (2007, p. 414) describe this as researcher “not overtly allowed personal values or theoretical inclinations manifestly to sway the conduct of the research and findings deriving from it.” Researchers of this study ensure to meet the confirmability criteria by respecting and understanding the importance of the ethical principles.

**3.2.7 Ethical Considerations**
The ethical principle of research has to be followed while conducting the research process. This should not be taken for granted and researchers should be well aware on these ethical grounds. These are four areas, where ethical issues may arise in business research, which are “harm to the participants, lack of informed consent, invasion of privacy and deception” (Diener & Crandall, 1978, cited in Bryman & Bell, 2007, p. 127).

To ensure that researchers meet these ethical principles, a request formal letter was sent to UCCK, Rheumatology department to conduct the interviews, and a formal letter of acceptance was provided by the chief of rheumatology department. This process was completed through email communication between the researchers and UCCK hospital. Because the research is related with the understanding of the processes, researchers also requested some visits to the department for observations to understand the processes. UCCK hospital agreed to contribute in the research by providing information about its processes, as well as disclosing the name of the hospital and the initials of the names of interviewees. Even the interviewees accepted to participate in this research. Since the researchers’ aim is to help UCCK hospital to improve the process and efficiency to enhance the future growth, data provided has been used without any manipulation and by following the quality evaluating criteria for the research.
Chapter 4 FINDINGS AND DISCUSSION

This chapter covers the analysis of the empirical data gathered from the semi-structured interviews and observation. Researchers analyzed the data, and the results of these findings and discussion is provided for the implementation of Lean tools and techniques in UCCK, Rheumatology department to fulfill the research objectives. This part is divided into three sections. The first section provides the background of UCCK. Second section covers Lean implementation where the researchers discuss 5S and process mapping implementation. Lastly, the CSF’s, challenges and benefits of implementing Lean in rheumatology department in UCCK is covered.

4.1 Background of University Clinical Center of Kosovo

In Kosovo, there are different health institutions tertiary health care, regional hospitals and family medical centres. UCCK is the only health care center in Kosovo that provides tertiary level health care services. The regional hospitals and family medical centers are in different cities of Kosovo (Qendra Klinike Universitare e Kosovës, 2010).

UCCK was established in 1958, originally as Pristina regional hospital, until the decision was reached to establish the Medical Faculty of the University of Pristina, in 1969. In 1973, the Faculty of Medicine joined Pristina Hospital, as the united organization, and from the year 1977 to 1991 has acted as the working organization of the Faculty of Medicine. Then from 1999 onwards, it was renamed to UCCK. Beside health care activities, UCCK provides educational activities and scientific researches. The executive directorate consists of executive director, executive assistant, health care assistant, educational issues assistant and pharmacy assistant. UCCK has total of 2830 employees, where among them, 522 are medical specialists of different fields and 1742 are nurses. There are also 555 administration staff and 11 other supporting staff (Qendra Klinike Universitare e Kosovës, 2010).

Within UCCK, there are clinics, institutes, centers, services and administrative units. UCCK has total of twenty three clinics that provide various health care services, including the institutes. UCCK consists of various clinics, such as Surgery Clinic, Neurosurgery Clinic, Surgery of Children Clinic, Orthopedic and Traumatology locomotor Clinic, Urology Clinic, Internal Medicine Clinic, Obstetrics Gynecology Clinic, Ophthalmology Clinic, Eye Clinic, Catching Diseases Clinic, Psychiatry Clinic, Neurology Clinic, Dermatology Clinic, Pediatric Clinic, Anesthesia and Intensive Care Clinic, Thoracic Diseases Clinic, Medicine in Physical and Rehabilitation Clinic, Diagnostic Center, Emergency Center, Oncology Center, Institutes, Maxillofacial and Ortoprotetica Surgery Clinic Center (Qendra Klinike Universitare e Kosovës, 2010).

Internal Medicine Clinic is one of the largest clinics in UCCK. Within the clinic, there are operating nine departments, such as Coronary Unit, Cardiology I, Cardiology II, Rheumatology, Gastroenterology, Endocrinology, Nephrology, Hematology and Hemodialysis. Also, there are three cabinets, which are Invasive Cardiology, not Invasive Cardiology and Cabinet of Endoscopy. Moreover, there are two laboratories, which are located in the Hematology department for hematological cases and in specialist clinics. In the internal medicine clinic, there are 251 beds available for patients. It has 11 department chiefs, 43 medical specialists of different fields, 13 main nurses and 160 other nurses. Within this clinic, there are the specialist clinics (ambulance for outpatients) for Endocrinology, Rheumatology, Nephrology, Gastroenterology, Cardiology and Hematology, who are responsible to make treatment
for all sorts of internal medicine diseases (Qendra Klinike Universitare e Kosovës, 2010).

The rheumatology department began its functionality in tertiary health care from 1976. Currently, this department has 17 employees, such as the chief of department of rheumatology, 4 other specialists in rheumatology field, 10 nurses, 1 psychotherapist and 1 cleaner. Also, there are 18 residents who also provide support for some weeks in rheumatology department (Interview 1). There are five rooms with total of 26 beds for inpatients in Rheumatology department. Three rooms are with 4 beds, one room has 6 beds, and another room has 8 beds. Also, there is a specialist ambulance dedicated for outpatients. Based on 2009 data, this department provided service to 3025 outpatients, 387 inpatients and few emergency patients. Approximately, 15 to 20 outpatients are visited in hospital per day and 2 inpatients are hospitalized in hospital per day (Interview 1).

The payment for outpatients and emergency cases is 4€, while for inpatients is 40€. However, this payment is excluded for elderly, handicapped people, kids, students and people with social assistance. This is because Kosovo society does not have health insurance from 1998 after the war (Interview 2).

4.2 Lean Implementation

4.2.1 CSF's and Challenges of implementing Lean in Rheumatology department in UCCK

In this part, researchers will show the results from the questions in the interview guide for CSF’s and challenges in sections E & F for quality practices implementation. Also, the interpretation for possible CSF’s and challenges for Lean implementation has been identified based researcher’s observation and interviews.

4.2.1.1 Findings in CSF’s and Challenges for quality practices implementation based on UCCK Rheumatology's Staff

The Chief of Rheumatology department, a Specialist and a Resident were interviewed with questions to rate the CSF’s and challenges for quality implementation in hospital. Five selected criteria were put together based on literature review. The answers were based on their past experience with quality programs within the hospitals settings.

The results for CSF’s and challenges are summarized in Table 11. This shows the most important CSF is top management involvement and results show that top rating in challenges is identifying non value added activities. The results from the data analysis for CSF’s and challenges are similar as the literature suggested. Details can be found in Appendix 6.
Table 11: CSF’s and Challenges results from UCCK staff perspective

<table>
<thead>
<tr>
<th>CSFs’ criteria</th>
<th>% of Total Score</th>
<th>Challenges’ criteria</th>
<th>% of Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management Involvement</td>
<td>27%</td>
<td>Non-value added activities</td>
<td>31%</td>
</tr>
<tr>
<td>Linking to overall hospital strategy</td>
<td>22%</td>
<td>Resistance to change</td>
<td>24%</td>
</tr>
<tr>
<td>Building trust within the organization</td>
<td>11%</td>
<td>Forecasting the demand of</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rheumatologic services</td>
<td></td>
</tr>
<tr>
<td>Effective Communication</td>
<td>24%</td>
<td>Standard documentation</td>
<td>22%</td>
</tr>
<tr>
<td>Patients involvement</td>
<td>16%</td>
<td>Employee empowerment</td>
<td>16%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Developed the authors based on interviews

The results have some limitations since this was done with small sample size. However, this does provide the researchers valuable insight from internal staff perspective. Aside from these questions, researchers also asked interviewees on the implementation of Lean in UCCK, Rheumatology department. These were some of the viewpoints provided by interviewees:

“It would be very difficult to implement Lean in the current settings considering the fact that all clinics should be informed about Lean concept, and also there should be a request to the Ministry of Health and changes in some regulations of working conditions in order to have better functioning of health institutions” (Interview 1).

“Due to many problems that rheumatology department has, it is difficult to have support from senior management for quality practice. This is because of the lack of investments even for essential items in the UCCK” (Interview 3).

These interviews suggest that the implementation of Lean in the UCCK currently may not be feasible due to investment issues. However, researchers are optimist that some aspects of Lean that require less investment, which are recommended in this study may be applied now. This would be the first step of making improvements in the processes within the department. Also, perhaps, after UCCK resolve the issue of lack of sufficient investments, then Lean might be applied at greater extent in the future.

4.2.1.2 Discussion in CSF's and Challenges for UCCK on Lean Implementation based on Researchers' Analysis

Understanding the CSF’s and challenges through literature review provided strong base for the research; however, some factors were generalized for different industries and organizations. Nevertheless, researchers were able to find and interpret some of the unique CSF’s and challenges specifically related to UCCK, which will further help the department to apply some of the suggested Lean tools and techniques.

CSF'

- Management support and acceptance for need for Lean: Without the management support, implementation of Lean is not possible. This is because Lean will require several changes in processes within the UCCK, which might happen slowly. Also, investment in equipments and training people is required. These improvements would be possible only with the management support. However, support from management can only be achieved with the acceptance of the need for change and realizing benefits of Lean.
Challenges

- **Resistance to change within staff**: With interviews and observation, researchers were able to conclude that the motivation level within the employees in the department is quite low. The main factor is because of low working conditions and low salary. Even though Lean implementation will require some changes in process for Lean thinking, it will only happen with support of staff. Thus, while encouraging change within the organization where staff is not motivated, it will be likely to cause the resistance to change. It will require more efforts and time.

