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# Lean Service

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## Foreword

This master thesis paper is a research project, which is part of last semester of Masters degree in Business Administration at NMBU, Norway. During the course of my two years master degree at NMBU, I have been continually brainstorming concerning my master thesis paper, in terms of selection of the topic, research methods I wanted to use and area of my interest. From the beginning of my two-year degree, I was mostly leaning towards learning more about lean management and the lean “way of thinking”. Lean management drew my interest for the first time, in an airplane, when I read an article about lean businesses and lean management. I read the article in one of airplane’s magazines, and from that point on, I become more aware of lean and waste management in companies around me. I was personally and professionally interested in knowing more about lean management. Here I am now, wrote a complete master thesis paper on lean management, yet interestingly lean management for companies that provides service.

Firstly, I would like to thank my main mentor Glenn Kristiansen for helping me with my paper, by directing, advising, actively listening, giving positive & useful critique and not least looking at situations from various different prospective. Which gave me confidence in my own ideas and an opportunity to learn & experiment more; it is as if a dream came true, academically. I also want to thank Morten Strønen, Managing director at Follo Taxi for taking his precious time off from his work and answering to my doubts and questions. Matter of fact, the whole company, has been helping me out with providing company information, documents, making me aware of company insides, being there for research interviews and helping me out by being honest and genuine.

I also want to thank my friends and relatives who supported me throughout my master thesis paper, for example giving me more time and space so that I could write a quality research paper. My college friends have been giving me positive critiques, counter arguments, being part of long discussions so that I could improve my paper as much as impossible by working harder, being critical and staying up late at nights.

Ås, 15.05.2016

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## Abstract

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## Summary

The purpose of this research paper is to study the potential impact of Lean Management principles on a service-providing company. Lean Management was originally developed for manufacturing companies when it was first designed in Japan, in Toyota, a car-making company. Lean Management was developed primarily to cut cost and help Toyota achieve its rock-solid sustainability. More specifically, the research seeks to examine whether lean principles can benefit a service-oriented company, or not.

In order to find the results for the problem topic, first I want to find out whether there is such thing as “Lean Service”. Further, I want to look into, what does the critiques say about Lean Service? Simultaneously research for, transferability of Lean principles transferrable to a service company? To make this research more focused, a service-providing company is chosen, known as Follo Taxi. Follo Taxi is a midsize regional cab company in Norway, which does not have Lean implemented currently. The research paper also focuses on the counterarguments for lean service. Even thou the problem topic, Lean Service, is quite “new”, there are some prior studies written by researchers and intellectuals. Several previous studies are included in this research to build a relevant theoretical background that can with the reader an insight on the ongoing debate on Lean Service. In order to understand the challenges in a service company, qualitative data was gathered.

The qualitative data was collected, through open interviews from different groups of stakeholders. These three groups were, the management, employees and customers. Data was then cross-analyzed, specifically to create an analyses and discuss resource usage, effectiveness & efficiency. The interviews were conducted on one-on-one bases to maintain the interviewee’s comfort level and anonymity. Then I coded the data to study the types of wastages that could occur in a service company. Since it is a qualitative study, stakeholder’s personal views, comments and feelings were crucial to consider.

After the data gathering and studying relevant theory, four essential lean principles were selected to be used in a service company. 1) Value Stream Mapping, 2) Just-In-Time, 3) Production Balancing, and 4) 5S Standardization. These four elements, originally borrowed from Lean Management to Lean Service, can benefit a fully service-oriented company. Value Stream

Mapping can help a service company with defining its value, creating a smooth value flow stream & considering pull-system and striving for perfection. Just-In-Time focuses on delivering the product on time and cutting cost, and Production Balancing seeks to prevent over- and underproduction. Whereas, 5S standardization concentrates on making processes standardized, simplified, cleaned, sorted out and finally yet importantly it seeks to make the procedures sustainable. The final discussion wanders around the significance of these four Lean principles in a service company.