- **Support from Government**: The medicines for UCCK are provided by Ministry of Health. To improve the processes by providing better services without the medicine shortage within the department, researchers’ recommendation for Ministry of Health is to provide all necessary drugs and only the expensive ones to be purchased by the patients. However, this change in process also requires going through the formal channel for request and approval from the government. Also, even Lean implementation within the UCCK has to be formally approved by the government, which could be challenging.

4.2.2 5S Implementation within the UCCK Rheumatology department

“A Lean consultant who worked with us (Bolton Hospitals NHS Trust) remembered that he used to tell clients their factories should be well organized and orderly as a hospital; after working in a hospital he no longer does so” (Fillingham, 2007).

4.2.2.1 Findings on Current State for 5S

With clear understanding of theoretical aspects of 5S from the literature review, researchers put together the interview questions with the aim to clearly identify the current process within the rheumatology department. Interview guide sections B and C consists of questions related to 5S tools to understand the current process within the rheumatology department.

- **Sort**

“Separate necessary to unnecessary” (Black & Miller, 2008, p. 54).

This is important to understand the processes followed by rheumatology department whether or not the staff sorts the necessary papers and objects from the unnecessary ones. Also, it helps to find out if there are some objects which are not functioning around the designated working areas.

“In the absence of the secretary and lack of my time, the small office has many files which are not sorted as follows: resident seminars, documentation of severe patient histories, annually projects for scientific publications related to experience with patients, as well as exams for students of Medical Faculty and for master and doctoral candidates” (Interview 1).

“We have not functioning computers which are not replaced on time. Usually, the request is done to change the computers, and then they will be replaced in approximately 1 to 2 months” (Interview 4).

Based on the information from interviewees and researcher’s observation, there were unnecessary items around the working area, such as books, journals and not functioning computer. Staff spends long time looking for the items in the desk since they were not well organized and sorted.
• **Simplify**

“Create place for everything” (Black & Miller, 2008, p. 54).

The questions related with “Simplify” will help to identify if the staff follows process to put frequently needed objects or important equipments in the right place or not. There are some items that will be required frequently, such as prescription pad, patients list and others.

“It is very hard to find patients’ documents, because the information is written by hand in a clinical protocol, and the most accurate source is the file that patients receive from the hospital for outpatients. On the other hand, for hospitalized patients, there are files of patients stored in hospital archive, which again is very difficult to find. Patients should tell the date they have been in the hospital to enable the staff to find the information easier. This happens as a result of lack of database for patients in a computer program to put the patients’ data” (Interview 4).

With the interviews and observation, the researchers conclude that the rheumatology department lacks the implementation of “simplify” within the working areas. Patients’ information history is important in hospital settings, but researchers found out that this information is not properly organized and labeled.

• **Sweep**

“Control the work area visually and physically” (Black & Miller, 2008, p. 54).

This will help to understand whether or not the department has clean and tidy working environment. In hospital, it is important for staff to be aware on cleanliness and hygiene because lack of that might lead to diseases or infections.

“There is only one cleaner who is not able to clean everything frequently” (Interview 4).

“We do not need to wear gloves for patients with rheumatic diseases but we use them only for patients that are suspected to have infection diseases. However, we wash and disinfect hands regularly” (Interview 1).

“The director of internal medicine, the main nurse and I are responsible to check if everything is cleaned in order to avoid any kind of infections that would dissatisfy patients. Beside this, there are frequent visits from professional sanitary inspection from UCCK and Ministry of Health to see if everything is in order” (Interview 1).

Based on information provided by interviwee and researcher’s observation, it seems like staff are well aware of the disinfection and take the neccessary measures to ensure that they comply with the cleanliness while treatment. However, there ia a need of one more cleaner within the department to maintain the place tidy.

• **Standardize**

“Document agreements made during previous steps” (Black & Miller, 2008, p. 54).

It is important to set a standard process for the regular work, so that there is consistency in the process and every employee follows this process. This can be the best process that can be followed or the regular process to ensure everything runs smoothly within the workplace, such as maintenance, patient admission procedure and others. This part
will help to understand the process that is followed within the department to create a standardized working environment.

“The patients are informed about the process in hospital by notes in the door of the rooms. If there is a waiting line, they wait for their turn, but there is no coupon or anything that will ease the process” (Interview 4).

Interviews and observation lead to the conclusion that some processes are standardized, such as the informing time to patients, nurse taking patients’ information by writing in a notebook. However, researchers think there are some processes which can be further improved with standardization to create a faster working environment.

- **Self Discipline**
  “Follow through on all 5S agreements” (Black & Miller, 2008, p. 54).

With the 5S implementation, it is important to create all these four aspects “Sort, Simplify, Sweep, Standardize” in practice to continue to increase the efficiency.

“There is a box for complaints, where patients can express their feelings” (Interview 1).

Since rheumatology department does not apply any Lean practices yet, it is hard to review in this aspect of 5S within the current process. However, researchers try to understand if the department takes any measures to improve the performance of the department, such as by understanding the patients’ feedback. They do not ask for the patients’ feedback but complaint box is placed to share their dissatisfaction. Table 12 summarized the current process before applying 5S.

**Table 12: Understanding current process before 5S**

<table>
<thead>
<tr>
<th>5S</th>
<th>Understanding current process before 5S implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sort</strong></td>
<td>- Broken beds not replaced on time</td>
</tr>
<tr>
<td></td>
<td>- Books and not functioning computers around the working area</td>
</tr>
<tr>
<td></td>
<td>- Small office has many files not sorted</td>
</tr>
<tr>
<td></td>
<td>- Documents of previous years are not well organized in the files because of the small room space and no secretary responsible to manage these tasks.</td>
</tr>
<tr>
<td></td>
<td>- Not enough cupboards to classify files properly</td>
</tr>
<tr>
<td><strong>Simplify</strong></td>
<td>- Hard to find patients’ documents because information is written by hand for outpatients</td>
</tr>
<tr>
<td></td>
<td>- For inpatients, data is stored in hospital archive but patients have to provide data to retrieve the information more easily</td>
</tr>
<tr>
<td><strong>Sweep</strong></td>
<td>- One cleaner in whole department</td>
</tr>
<tr>
<td></td>
<td>- Director of internal medicine, Chief of Rheumatology Department and the main nurse are responsible to check if everything is cleaned to avoid any kind of infections that would dissatisfy patients. Beside this, there are frequent visits from professional sanitary inspection from UCCK</td>
</tr>
<tr>
<td></td>
<td>- Doctors wear gloves only for patients that are suspected to have infection diseases</td>
</tr>
<tr>
<td><strong>Standardize</strong></td>
<td>- Patients are informed about the processes in the hospital by notes in the door of the rooms. If there is a waiting line, they wait for their turn, but there is no coupon or anything that will ease the process</td>
</tr>
<tr>
<td><strong>Self discipline</strong></td>
<td>- Only complaints box for patients to share their complaints</td>
</tr>
</tbody>
</table>

Source: Developed by authors based on interviews and observation

**4.2.2.2 Discussions on Proposed State with 5S**

This part covers the implementation approach to apply 5S within the department. Also, researchers have tried to propose realistic and applicable tools with the understanding of
the rheumatology department in UCCK. Since this department is fairly new to Lean theory, it should not be applied to a great extent immediately, because too many changes at the same time would not bring successful implementation of Lean. Thus, researchers proposed only some applicable and easy tools and techniques to start creating a Lean culture within the department.

- **Sort and Simplify**

IT technology has developed enormously to support various sectors but implementation of this technology to manage the administrative work lacks behind significantly in healthcare sector (The Economist, 2005, cited in Natarajan, 2006). 5S is one of the important tools that will help to sort and simplify the work process and reduce the waste but interestingly hospitals are not utilizing it well. These are some proposed techniques to implement these 2S within the Rheumatology department.

  - **Implement red tagging:** With help of literature review for this technique, researchers think that this will be useful to sort out objects and equipments that are not working. Suppose certain equipments are not working or unnecessary books are creating cluster around work, then staff will put the red tag with short description about the problem. Tagging can be done with different colours to sort out and to give the right sign. All staff in the department should follow this within their working area and even if they notice some disorganized items outside their department, they should make a habit to report to the audit team in charge to review this process.

    Green:  Useful, but in wrong place or no use in that department
    Yellow:  Sign for items that are not working, such as computers, equipments
    Red:  Sign for discarded items, unnecessary

  - **Investment in Computers and IT System:** Based on the review of the processes within the department, researchers observed that patients’ data is not properly organized. Investment in computer and IT system would help to file the necessary documents in proper order, so staff would spend less time finding or writing patient reports. Also, starting from patients’ registration to their discharge, the data should be in computer, so that physicians can also retrieve information from their computers during the patients’ visits.

  - **Visual management for supplies:** In rheumatology department, there are some medicines supplies and also some other day to day supplies. Researchers suggest applying visual management to manage these supplies, so that it is easier to identify. Suppose, there is medical mask. Picture can be placed in front of it, so that staff will not waste much time to look for it. This can also be done for the medicine supplies.

- **Sweep**

Liker and Meier (2006, p. 64) noted that people, who are not aware of 5S, assume that this is tool used only to clean the workplace. Working environment without waste in process is the result of the application of 4S, while “sweep” is to ensure that place is clean, tidy and without cluster. With the implementation of suggested tools for “Sort” and “Simplify,” working area will be well organized, which will make it easier and faster even for cleaner to clean and maintain the place. Researchers also think that staff is already aware of the cleanliness and hygiene, but to further improve on this, researchers recommend hiring additional cleaner.
● **Standardize**
In Virginia Mason medical center, the standardizing process for “one standard instrument tray for the 12 doctors performing laparoscopic gallbladder surgery” led to cost saving by $950 (Connolly, 2005). Standardize can lead to cost saving, as well as increase the efficiency in staff since the process followed will be the same and there will be no confusion. Researchers noted that even in Rheumatology department, some processes should be standardized.

- **Visual Management in the reception area**: Patient will take a coupon with number in reception and wait for their turn in the waiting area. Only when it is their turn, patients will go to the nurse and provide the referral form. This way nurse can provide services on first come first served basis. The process will be clear to everyone and also, it will help nurse and department to organize and work efficiently.

- **Standardize process with labelling**: Rheumatology department can also put label to assign designated area for items to segregate by the work process. Researchers suggest this to implement for nurses in reception with label tray for important documents separately, such as patient form that are already approved waiting for collection in one tray, and one separate tray with documents for urgent processing. This can also be combined with the colour coding system to provide sign with the colour.

● **Self Discipline**
Liker and Meier (2006, p. 64) mentioned that to sustain Lean, it is important to build discipline to follow these processes improvement and also develop Lean thinking while working, which is critical for Lean implementation. To create discipline in Lean way of thinking, it can only be achieved by understanding the tools in similar way as explained in the following example. “A trained mechanic does not bring wrench to the car and then find a nut to loosen, He first determines the nature of problem, what will need to be done to correct it, and then selects the appropriate tools to complete the job” (Liker & Meier, 2006, p. 82). To ensure that these 4Ss are followed by staff members in their work process after implementation, researchers suggest these points within the department.

- **Educate & Empower staff for process improvement**: The literature review shows that employee involvement is one of important CSF and also it is crucial to get the support from the top management for Lean implementation from the beginning of the process. Management should educate staff by mentioning the benefits that can be generated from Lean and empower them to make improvement. In this way, self discipline can be implemented in the department.

- **Include Lean in staff performance evaluation**: Lean can also be included as one of the criteria to evaluate the staff performance. This will also ensure the sustainability of self discipline.

- **Feedback from the patients**: After completing the treatment, patients should be suggested to fill feedback form to understand their experience in the department. This will be also helpful to find some area where Lean can be applied or further improved.

- **Create Lean Audit team**: Group of two or three employees should be involved in Lean audit team. This team will look at all the area in the department to ensure that Lean has been followed and take measures if there is some area that Lean is ignored.
Table 13 summarizes the proposed process of UCCK, rheumatology department with 5S implementation.

Table 13: Proposed Process Improvement with 5S

<table>
<thead>
<tr>
<th>5S</th>
<th>Proposed process improvement with 5S implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sort and Simplify</strong></td>
<td>- Implement red tagging techniques to sort out objects, equipments</td>
</tr>
<tr>
<td></td>
<td>- Computers and IT System</td>
</tr>
<tr>
<td></td>
<td>- Visual management for supplies</td>
</tr>
<tr>
<td><strong>Sweep</strong></td>
<td>- Hire one cleaner</td>
</tr>
<tr>
<td><strong>Standardize</strong></td>
<td>- Visual Management in the reception area</td>
</tr>
<tr>
<td></td>
<td>- Standardize process with labeling</td>
</tr>
<tr>
<td><strong>Self discipline</strong></td>
<td>- Educate &amp; Empower staff for process improvement</td>
</tr>
<tr>
<td></td>
<td>- Include Lean in performance evaluation</td>
</tr>
<tr>
<td></td>
<td>- Feedback from the patients</td>
</tr>
<tr>
<td></td>
<td>- Create Lean Audit team</td>
</tr>
</tbody>
</table>

Source: Developed by authors

4.2.3 Process Mapping Implementation within the UCCK Rheumatology department

Interview guide section “D” consists of questions related to process mapping of patients’ journey to understand the current process within the rheumatology department.

4.2.3.1 Findings on Current State of Process Mapping of Outpatients’ Journey

Process mapping is a valuable tool that represents visually the processes within organization (Liker & Meier, 2006, p. 38). Identifying the current state of process map is key factor in order to make the waste visible (Black & Miller, 2008, p. 43). It is also helpful to have common language with the same focus in organization (Liker & Meier, 2006, p. 42). To understand the processes in UCCK, rheumatology department, the first step is to construct a process mapping of the current state for the outpatients’ journey in specialist clinic of internal medicine of rheumatology, using the information gathered from researcher’s observation and semi structured interviews. The current state map is useful to expose the waste in individual processes and make people think in terms of problem solving in continuous basis (Liker & Meier, 2006, p. 39). When mapping the current state of processes, it is important to know the goals that organizations want to achieve by having in mind how the processes would be in the future state map (Liker & Meier, 2006, p. 43). With the findings in the current process, the second step is to map a suggested future state for the outpatients’ journey in specialist clinic of internal medicine-rheumatology.

The process flow (PF) in the specialist clinic can be represented by the following activities:

- PF1: Patient refers to the primary health care
- PF2: Patient is referred to tertiary health care UCCK
- PF3: Patient contacts the nurse to schedule appointment
- PF4: Patient arrives at the hospital
- PF5: Patient contacts the nurse
- PF6: Patient goes to waiting area
- PF7: Patient is examined by the specialist
- PF8 I: Specialist informs the patient for follow up treatment
- PF 9 I: Nurse schedules new appointment for the patient
OR,
- PF8 II: Specialist acquires some lab tests and examinations
- PF9 II: Specialist informs the patient for follow up treatment
- PF10 II: Nurse schedules new appointment for the patient

**PF1: Patient refers to the primary health care:** When patient has any kind of medical complaints, the first level of contact is primary health care. Primary health care is the essential health care service, which is provided by general practitioners for people in a community by paying a cost which is affordable for them. If the patient has more complex medical health condition, then they are referred to secondary health care, which are services from regional hospitals in various cities of Kosovo. However, as the capital of Kosovo, Pristina, does not have secondary health care, patients are referred to the highest level of health care, which is tertiary health care, UCCK. In this case, patients receive a referral form (Appendix 7) with patients’ information, health care team information, diagnosis and the reason for being referred (Interview 3).

**PF2: Patient is referred to tertiary health care UCCK:** Patient goes to tertiary health care, UCCK, to receive health services which are not available in other health care institutions. Tertiary health care involve advanced services from physicians, who are medical specialists (Interview 3).

**PF3: Patient contacts the nurse to schedule appointment:** When patients are referred to UCCK, they have to go by themselves to schedule appointment to the nurse. This might waste the patients’ time from 1 to 3 hours, depending from which city they come from. Also, patients have to wait from 1 to 2 months to get appointments. This happens mainly in rheumatology department, as other regional hospitals in the cities of Kosovo do not provide rheumatology services (Interview 1).

**PF4: Patient arrives at the hospital:** 50% of the patients arrive at UCCK by public transport, while the other half comes by car. Mostly, all the patients are accompanied with someone. This is because rheumatic diseases occur mostly to elders (Interview 2).

**PF5: Patient contacts the nurse:** Then, the patient gives the referral form to the nurse to keep track of the queue of patients. In the absence of computers, printers and the program to register the patients’ data, the rheumatology department has only the patients’ information and diagnosis written in a clinical protocol. However, in referral form is written by hand the diagnosis and therapy of patients which is given to patients. Furthermore, the nurse accepts the outpatients in the specialist ambulance every day, and at the same time makes appointments for other patients. There are 15 to 20 patients seen per session, so every day the specialist clinic works from 9:30 AM to 12:30 PM (Interview 1 & Interview 3).

**PF6: Patient goes to waiting area:** Patient waits in the waiting area, which is very crowded. This is because patients are accompanied with family members. Also, the specialist clinics of various departments are close to each other, and there is one waiting area for patients with different diseases of internal medicine. The appointment date is accurate for the patients, but the time is just set approximately, so the patients might wait one to two hours (Interview 1).
**PF7: Patient is examined by the specialist:** The nurse calls the patients by name when it is their turn to see the specialist. There is one room for specialist and nurse with a separator. Due to this, a lot of noise distracts the specialist and the patient. For example, when the specialist is done with one patient’s examination, then the patient talks to nurse to make appointment for follow up treatment. At the same time, the next patient is being examined by the specialist. Moreover, chief of rheumatology department said: “when I am assigned for the day of the specialist clinic, I get distracted from another nurse, who asks to sign the discharge information form for inpatients. This causes a delay of approximately 5 to 10 minutes for the next patient who is waiting in queue” (Interview 1). Also, one of the researcher that conducted interviews was allowed to participate for 30 minutes in the specialist clinic, where she observed this issue that is considered waste in the eyes of customers.

After this stage, the PF8 is sub divided into two categories depending in the case of patients if they have to go through the follow up treatment (PF8 I) or they are acquired to do further lab tests (PF8 II).

**PF8 I: Specialist informs the patient for follow up treatment:** When the visit is finished, the specialist informs patients for the date of the next treatment. The patient is directed to the nurse to schedule appointment (Interview 1).

**PF9 I: Nurse schedules new appointment for the patient:** The nurse schedules new appointment for the patient based on the date that specialist requested. However, there are cases that there is no availability of that date for appointment, so patient has to make appointment according to availability. Even though this dissatisfies the patient, it is not major issue because these are chronic diseases and patients are not required to visit the specialist frequently. However, if patients’ case gets worse, then they go to emergency center to get immediate treatment (Interview 2).

**PF8 II: Specialist acquires some lab tests and examinations:** The patient is informed for the lab tests and examinations that are necessary to be done. The patient is referred back to primary health care to get those services (Interview 1 & Interview 2).