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## 1.0 Introduction

Developing and evolving by using our existing knowledge in different ways creates new knowledge and that is what make us humans. We can pick almost any field of knowledge, one element has been common and obvious we had to think differently to solve the new problems. As someone great once said, *“We cannot solve our problems with the same thinking we used when we created them”* (Albert, Einstein). Similarly, industrialists, developers alongside with philosophers and individuals from many other areas of knowledge have been evolving the way we work today. Historically, prior to 1800’s, the nature of work was “Craft-Production”. Craft-Production *“refers to the process of manufacturing a product through the use of manual skills”* (Ruthtrumpold.id.au). Then roughly in the mid 1800’s the nature of work become “Mass-Production”. Mass-Production is *“The manufacturing of large quantities of standardized products, frequently utilizing assembly line technology”* (Investopedia). Not before late 1900’s we begin to develop “Knowledge-Driven Work”. The definition of Knowledge-Driven Work is *“An organization is knowledge-driven to the extent that it depends on the knowledge of all stakeholders in order to accomplish its goals”* (Joel Cutcher-Gershenfeld). Lean Management is typical example of Knowledge-Driven Work. Lean Management clearly made it’s mark and stands high as the current nature of work. More and more companies have started to adopt the Lean Management philosophy. Some companies have completely based their business strategy and vision on Lean thinking, while others have chosen to use some elements of Lean Management while leaving the rest out. There are also many companies those who are using Lean Management methods unconsciously, without knowing themselves. Maybe because Lean thinking is becoming quit generally accepted and practiced by many. Let us first understand, what is Lean Management exactly? And then we will further move in the topic of Lean Management in service sector.

Lean Management is a production philosophy, that seeks to improve production processes, defined as *“becoming ‘lean’ is a process of eliminating waste with the goal of creating value”* (Gershenfeld, 2002). Lean was first introduced in a car making company, Toyota. System developers in Toyota Production System (TPS) used thirty years to develop TPS, and the Lean Management methods were part of this system. In 1990’s, the Lean Management was ready to use by other companies around the global. Assuming, since Toyota was raising as a company



through selling cheaper cars than most of the major car making companies around the world, other carmakers become curious about Toyota's production system. Toyota was simply following their, "home-made recipe," in-house developed production system, Lean Management. The whole purpose of Lean Management is to eliminate, as the Toyota calls it, "*Muda*". *Muda* is a Japanese term, which means "elimination of waste".

This research paper will discuss the Lean Management philosophy itself, thoroughly. However, there have already been done tones and tones of studies on Lean, so how does the study in this research paper differs from most, if not all, of the prior studies? The Lean Management is fundamentally a production process, in other words, a system that specifically was developed to cut the waste in a manufacturing environment. Whereas this research paper is attempting to find impact of Lean implementation in a service providing company. Even if a company's product is to provide service, I assume most companies still want to be more profitable. After understanding the Lean Management, the research would be lead towards implementing Lean thinking in the service sector. Thereafter, a specific company would be used as a lab-rat for this research paper. However, I am afraid to say that there are many limitations to this research paper. One of them is concerning time-limitation. There is not enough time to actually implement the Lean system to the chosen company and evaluate the actual annual results. Further not to forget, the development and effect of the system over several years ahead. Therefore, the focus of this research paper is develop new hypothesis on impact of Lean Management on a service-providing company.

The research will be conducted from the button-up, including, not just the management board and the leaders, but also the ground-level employees and customers. Mainly because all of these stakeholders are important for a company, and they might have inside and outside information about the company's status. This is done to tackle the situation from various angles and to involve different prospective, so that I as the researcher can develop a solid learning for the service provider company. I have chosen a transportation company known as, Follo Taxi, for my research paper. Follo Taxi is a regional cab-company, establish is 1989 ([www.follotaxi.no](http://www.follotaxi.no)), in southeast Norway. The company dispatches for over seventy cab cars, is the biggest cab company in its region, and further among the main taxi companies in the country. Along with the research methods, the company details would be discussed more thoroughly in the methodology section, later in this paper.

In the methodology section, the methods of researching would be presented such as coding, analyzing theories, data types and the interview guide etc. This research paper is based on qualitative study therefore, interviews are seen as one of the most important objectives. The interviews would be performed in a form of open interview. Moreover, what an open interview is, will be explained in detail, in the methodology section. Further, in the analytical section, the gathered data from the research would be organized, scanned, analyzed and transformed into a logical & easily readable format. The findings will be presented and discussed under the Lean prospective. However, the discussion would be reflecting the problem thesis throughout the paper, since that is what I am trying research. The conclusion section will be short and to the point, stating the problem thesis & finding; also discussing the new hypothesis developed from the research.