**PF9 II: Specialist informs the patient for follow up treatment:** (Procedures in this step are the same as PF8 I)

**PF10 II: Nurse schedules new appointment for the patient:** (Procedures in this step are same as PF9 I)

These processes are shown in Figure 10, where the red squares show the non value added activities during outpatients’ journey in specialist clinic.
4.2.3.2 Discussion on Proposed Future State of Process Mapping of Outpatients’ Journey

It is worth to mention that the task of developing a process map is not easy, as organizations get stuck due to the lack of work standardization (Liker & Meier, 2006, p. 42). As discussed in the current state map, patients have to go through several non-value added processes from the admission to discharge. That is why there is a need to streamline the processes with the help of future state of map. For example, at Virginia Mason Medical Center, chemotherapy patients’ walking was reduced from 748 feet to 181 feet by bringing the services closer to the patients (Black & Miller, 2008, p. 107).

When developing the future state map, one person must have Lean experience to draw it successfully. The future state map shows what will be achieved with the improvements made by adding value from the customers’ perspective (Liker & Meier, 2006, p. 40). The crucial factor for UCCK is to follow patient-first vision in order to deliver high quality health care services (Black & Miller, 2008, p. 43). Furthermore, after implementing the future state map, it is good to draw again the latest current state map that organizations are working, and then develop another future state map. This would help to implement a culture of continuous improvements which is Lean principle (Liker & Meier, 2006, p. 41).

In case of outpatients, the researchers identified waste in four PFs, such as

- PF3: Patient contacts the nurse to schedule appointment
- PF6: Patient waits in the waiting area
- PF7: Patient is examined by the specialist
• PF9 I & PF10 II: Nurse schedules new appointment for the patient

To map the future state of outpatients, there is a need to eliminate waste on these activities. Therefore, based on the understanding of PFs in outpatients’ journey of current state, the researchers will discuss these processes by suggesting ideas for improvement.

**PF3: Patient contacts the nurse to schedule appointment:** When the patient goes to primary health care and is referred to the UCCK, the primary health care should schedule appointment immediately. This can be done by having online database for patients’ appointment, which will enable the nurse to check the availability of the appointments. In this case, patient will know the date of the appointment and will only go to UCCK at the scheduled timing. This will increase patients’ satisfaction because they will save time of 1 to 3 hours depending from which city they come from. Also, this will decrease the nurse of UCCK’s responsibilities to schedule appointment by writing the data in clinical protocol. This system improvement will simplify the processes, which will ease the job of the primary health care and UCCK to keep track of the patients. Furthermore, the referral form that includes diagnosis and the history of illness/symptoms should be sent from primary health care to UCCK by fax. In this way, the patient will not be asked the same questions by different physicians. By doing this, this process flow will be eliminated when mapping the future state.

Another problem in this process was the high demand of rheumatology services in Kosovo, where patient has to wait 1 to 2 months for appointment. According to the chief of rheumatology department, “there is a request to make it a clinic but no decision is reached yet” (Interview 1). This would satisfy the needs of patients and reduce the waiting time of appointment that is happening now.

**PF6: Patient waits in the waiting area:** As mentioned in background of UCCK, there are six specialist clinics for outpatients of internal medicine clinic within a close distance. All clinics have the same schedule of 9:30AM to 12:30PM for outpatients. This is the reason corridors become crowded with patients that wait for different health care services of internal medicine. In order to improve this process, specialist clinics should work in different time schedule. As UCCK’s official working hours are from 7AM to 3PM, the timing for three specialist clinics could be from 8:30AM to 11:30AM, and three others should operate from 11:30AM to 2:30PM. Other solution could be having separate waiting area for every specialist clinic, which involves investment in new facilities. “Moreover, many patients are accompanied with family members because most of them are old” (Interview 1). However, patients should not be allowed to be accompanied with more than one person in order to free up the waiting area space.

It is important to understand how processes affect each other, in order to identify activities which are causing waste and make improvement (Black & Miller, 2008, p. 57). For example, when PF3 is improved with a database for scheduling appointments for patients, there will not be a need for patients to go to UCCK to schedule appointments. This would reduce the nurse’s responsibilities and further free up the space in the waiting area for the patients, which will increase their satisfaction. It will save approximately 30 minutes of patients’ waiting time.
**PF7: Patient is examined by the specialist:** As mentioned before, there is one room of specialist and nurse with separator, which causes a lot of noise and distraction (Interview 1). Researchers suggest that outside of this clinic room in the waiting area, there should be nurses’ reception for internal medicine, similar as shown in Figure 11. This reception is based on Lean concept for wheeled work station which can be moved and placed anywhere, and this is adapted from the example of Virginia Mason Medical Hospital (Black, 2008). Patients should be examined based on first come, first served. They should receive a coupon to keep the queue. In this way, the nurse will be there for patients to answer any question that they might have.

![Figure 11: Suggestions for Nurses’ Reception of Internal Medicine](image)

*Source: Black, 2008*

Also, as mentioned in current state of PF7, when the chief of rheumatology department is assigned for specialist clinic, he gets distracted by other nurses to sign documents, such as discharge information form for inpatients (Interview 1). Researchers suggest that chief of rheumatology department should be assigned on the timing from 11:30AM to 2:30PM for specialist clinic. Again this is linked with the essential need of database for patients’ data. When the information exists in the database, there would be needed only the final diagnosis and therapy to be added for the patients, which is fast procedure and enables the chief to sign them before starting the work in specialist clinic. This would save 5 to 10 minutes of the waiting time for patients, which will increase their satisfaction. Also, the chief and nurse will not be stressful of having to do different things at the same time.

**PF9 I & PF10 II: Nurse schedules new appointment for the patient:** For follow up treatment, after being examined by specialist, patients go to the nurse to schedule appointments (Interview 2). Researchers also support the chief of rheumatology statement that there is a need for rheumatology clinic to meet the needs of patients’ with rheumatic diseases, in order to avoid the waiting time of 1 to 2 months for patients (Interview 1).

Indeed, not all the improvements in processes can be measured in quantity, but they will surely increase the efficiency in work, which will lead to patients’ satisfaction. The processes of patients’ journey should be waste free by eliminating waiting and providing full care to patient from the first PF to the last one (Black & Miller, 2008, p. 44). Figure 12 shows the mapping of the future state for outpatients in specialist clinic,
In conclusion, Table 14 shows the current state of process map with identified waste in outpatients’ journey. This is followed with the discussion of future state of process map for outpatients’ journey. In both process maps, researchers sorted processes as controllable or uncontrollable factors. This means that controllable factors can be improved, while uncontrollable factors are linked with government decisions, which might take some time to improve.
<table>
<thead>
<tr>
<th>Process Map of Outpatients’ Journey</th>
<th>Waste identification in the current state</th>
<th>Proposed waste elimination for future state</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Uncontrollable</strong></td>
<td><strong>Uncontrollable</strong></td>
</tr>
<tr>
<td></td>
<td>✓ No health insurance in Kosovo</td>
<td>✓ Still no health insurance</td>
</tr>
<tr>
<td></td>
<td>✓ No computer database to keep track of patients’ information</td>
<td>✓ A request of implementing rheumatology clinic to meet patients’ demand, which involves huge investment</td>
</tr>
<tr>
<td></td>
<td>✓ Patients spend one to three hours to come to UCCK to schedule appointment</td>
<td>✓ Investment in computer databases for patients: saving time from one to three hours to schedule appointments</td>
</tr>
<tr>
<td></td>
<td>✓ Patients wait for 1 to 2 months to get rheumatology services</td>
<td>✓ Primary health care should send referral form of patients by fax to UCCK</td>
</tr>
<tr>
<td></td>
<td>✓ Crowded waiting area for patients</td>
<td>✓ Change the working hours of specialist clinics of internal medicine to free up the waiting area</td>
</tr>
<tr>
<td></td>
<td>✓ Small clinic room of specialist and nurse with separator, which cause distraction and a lot of noise</td>
<td>✓ Chief of rheumatology department should work in specialist clinic from 11:30PM to 2:30PM to be able to sign various documents before that time</td>
</tr>
<tr>
<td></td>
<td>✓ Chief of rheumatology department gets distracted from the nurse to sign discharge information form for inpatients</td>
<td>✓ Investment in nurses’ reception wheeled workstation outside the office of specialist clinics’ rooms</td>
</tr>
<tr>
<td></td>
<td>✓ Patients are accompanied with one or more family members</td>
<td>✓ Patients should be allowed to be accompanied with only one family member to free up the waiting area</td>
</tr>
</tbody>
</table>

Source: Developed the authors

### 4.2.3.3 Findings on Current State of Process Mapping of Inpatients’ Journey

The first step is to construct a process mapping of the current state for the inpatients' journey in UCCK, rheumatology department of internal medicine, using the information gathered from observation and semi structured interviews. The second step is to map a proposed future state for the inpatients' journey in rheumatology department of internal medicine.

The hospitalization process can be represented by the following activities. The first seven activities are the same as for outpatients, and then the procedure continues only for inpatients. In this way, outpatient becomes inpatient with medical recommendation of the specialist to get hospitalized.

- PF1: Patient refers to the primary health care
- PF2: Patient is referred to tertiary health care UCCK
- PF3: Patient contacts the nurse to schedule appointment
- PF4: Patient arrives at the hospital
- PF5: Patient contacts the nurse
- PF6: Patient goes in the waiting area
- PF7: Patient is examined by the specialist
- PF8: Medical recommendation for hospital admission
- PF9: Patient’s history of illness is opened
• PF10: Patient is hospitalized
• PF11: No lab tests or examinations are done in 1st day
• PF12: Lack of essential drugs for inpatients
• PF13: Patient discharge
• PF14: Patient receives discharge information form & new appointment

The procedure for inpatients will be explained only from PF8 in order to avoid repetition.

**PF8: Medical recommendation for hospital admission:** When the outpatients come for the visit, the specialist might propose to patients to get hospitalized by writing medical recommendation in the referral form (Interview 2).

**PF9: Patient’s history of illness is opened:** Patient gives the referral form (Appendix 7) to administration staff to open patient’s history of illness form, which is written in computer. However, they are not stored properly because computers can be formatted, patients’ forms can be deleted or the staff can rewrite in those forms for other patients as they just need to print them. Also, patient’s history of illness is not written only in one computer even though there is one room with computer for this purpose. This happens because when that computer does not work, they use another just for the printing purpose. This form is stored in the hospital’s archive when the patient is discharged. This procedure takes 20 minutes to 1 hour, depending on the queue of patients (Interview 3).

**PF10: Patient is hospitalized:** The patient goes to main nurse and gives the form with history of illness. Then the main nurse writes patients’ information in clinical protocol. At this stage, the patient is assigned in a room and receives bed number. Then main nurse assigns another nurse to prepare patient’s bed and take the patient to the room. Usually patients with rheumatic diseases are able to walk themselves, but in case they cannot, wheelchairs can be used (Interview 2).

**PF11: No lab tests or examinations are done in 1st day:** The patient will start to do necessary lab tests and examinations only in the 2nd day of hospitalization. Exceptions are only for severe cases. Immediate treatment is not possible because of low capacity of laboratories and shortage of materials needed. This increases the number of days staying of inpatients in hospital. Also, there are cases when new patients have to be hospitalized in other departments because of the lack of availability of beds (Interview 1 & Interview 3).

**PF12: Lack of essential drugs for inpatients:** According to the UCCK's statute, the requirements of the Ministry of Health, and with the request of executive director of UCCK and director of internal medicine, the chief of rheumatology department does annual planning for essential drugs based on the capacity of the hospitalized patients and the modern therapeutic guidelines for the treatment. This planned list is sent to the Ministry of Health, who is financial responsible for drugs. Usually, not all the requested drugs are provided; that is why the Ministry of Health is reminded for the essential drugs. In case of unavailability of drugs, family members of patients have to purchase the missing drugs and bring to the clinic. Sometimes, corridors become crowded from the family members, but the staff allows this as there is no other option. This also
increases inpatients’ treatment time in hospital and sometimes leads to complications of the disease (Interview 1 & Interview 5).

**PF13: Patient discharge:** This discharge procedure takes five hours, as the patient is notified for discharge at 8AM and leaves at 1PM. Resident prepares discharge information form (Appendix 7) which is written in the computer. In the first page are included patients’ data, history of illness, and diagnosis. In the second page are written lab tests and examinations that have been done during patient’s hospitalization. Then are consultations, which have been done from specialists of other departments for the patient in rheumatology department, drugs that patient has been prescribed for treatment and therapy that should be taken by patient. This form should be signed by the director of internal medicine clinic, chief of rheumatology department, as well as assigned specialist and resident of the patient’s room. The main nurse gives the form to sign to these people and sends one copy to the administration and another copy is stored in hospital’s archive. The director of internal medicine signs the discharge information forms till 12PM, so patients receive them at administration around 1PM. Even though the discharge information forms are written in computer, there is no proper way of storing them in computer, as in the case of patients’ history of illness. Furthermore, in the end of the form for patients’ history of illness is written the final diagnosis, patients’ condition and therapy that should be followed. This form is stored in the archive, but it is not given to the patient (Interview 3).

**PF14: Patient receives discharge information form & new appointment:** Patient receives the discharge information form at administration. At this stage, patient schedules new appointment according to the specialist’s request (Interview 1).

These processes are shown in Figure 13, where the red squares show the non value added activities during inpatients’ journey in rheumatology department.

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**Figure 13: Current State of Inpatients’ Journey in Rheumatology Department**
Source: Developed the authors based on Interviews
4.2.3.4 Discussion on Proposed Future State of Process Mapping of Inpatients' Journey

After understanding the current state of process map for inpatients, the next step is mapping the future state. To do that, researchers discuss some suggestions for improvements, which would eliminate the waste that was identified. As the first seven PFs were discussed for the outpatients’ journey, this part will focus only on the other PFs that affect inpatients.

In addition to the four PFs with wastes that were discussed for outpatients, there are four other wastes in the following PFs:

- **PF9: Patient’s history of illness is opened**
  Storing data of patients in different computers is a key problem in this PF. To improve this process, the database to store patients’ history of illness and network to access this database from all computers is needed. In this way, every time a patient is hospitalized, he/she does not have to have a new history of illness. For example, currently, they receive a new protocol number that identifies that patient every time they are hospitalized. If the patients’ data is stored in the computer, then the waiting time to get patients’ history of illness will be shortened. To keep track of the queue of patients, coupon will be a good solution for this case as well.

- **PF11: No lab tests or examinations are done in 1st day**
  In order to resolve this problem, two solutions can be suggested. The first one was suggested by the chief of rheumatology of department (Interview 1). The lab tests and other examinations for patients should be available in 24 hours, not only during the working hours of 7AM to 3PM (Interview 1). Even Black and Miller (2008, p. 124) point out that use of the equipments should optimize by working 24 hours a day, seven days a week. The second solution would be to purchase additional equipments, which would fulfill the needs of all patients. Both of these solutions would reduce the queue for these examinations and increase patients’ satisfaction as they will receive these services on time. Also, at least 1 to 4 days of patients stay in the hospital will decrease, which lead to higher availability of beds for new inpatients. This will also generate more income for the hospital.

- **PF12: Lack of essential drugs for inpatients**
  The database for drugs will serve to keep track of the drugs and reduce errors. In this way, the rheumatology department will keep track of the essential drugs that were ordered, and the drugs that they received. Currently, these analyses are done by the main nurse only by hand writings in notebooks (Interview 5). At Virginia Mason Medical Center, the flow of drugs improved with implementation of computerized physician order entry, which eliminated order errors (Black & Miller, 2008, p. 116).

Based on the interviews, the researchers do not think that there are available funds to provide all the necessary drugs in the UCCK, even though the Ministry of Health has increased its availability in 2009 compared to previous years (Qendra Klinike Universitare e Kosovës, 2010). Therefore, a more realistic recommendation would be for the Ministry of Health to provide all necessary drugs in the hospital, from which the expensive drugs should be available only for extra costs. In this way, family members...
of patients would not have to come in the clinic to bring drugs for patients, which would free up the space in the corridors. Also, the patient will take the drugs on time, so complications of the disease related to missing drugs would be mitigated. Furthermore, patients can even recover faster with no stress.

**PF13: Patient discharge**: To shorten the procedure of patient discharge of 5 hours (8AM to 1PM), some measures should be taken. Firstly, as in other processes, a database for patients is essential. When the patient’s information is on database from the beginning of treatment, then in the end of the procedure, there are not many data to be added. Only the therapy that patient should take has to be added, and this form should be signed by the director of internal medicine clinic, chief of rheumatology department, as well as assigned specialist and resident of the patient’s room. This recommendation will shorten the discharge procedure to approximately one hour.

After discussing these suggestions for the activities that lead to waste, the researchers drew the Figure 14 that shows the improvement by mapping the future state for inpatients in rheumatology department.

Indeed, Table 15 shows the current state of process map with identified waste in inpatients’ journey. This is followed with the discussion of future state of process map for inpatients’ journey.
Table 15: Waste identification and elimination with process map for Inpatients Journey

<table>
<thead>
<tr>
<th>Process Map of Inpatients’ Journey</th>
<th>Current and Future State of Process Map for Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste identification in the current state</td>
<td>Waste identification in the current state</td>
</tr>
<tr>
<td>Uncontrollable</td>
<td>Uncontrollable</td>
</tr>
<tr>
<td>✓ No lab tests or examinations are done in the 1st day of patient being hospitalized due to high demand of these services</td>
<td>✓ Optimizing the use of equipments for lab tests and examinations by working 24 hours or investing for additional equipments</td>
</tr>
<tr>
<td>✓ Lack of essential drugs in hospital for inpatients</td>
<td>✓ Making available all drugs in hospital, where expensive drugs are provided to patients in extra costs</td>
</tr>
<tr>
<td>Controllable</td>
<td>Controllable</td>
</tr>
<tr>
<td>✓ Patients’ history of illness is written in computer for the printing purpose, which can be deleted, or staff can rewrite on them for other patients</td>
<td>✓ Investment in computer databases for patients will ease and fasten the process to fill patients’ history of illness and discharge information form</td>
</tr>
<tr>
<td>Proposed waste elimination for future state</td>
<td>Proposed waste elimination for future state</td>
</tr>
<tr>
<td>Uncontrollable</td>
<td>Uncontrollable</td>
</tr>
<tr>
<td>✓ Patients’ procedure for discharge lasts 5 hours, as discharge form should be completed</td>
<td>✓ Optimizing the use of equipments for lab tests and examinations by working 24 hours or investing for additional equipments</td>
</tr>
<tr>
<td>Controllable</td>
<td>Controllable</td>
</tr>
<tr>
<td>✓ Patients’ procedure for discharge lasts 5 hours, as discharge form should be completed</td>
<td>✓ Making available all drugs in hospital, where expensive drugs are provided to patients in extra costs</td>
</tr>
</tbody>
</table>

Source: Developed the authors

Researchers have also analyzed the process mapping for emergency cases. However, as there are not many emergency cases with rheumatic diseases, there was one non value added activity identified, which is having database for patients’ information. The details can be found in Appendix 8.

4.2.4 Findings and Discussion based on researchers’ analysis in Benefits for UCCK from Lean implementation

“In adopting the Toyota mind-set, Kaplan said, the 350-bed hospital has saved $6 million in planned capital investment, freed 13,000 square feet of space, cut inventory costs by $360,000, reduced staff walking by 34 miles a day, shortened bill-collection times, slashed infection rates, spun off a new business and, perhaps most important, improved patient satisfaction” (Black, 2008).