## 1.1 Problem thesis

Many companies for the past three decades have been researching on Lean Management, mainly through implementing and evaluating results. While authors have been writing several books, articles and journals discussing Lean philosophy. On the other hand, researchers and university professors have been debating, discussing and deliberately trying to understand the effects of Lean Management. In short, several studies have been done on Lean. Yet, Lean Management still seems quiet fresh to many. If the Lean Management sustains in the global market, for somewhat the similar length of period as prior management systems, such craft production and mass production, for approximately 100 years, then the Lean Management system is in its introduction stage; in the life-cycle graph. While, Lean Management in service industry is completely new. Therefore, this research paper seeks out to find results and impact of Lean Management on a service-based company. The research question that this paper seeks to answer is as following:-

*“How might lean management philosophy impact on a company that provides service as it’s product?”*

Let us look behind the research question of this paper. The focus is to research on the impact of Lean way of working, or one might call it as “Lean-mindset”, on a company that

provides service. Now, many companies out there produce tangible/physical products and also provide service to their customers. For instance, a washing machine company, that sells washing machines itself and maintenance services, as a separate product. This company is selling two products, the machine and the services. Or a pizza restaurant, that sells pizzas and other fast food items alongside with the delivery services. This paper desired to research on a company that only provides service as their product. Mainly to avoid obscured and invalid results. Because then all of the earnings would be generated from service activities, without being partly supported by physical products sold.

This research paper seeks to find the potential of Lean Management in Follo Taxi. Furthermore, evaluate what kinds of Lean Management principals would be suitable for a service provider company, Follo Taxi. The question one might ask her or himself, as obvious to many is that, why this research should matter to the company itself and the research author? It is because the financial health of Follo Taxi has been dwindling for past three to four years. Follo Taxi is desperately trying to find new ways and methods to stop this from happening. The reasons for drop in sales of Follo Taxi might be several, most of them seems to be internal and some are as well as external challenges.

**Listing some of the external challenges, which are as following:-**

1. New startup companies that focus on Knowledge-Driven Work are being established such as UBER.
2. Follo Taxi is falling short on the technology area, whereas the competing companies have more effective and efficient methods of communication.
3. Customers are shifting their cab-company due to late arrivals and poor service.
4. Due to high prices for cab rides and mixture of other issues, customers are finding cheaper alternatives, such as buses, trains, pirate cabs and driving themselves or with someone, they know.
5. Spread of poor reputation.

**Some of the internal challenges are such as:-**

1. Poor communication infrastructure.

2. Employees with outdated knowledge. Many Follo Taxi drivers are lacking basic qualifications, such as national language skills, effective reading & writing, work ethics and local culture understanding.
3. Employees are confused about their responsibilities and job roles.
4. Lack of communication among employees and disturbed flow of communication.
5. Mainly wastage of human resources, knowledge, time, capital, supplies and not least already created brand name.

Clearly, the system of Follo Taxi needs to be changed and or up-graded. The research paper will first discuss the literature behind Lean Management, in order to explain the Lean philosophy and its impact. Moreover, the core of this research, compatibility of Lean Management in service providing company.

In methodology section, to maintain the validity of the research, I will focus on many sub questions that are needed to be answer; in order to response to the problem thesis at hand. These questions will be discussed, in more detailed format, in methodology section. Yet I still want to state some of the main ones, briefly. These questions are such as, what are the main areas of wastage in the company? What types of wastage is Follo Taxi being victim to? How can Follo Taxi potentially prevent themselves from these wastages? How much of the wastage saving is productive, without being counter-productive?

## 1.2 Research limitations assumed prior to the research

There are some limitations to this research paper, mainly due to the time limitations and resources. It would have been more accurate, in terms of evaluating results, if there was enough time actually to implement the Lean principles to the research company. There are only four and a half months to complete the research. I would not be able to examine the annual impact of Lean Management and its development over time, due to the time limitations. Moreover, that is only if the Follo Taxi actually does implement the Lean system. Another challenge due to limited period is lack of variety. I also wanted to include another service providing companies to examine the variation, and further, to raise the validity of my study. For instance, examine an insurance company, to see the variation & difference between the impact from one service providing company to another.

Another interesting comparison would have been selecting some number of employees from the company that's being researched, and put them through test. In order to do so, the author have to pay the employees for the number of days they are not working, rather being available for the research. Because the author cannot just make couple of employees available, there should be a significant size of sample to do a representable testing with high degree of validity and reliability.

## 2.0 Theoretical Background

Eiji Toyoda, Taiichi Ohno and Shingeo Shingo created the term “Lean”. They were leaders in the car making company, Toyota. The reason they called this type of management as “Lean” was because this method used fewer workers, capital investments, raw material, and less factory space (Anisul Hoque Ansari)<sup>1</sup>. The history behind the birth of Lean philosophy was the immediate need for change. The Second World War caused great losses to Japan and its manufacturing industry. Mainly because the country had to deal with countless number of damages led by the war. Post the Second World War, Japanese manufacturers had to rebuild their companies, almost from the scratch. Japanese manufacturers were lacking from three main elements of production, states Ansari in his article, decline in human resources, lack of raw materials and financial resources. Then the need for new ideas triggered the thought process for creating a smarter and more strategic use of resources. The question most of the company owners’ wanted to answer was, how could they use their limited amount of resources strategically? Leaders at Toyota Motor Company, developed a production system called “Toyota Production System” (TPS); mentioned earlier in this study. Lean philosophy was developed as a part of TPS.