In the case of UCCK Rheumatology department, researchers identified all the non valued added processes, amount of waiting time for customers and some of the duplication of work through process mapping. Even though researchers could not quantify the benefits in monetary terms and also some benefits are not measurable, these are few of the direct benefits that are suggested with Lean implementation.

- **Waiting time reduction leads to higher customer satisfaction:** Approximately 2 to 3 hours of waiting and travelling time for outpatients and inpatients will be reduced with the suggested process improvement by the researchers. Waiting time is directly associated with the customer satisfaction; thus, its reduction would increase the customer satisfaction.

- **System will reduce the nurses’ administration work:** Currently, without databases to store information and long processes, nurses are spending several hours in reviewing paper works and finding patient’s histories of illness, which are mostly administration work. With the implementation of the system and reduction in some
processes, nurses can focus more on the value added work, rather than activities that cause waste.

- **Reduction of stress and distraction**: With the proper process in place by having the coupon system, the noise around the nurses area will be significantly reduced, which will lower the stress and distraction for the staff.

- **Generate higher income**: For inpatients, at least 1 day of staying in hospital will be reduced with the suggested process improvement by the researchers, which can generate higher income for the hospital.
Chapter 5 CONCLUSION AND RECOMMENDATIONS

The final chapter of this research will cover the conclusion and recommendations. This section is divided in four parts. The first section is conclusions, which is further divided into two parts, general summary of the study and conclusion on the research question. Second part is the recommendation to UCCK for further improvements. Third section covers the limitations of the study and final part includes further areas for improvements.

5.1 Conclusion

5.1.1 General Summary of the Study

Lean service implementation helps the organizations to eliminate the waste from the system, which enables the value added activities to run smoothly. Even though Lean should be applied in both manufacturing and service settings, it has not been fully utilized to maximize the benefits in the service settings. In service settings, particularly healthcare is one of the areas that Lean application is needed with the high possibility to achieve successful results. Literature from peer-reviewed journals in Lean healthcare was limited; however, there were several practitioners’ articles available for Lean healthcare. That is why researchers have used information from NHS UK websites and consultancies reports to strengthen this study. It is worth to mention that NHS UK is considered a main contributor of Lean implementation in healthcare by highlighting benefits explicitly and also by sharing and creating knowledge that they have experienced.

From this study, researchers conclude that Lean is not necessarily difficult to implement in service sector. It was obvious that some of the challenges are different because it has to do with people, not machines. However, the main reason Lean implementation is considered easier in manufacturing compared to service is because it has shown to be successful and there are many peer-reviewed journals that show debate about its applicability. In the following, the researchers provide conclusions from the findings of literature review for Lean service implementation and the empirical data in UCCK.

The main research objective was to implement Lean tools and techniques in healthcare settings and also to understand CSF’s, challenges and benefits that are associated with it. To fulfill this objective, a thorough research was done to understand the implication of the theoretical aspects of Lean service. These six areas were the critical ones that were covered in the literature review, such as CSF’s, challenges and benefits of Lean implementation, as well as Lean tools and techniques, comparative study of Lean in hospitals and Lean criticisms.

Research framework was derived to answer the research question. The case study research approach was pursued for conducting this study for UCCK, Rheumatology department. Qualitative data was collected from the five semi-structured interviews and also researcher’s observation. With data collected from interviews, detail analysis and discussion was carried out. Tools and techniques from the review of literature for Lean service are recommended after analyzing the current process and practices within the UCCK, Rheumatology department. Therefore, 5S, process mapping, red tagging and visual management are few Lean tools and techniques that were proposed to identify and eliminate waste, which would lead to the improvement of the process in Rheumatology department. However, from researchers’ viewpoint, red tagging, visual
management and some practices suggested in 5S might be applied in the near future. This is mainly due to the need for further investments in the UCCK.

5.1.2 Conclusion on the research question
With this study, the researchers aimed to answer the research question, which was: “How is the implementation of Lean tools and techniques affected by critical success factors and challenges of Lean in service sector?”

The researchers conclude that organizations have to choose Lean tools and techniques which are applicable depending on the nature of company. In service sector, there were some Lean tools and techniques, which have shown to be successful, such as 5S, value stream mapping, visual management, process mapping, Kanban, fishbone diagram and red tag techniques.

By doing a comparative study of hospitals that implemented Lean tools and techniques from the literature review, researchers were able to understand applicable ones for rheumatology department in UCCK. These are few of them, which were identified for healthcare, such as 5S, visual management, process mapping and red tag techniques. The researchers have developed interview guide to understand the processes within the rheumatology department in order to implement Lean tools and techniques. Based on data analysis, the researchers think that it is crucial for UCCK to implement these Lean tools and techniques for rheumatology department in order to make process improvements. The results of the main CSF’s and challenges from empirical data were in line with the literature findings. The researchers also agree on these findings for CSF’s and challenges, which were top management involvement as main CSF, and non value added activities from the processes as the main challenge. Moreover, researchers highlighted some benefits that can be generated from Lean implementation for rheumatology department in UCCK.

The results show that future implementation of Lean is achievable in rheumatology department in UCCK. This study concludes that CSF’s and challenges do affect the implementation process and Lean is applicable in any service organization. It provides answer on successful implementation with the aim to foster the benefits. Some benefits were identified, such as reduction of waiting time, reduction of stress for employees, increasing patients’ satisfaction and higher income for organizations. Lean implementation is done with the proposed framework, which was useful to provide the realistic approach to this research.

Researchers also realized that there is need of Lean in the healthcare sector. This is not only applicable in hospitals, but also in the private clinics or nursing home. Lean is not popular partly due to unfamiliarity of the terms and also not that common subject in business and management field. Even in those hospitals that are adopting Lean, in some cases, employees are not aware of this term, which was surprising to the researchers. Lean tools and techniques are not different from other management theories; however, it has huge scope and growth for implementation in every organization in the near future.

5.2 Recommendations
With the researcher’s observation and interviews, as well as the review of literature, especially the comparative study of hospitals that implemented Lean in Chapter 2, researchers propose recommendations to rheumatology department in UCCK to make continuous improvements with Lean. Nevertheless, the researchers presented the
findings of the current processes in rheumatology department and discussed the future processes by highlighting the benefits from Lean in Chapter 4 of findings and discussion.

With the findings in the current process and discussion on the proposed future process in rheumatology department, researchers think that improvements will materialize with Lean implementation. At the interim, researchers summarized some of the recommendations for Lean implementation which could be applicable in any hospital.

✓ **Develop a sense of necessity**
  
  Top management should influence the behaviours and attitudes of employees by developing a sense of necessity for Lean implementation. This could be achieved by sharing and stating clearly the problems in process, as well as highlighting the benefits of this process by focusing on value added activities and elimination of wastes.

✓ **Develop Lean thinking process**
  
  This can be done by organizing a workshop for staff to introduce Lean tools and techniques, which would help to create future Lean strategy in hospitals. This would also lead to involvement of all employees from the beginning of Lean thinking process.

✓ **Follow patients-first vision**
  
  Hospitals should provide higher quality health care services and give greater attention to patients by focusing always on their needs. To do this, staff should also be well committed. In this way, hospitals can create the culture of the patients-first vision.

✓ **Increase employees’ motivation**
  
  Lean implementation requires motivated employees since this will lead to higher job performance and creativity within the hospitals. Usually, employees are motivated by providing incentives. This can be done by creating employee of the month award program within the department to increase the efforts and motivation within the team. Also, this can be changed to employee of the year by being awarded with a certificate from the hospital. Beside this, before being discharged, patients should have the opportunity to write a “Thank you” note to the staff who have been the most supportive during their treatment or journey in the hospital.

✓ **Implement Lean tools and techniques**
  
  With Lean tool of 5S, the processes in workplace would be analyzed, which would help the hospitals to make improvements at low cost. Visual management would be useful by having coupons for patients waiting in reception, as well as for medical supplies to find them easier. Also, process mapping is valuable Lean tool to define processes. It would be helpful to define all processes in patients’ journey by department, in order to simplify and standardize them, which would increase patients’ satisfaction. These tools should be implemented and reviewed on ongoing basis to ensure that the waste is not piling off and improvements are done continuously.

✓ **Report equipments breakdowns immediately**
  
  The staff should take this issue more seriously, by reporting any defect that happens in equipments immediately. This can be done with red tagging method to tell the name and the place of the equipment, as well as the date and time of the occurrence.

✓ **Investments in computers and development of databases**
  
  This is crucial factor in order to enhance functionality in hospitals. It will standardize the process of keeping track of patients’ data, scheduling appointments.
and drugs management. To do this, training of staff is essential for the best usage of the databases. The procedures will be simplified, which will increase satisfaction of patients and reduce the workload for staff.

✔ **Standardize and streamline the processes**

Processes in hospital related to patients’ journey should be standardized, so they are understandable for employees and patients. There is a need to streamline these processes, so patients will not be asked twice for the same information, which will also reduce the responsibilities of the staff.

Beside these recommendations for Lean implementation in various hospitals, including UCCK, researchers also highlight some specific recommendations for several uncontrollable factors that are impacting the performance of UCCK hospital. Most of these factors are related with the government and management issues, which may require some time to resolve.

✔ **Increase employees’ salary**

It is important to increase salaries of the staff to increase their motivation which would lead to higher creativity and productivity. Researchers understand that all medical doctors that were interviewed have a second job in private clinics for extra income. It is essential to increase salaries in order to keep the professional people within UCCK; otherwise, they might leave the job at UCCK.

✔ **Increase the investment in the health infrastructure**

With the growing demand for the modern facilities and medical equipments, UCCK should increase the investment in the healthcare infrastructure to sustain in the future.

✔ **Need of health insurance in Kosovo**

Researchers reason that low salaries and not sufficient investments fund in UCCK occur mainly because of lack of health insurance in Kosovo. Health insurance should be implemented based on percentage of salaries and this can be further categorized based in the income level. In this way, people with higher income level will contribute more than those with lower income level. The quality of the UCCK service will also improve and Kosovo society will be encouraged to visit to UCCK for treatment. Moreover, staff will be discouraged to work in private clinics, as they will have enough earnings and they will increase their efforts to provide better job.

5.3 **Limitations of the Study**

These are some of the limitations that were identified during the research:

- There were limitations of quality management resources in the library, as well as in the online access resources. This is because Lean implementation in service is relatively new area of research; thus, the resources from academicians were few.

- This research was based in the hospital settings in Kosovo, which was difficult for researchers, as business students, to understand some terms and processes, which were relevant particularly to healthcare; thus, this required longer time to understand and translate them from Albanian to English language.

- Initial plan of this research was to implement and contrast the findings of Lean Healthcare implementation in hospitals in Kosovo and Nepal, but due to the time limitation of the study, researchers were only able to focus on implementation in hospital in Kosovo.

- Comparative study using the secondary data from several hospitals was used for this research. However, this research would be stronger if secondary data for hospitals were more detailed on the steps taken to make improvements with Lean. This is
because most of these articles focus more on benefits in waiting reduction, monetary savings and others.

- The data in the Chapter 4 of findings and discussion are valid only for rheumatology department, and should not be generalized for the whole UCCK. However, depending on the requirements for other departments in UCCK or other hospitals in general, by understanding the process with thorough study, some tools and techniques that are suggested may be transferable to other departments, or even other hospitals.

- For the data collection, the method of recording data was applied. However, the interviewer could not fully use this method to ensure that the interview is not disrupted in between because in some cases, the interview time for this research was quite long.

### 5.4 Further Areas for Research

Several limitations that have been raised above will create opportunities for future research. One of the future research areas could be on conducting comparative study of hospitals for Lean in developed countries to understand the transferability in hospitals of developing countries. All Lean tools and techniques may not be applied at the same way and some may be adjusted, but the timeframe to implement will be lesser and the actual results will be visualized.

The researchers recognize that this study is based on case study research, and there might be limitations of transferability of the findings to other cases. However, researchers encourage further research for implementation of Lean tools and techniques in service to increase the knowledge within this area. There is need for more studies related to Lean practices in service, which may lead to real implementation and improvement of services.
References

Articles in Scientific Journals


**Books**


**E-books**


**Newspaper Article**


Web Pages
**Personal Communication**


Appendices

Appendix 1: Cover letter for Interview
Lura Rexhepi
Historiegränd 6 A - 127
907 34 Umeå, Sweden

Priti Shrestha
Historiegränd 6 A - 132
907 34 Umeå, Sweden

Date: 13th November 2010

To Internal Clinic: Rheumatology Department, University Clinical Centre of Kosovo (UCCK), regional hospital in Prishtina

Subject: “Requesting Interviews in Lean implementation in UCCK Hospital”

Dear Sir/Madam,

I (Lura Rexhepi) and my colleague, Priti Shrestha, are in final semester students in Masters of Strategic Project Management European (MSPME) in Umeå University, Sweden. As a course requirement of MSPME program, we are working on a thesis paper in Lean implementation in hospital. The thesis is expected to be useful in understanding the key success factors and challenges for implementing Lean in an organization to improve the efficiency.

Studies have suggested several benefits of Lean implementation and current stage of its limited use in service sector, including hospitals. Lean healthcare is a systematic approach to aligning work at each level and step of the healthcare organization or patient experience so that the skill, knowledge, experience, materials and information necessary for quality outcomes is provided. Through our thesis, we will recommend tools and techniques to be implemented in internal clinic, rheumatology department in order to eliminate wastes in processes, improve efficiency and increase patients’ satisfaction. The sole purpose of this thesis is to improve understanding of current practices and recommend tools for improvement; we assure you that the information obtained will be used only for the thesis purpose.

Since UCCK is a renowned hospital in Kosovo, we are eager to conduct this thesis in your hospital. We would be grateful if you could suggest a time for a meeting/interview/discussion.

Thank you very much for your kind consideration and looking forward to hear from you.

Sincerely,
Ms. Lura Rexhepi
Miss Priti Shrestha
Appendix 2: Interview Guide for the Interviews with Medical Doctors

Section A: Introductory questions

I. Background of Medical Doctors
   1. Please share something about yourself?
   2. What is your background and share professional experience working in UCCK?
   3. How long have you been working in UCCK?

II. Background of UCCK
   1. How is UCCK Hospital organized? How many departments does it have? What are the opening hours of UCCK?
   2. How long rheumatology department has been established in UCCK Hospital?
   3. What is the structure of Rheumatology Department?
   4. How many employees are working in the rheumatology department?
      Doctors  ____________
      Nurses  ____________
      Other Staffs  ____________
   5. How many rooms for outpatient and inpatients are there?
   6. What is the number of patients in the rheumatology department?
      Outpatient  ____________
      Inpatient  ____________

Section B: The current process and practices for Quality

1. Have you heard about Lean implementation in the hospital settings?
2. How does the hospital measure the overall quality in the healthcare services that is been provided to customer?
3. Is there anyone responsible to check the standard of infection control?
4. Does the hospital provide questionnaire to customer to know the feedback on the service that is been provided to customer?
5. Is employees’ participation and involvement in quality improvement within the hospital processes?

Section C: Understanding the work in UCCK

1. Does your desk contain items pending that need to be filed or signed?
2. Are there things on your desk that do not belong there?
3. Are all necessary things sorted, classified, described and possess the own place?
4. Do you keep in your desk things that you have not use for a long time?
5. Do you use gloves before checking the patients? Do you wash your hands after checking the patients?
6. Does the hospital provide disinfection for hands?
7. Is there any standard process that you have to follow?

Section D: Understanding patients’ journey

I. Procedure of outpatients and inpatients visit in Rheumatology Department
   1. What are the steps of the patients coming to the hospital?
   2. How is the booking procedure to make an appointment?
   3. How many days does it take to schedule appointment?
   4. What do you do if patients’ condition gets worse while waiting for the procedure?
   5. Do they receive a specific date and timing for their appointment?
6. How long do patients need to wait for visit?
7. When patients come for visit, who responsible to take patients’ information?
8. Do they need to fill out any form?
9. Where is patients’ information kept?
10. In case the doctor asks the patients for further lab tests after getting initial diagnosis and treatment, how does this work?
11. How is the payment done?
12. How is follow up treatment planned?

II. Further information needed for inpatients visit in Rheumatology Department
1. How many rooms are available for patients staying in hospital?
2. Is there higher demand for rooms compared to its availability?
3. How do you manage in case of unavailability of rooms?
4. How long do patients usually stay in hospital?
5. Are the rooms clean?
6. Are the instruments easy to find, and in their place all the time?
7. Are patients asked several times from different staff for their diagnosis and recovery condition?

III. Procedure of emergency cases in Rheumatology Department
1. What is the procedure of emergency cases?
2. Does the treatment for emergency follow immediately?
3. If there is certain procedure then how long does the procedure lasts?
4. How many rooms and doctors are available for emergency cases?
5. Is there any time when there is lack of availability of rooms?

Section E: Understanding the critical success factors and challenges of implementing quality practice
1. How would you rank these key success factors in numerical order for implementing a new quality practices? (Rank from lowest importance to the highest importance 1-5)

<table>
<thead>
<tr>
<th>Critical Success factors</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management Involvement</td>
<td></td>
</tr>
<tr>
<td>Linking to overall hospital strategy</td>
<td></td>
</tr>
<tr>
<td>Building trust within the organization</td>
<td></td>
</tr>
<tr>
<td>Effective Communication</td>
<td></td>
</tr>
<tr>
<td>Patients involvement</td>
<td></td>
</tr>
</tbody>
</table>

2. How do you rank these key challenges in numerical order based on the importance of implementing a new quality practices? (Rank from lowest importance to the highest importance 1-5)

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-value added activities</td>
<td></td>
</tr>
<tr>
<td>Resistance to change</td>
<td></td>
</tr>
<tr>
<td>Forecasting the demand of rheumatologic services</td>
<td></td>
</tr>
<tr>
<td>Standard documentation</td>
<td></td>
</tr>
<tr>
<td>Employee empowerment</td>
<td></td>
</tr>
</tbody>
</table>
Section F: Lean Implementation in Rheumatology Department

1. Do you think there will be support of senior management for quality practice implementation?
2. Do you think employees are empowered and encouraged to improve the processes within the hospital?
3. Based on your experience and knowledge, what are the process improvements that are needed in Rheumatology department?
Appendix 3: Interview Guide for the Interview with Nurse for Outpatients in Specialist Clinic

Section A: Background of Nurses
1. Please share something about yourself?
2. What is your background and share professional experience working in UCCK?
3. How long have you been working in UCCK?

Section B: Understanding the work in UCCK
1. Are unnecessary things causing the mess in the Rheumatology Department?
2. Are patient files/documents easy to find when they are needed?
3. Is the movement of people easy in corridors? Are the any materials or anything left in corridors?
4. Is the rheumatology department always clean?
5. If data is needed for that patient after a month of the visit, how difficult or easy is to find those information?
6. Is the new customer well aware of the process whom to contact and what procedure to flow? Is there any sign or helpdesk in place?

Section C: Lean Implementation in Rheumatology Department
1. Do you think there will be support of senior management for quality practice implementation?
2. Do you think employees are empowered and encouraged to improve the processes within the hospital?
3. Based on your experience and knowledge, what are the process improvements that are needed in Rheumatology department?
Appendix 4: Interview Guide for the Interview with the Main Nurse

Section A: Background of Administration staff
1. Please share something about yourself?
2. What is your background and share professional experience working in UCCK?
3. How long have you been working in UCCK?

Section B: Understanding the work in UCCK
1. Do you arrange items in order to find them easier?
2. Is there anyone responsible to remove the out-of-date stock for medicines?
3. Are the files organized in logical order?
4. Are the medicines stock ordered from the most frequent used items?
5. Do you use any tag for items in the hospital? If yes, do you differentiate by colours to know when a certain item is missing?
6. What kind of medicines is provided in the Rheumatology department?

Section C: Understanding medicines stocks procedure
1. What are the processes to order for medicines or to manage them within the department? How is it being controlled?
2. In what basis do you order the quantity medicines?
3. Are there cases when there is lack of medicines which patient needs?
4. Who provides the inventory for Rheumatology Department?
Appendix 5: Briefing Material for Interviewees

Chart 1

Introductory Briefing
Lean Healthcare & Tools

Chart 2

Lean Health care
- Systematic approach to aligning work at each level and step of the healthcare organization or patient experience so that the skill, knowledge, experience, materials and information necessary for quality outcomes is provided.

Chart 3

Lean tools example for 5’s

Chart 4

Lean tools example for Kanban

Chart 5

Lean tools example for Value Stream (Process map)
### Appendix 6: Results for Interview Questions on CSF’s and Challenges

#### Critical Success factors

<table>
<thead>
<tr>
<th>Critical Success factors</th>
<th>Int. 1 Ranking</th>
<th>Int. 2 Ranking</th>
<th>Int. 3 Ranking</th>
<th>Total Score</th>
<th>% of Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Top Management Involvement</em></td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>12</td>
<td>27%</td>
</tr>
<tr>
<td>Linking to overall hospital strategy</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>10</td>
<td>22%</td>
</tr>
<tr>
<td>Building trust within the organization</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>11%</td>
</tr>
<tr>
<td><em>Effective Communication</em></td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>11</td>
<td>24%</td>
</tr>
<tr>
<td>Patients involvement</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>7</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
<td><strong>45</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

#### Challenges

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Int. 1 Ranking</th>
<th>Int. 2 Ranking</th>
<th>Int. 3 Ranking</th>
<th>Total Score</th>
<th>% of Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-value added activities</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>14</td>
<td>31%</td>
</tr>
<tr>
<td>Resistance to change</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>11</td>
<td>24%</td>
</tr>
<tr>
<td>Forecasting the demand of rheumatologic services</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>7%</td>
</tr>
<tr>
<td>Standard documentation</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>10</td>
<td>22%</td>
</tr>
<tr>
<td>Employee empowerment</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>7</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
<td><strong>45</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Memo: To rank from lowest importance to the highest importance 1-5
# Appendix 7: Different Kind of Patients’ Forms in UCCK, Rheumatology Department

<table>
<thead>
<tr>
<th>No.</th>
<th>Patient form</th>
<th>Used for</th>
<th>Information filled by</th>
<th>Signed by</th>
<th>Approx. time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Referral form</td>
<td>Outpatients and Emergency</td>
<td>Primary health care staff</td>
<td>Medical Doctor</td>
<td>10 Minutes</td>
</tr>
<tr>
<td>1a</td>
<td>Referral form</td>
<td>Outpatients and Emergency</td>
<td>Specialist</td>
<td>Specialist</td>
<td>10 Minutes</td>
</tr>
<tr>
<td>1b</td>
<td>Referral form</td>
<td>Outpatients and Emergency</td>
<td>Specialist &amp; residence</td>
<td>Specialist</td>
<td>10 Minutes</td>
</tr>
<tr>
<td>2</td>
<td>History of illness form</td>
<td>Inpatients (<em>internal use only</em>)</td>
<td>Specialist &amp; residence</td>
<td>Specialist</td>
<td>Depend on the patient recovery</td>
</tr>
<tr>
<td>3</td>
<td>Patient report form</td>
<td>Emergency</td>
<td>Specialist &amp; residence</td>
<td>Specialist</td>
<td>10 Minutes</td>
</tr>
<tr>
<td>4</td>
<td>List of statistics for disease</td>
<td>Out patients (<em>internal use only to send to MIH</em>)</td>
<td>Nurse</td>
<td>Nurse</td>
<td>10 Minutes</td>
</tr>
<tr>
<td>5</td>
<td>Discharge information form</td>
<td>Inpatients</td>
<td>Specialist &amp; residence in UCCK</td>
<td>Dir. of int. medicine clinic, dept. chief, specialist &amp; resident</td>
<td>5 Hours</td>
</tr>
</tbody>
</table>
Appendix 8: Process Mapping of Emergency Cases

Findings on Current State of Process Mapping of Emergency Cases

The first step is to construct a process mapping of the current state for the emergency cases in emergency center, using the information gathered from observation and semi-structured interviews done in UCCK. The second step is to map a proposed future state for the emergency cases in emergency center.

The emergency cases of rheumatology process can be represented by the following activities.

- **PF1: Patient refers to the primary health care**
- **PF2: Patient is referred to emergency center of UCCK**
- **PF3: Patient arrives at the hospital**
- **PF4: Patient contacts the nurse**
- **PF5: Patient is taken to the emergency room for internal clinic**
- **PF6: Patient is examined by the internal medicine specialist**
- **PF7 I: Patient discharge**
- **OR,**
- **PF7 II: Triage station to rheumatology department**
- **PF8 II: The procedure as for inpatient follows**
- **OR,**
- **PF7 III: Patient is referred to intensive unit if the case is severe**
- **PF8 III: Patient gets detailed treatment**
- **PF9 III: Patient discharge**

**PF1: Patient refers to the primary health care:** When patient has any kind of medical complaints, the first level of contact is primary health care. If there is an emergency case, the patients receive a referral form with patients’ information, health care team information, diagnosis and the reason for being referred (Interview 3).

**PF2: Patient is referred to emergency center of UCCK:** Patient is referred to internal medicine emergency room in the emergency center of UCCK (Interview 2).

**PF3: Patient arrives at the hospital:** Most of the emergency cases arrive at UCCK by car and accompanied by family members. However, the ambulance is used for severe cases with rheumatic diseases (Interview 2).

**PF4: Patient contacts the nurse:** Upon the arrival, the nurse takes patients’ information based on the referral form and writes it in clinical protocol. Patient’s information is not stored in the computer. Then, the nurse gives to patient a patient report form and is directed to the internal medicine emergency room (Interview 1 & Interview 3).

**PF5: Patient is taken to the emergency room for internal clinic:** The patient gives the report form to the medical staff in the internal medicine room (Interview 2 & Interview 3).

**PF6: Patient is examined:** Patient is examined by two residents of internal medicine and two nurses. If the case is severe, the specialist of internal medicine does a formal clinical assessment for patient. The nurse informs the specialist by phone. Patient stays in emergency room for two to four hours (Interview 2).
After this stage, the PF7 is subdivided into three categories depending on the examination assessment by the specialist.

**PF7 I: Patient discharge:** If the patient case is not severe, then patient receives some medicines and discharges from the hospital. The patient report form has two copies, and in the end of procedure one copy is given to the patient and the other is stored in archive (Interview 1).

**PF7 II: Triage station to rheumatology department:** Triage station is done after patient is examined by the specialist. Depending on the result, patient will either be discharged or admitted to the rheumatology department for hospitalization (Interview 1 & Interview 2).

**PF8 II: The procedure as for inpatient follows:** If the patient is hospitalized, the procedure for inpatient follows as mentioned in the processes of inpatients’ journey.

**PF7 III: Patient is referred to intensive unit if the case is severe:** If there is a severe case, then the patient is taken to the intensive unit (Interview 1).

**PF8 III: Patient gets detailed treatment:** The physicians do a detailed clinical assessment accompanied with necessary diagnostic tests and examinations (Interview 1).

**PF9 III Patient discharge:** The patient report form has two copies, and in the end of procedure one copy is given to the patient and the other is stored in archive. Patient makes new appointment according to the specialist’s request (Interview 2).

These processes are shown in Figure below, where the red squares show the non value added activities during the procedure of the emergency cases of rheumatology in emergency center.

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Current State of Emergency Cases’ journey in Rheumatology Department
Source: Developed the authors based on interviews
Discussion on Proposed Future State of Process Mapping of Emergency Cases

As there are not many emergency cases with rheumatic diseases in emergency center, there are few pitfalls which cause dissatisfaction for the patient. Mainly, waste was identified in PF4, which occurs when patient contacts the nurse. Once again, the database for patients will ease this process to keep track of patients’ information and add value for customers. Therefore, the process map for future state for emergency cases will be as shown in figure below.

Future State of Emergency Cases’ journey in Rheumatology Department
Source: Developed the authors

Indeed, the table below shows the current state of process map with identified waste in emergency cases. This is followed with the discussion of future state of process map for emergency cases.

<table>
<thead>
<tr>
<th>Process Map of Emergency cases</th>
<th>Current and Future State of Process Map for Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient refers to the primary health care</td>
<td>Waste identification in the current state</td>
</tr>
<tr>
<td>1</td>
<td>✓ Patients are accompanied with one or more family members</td>
</tr>
<tr>
<td></td>
<td>✓ Patients’ information are written in clinical protocol</td>
</tr>
<tr>
<td>Patient is referred to emergency center of UCCK</td>
<td>Proposed waste elimination for future state</td>
</tr>
<tr>
<td>2</td>
<td>✓ Patients should be allowed to be accompanied with only one family member to free up the space</td>
</tr>
<tr>
<td></td>
<td>✓ Investment in computer databases for patients is needed to ease the process</td>
</tr>
</tbody>
</table>

Source: Developed the authors