In order to discuss the research-case, one has to first understand what is Lean ? Researchers and authors also articulate Lean Management many times just as the term “Lean”. Lean has many names in the professional world. Some refer to Lean Management as Lean system, or Lean production, while others call it as a Lean thinking, Lean philosophy, and Lean mindset. The shortening of the title is a sign of its raising popularity and shows that its an often discussed topic. However, let us first understand Lean. There are many definitions of Lean, some are quiet basic and brief, while other definitions are more explanatory, they go a step further. The definition itself has been involving and changing, as researcher and intellectuals learn more about this method and contribute in the further development of this phenomenon. In 2003, James Womack and Daniel Jones published a book called “Lean Thinking”, through Free Press Publishing, in which they were praised for their work. Several articles that are written post Lean

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<sup>1</sup> Article: A brief history of Lean manufacturing, Anisul Hoque Ansail. Lecturer, BUFT, Trainer & Consultant, BDJOBS Training Trainer and consultant, Prothom-Alo Jobs training Trainder for Wal- Mart BD Ltd. Also General Manager, Operations MK Fashion Ltd.

Thinking, often tend to refer back to Womack, J and Jones, D. According to them, the definition of Lean is *“Lean thinking is about eliminating all forms of waste”*, simple and to the point. While Jerry Kilpatrick, defines Lean as, *“a systematic approach to identifying and eliminating waste through continuous improvement, flowing the product at the pull of the customer in pursuit of perfection”*. Kilpatrick, J, goes a step further compared to Womack, J and Jones, D and includes additional Lean elements as continuous improvement, pull-system, and flow of the production and pursuit of perfection. These elements talk about the importance of sustainability and becoming even “Leaner”. While other authors such as Professor Peter Hines, stress on the five steps of Lean implementation process. The Hines, P, defines Lean as, *“Lean thinking can be summarized in the five principles: precisely specify value by specific product, identify the value stream for each product, make value flow without interruption, let the customer pull value from the producer, and pursue perfection”*. If one summaries various definitions of Lean, Lean Management focuses on eliminating any type of “Muda”; a term for “waste” in Japanese as earlier discussed, which is seeking for sustainability through continuous improvement.

There are several types and areas of wastage in a company that Lean seeks to eliminate. Taiichi Ohno, the co-developer of the TPS, wanted to eliminate mainly eight types of wastages. Moreover, he advocated that these eight types of wastages accounted for ninety five percent of muda. Muda does not just means, waste that comes from non-value-added activities but also the types of waste that decrease the value of value-adding activities. For instance, waiting for material to arrive is not just waste of time, but also it dwindles the brand name and the reputation of the company that marketing department is desperately trying to build. However, these eight types and areas of waste are as following:-

1. **Excessive inventory:** Having too much of inventory in warehouses, stores and factories increase the company expenses related to storage such as electricity, worker payment, maintenance, storage space costs and other costs. Excessive inventory also transfers into goods that go out of date, fashion, technology, trend and the company often have to sell them in the dump market or throw them in the waste. These goods occupy the storage space that could have used to store other goods that are actually demanded by the customers and market. The waste from “Excessive inventory” is directly linked to “Overproduction”.

2. **Overproduction:** Usually overproducing causes the excess inventory waste. The reason for overproduction almost does not need a supporting argument from an academic researcher; debatably it can be one or the two reasons for this of waste. Either the customer demand has shifted or the market does not need as much as predicted by the company. Thus, the company is left with over produced products, external event. Another reason is that the company have an error is their prediction while the market demand is consistent, internal event. Overproduction raises the cost through increasing the expenses that are associated with production, such as workers' pay, over-head costs, storage expenses and transportation of material and many other expenditures.
3. **Transportation:** There are many ways of wasting in transportation area. Key events of wastage in transportation are such as, wrong deliveries, selecting expenses but not need method of transporting goods, choosing an expensive transportation route, moving goods around without creating any value etc. Waste in transportation also occurs when the company is transporting overproduced goods, which is a complete waste. Most of the waste areas are connected to each other, when a miscalculation occurs in one department or a section of a company; it causes the waste to occur in other areas down the supply chain.
4. **Waiting:** Another type of waste in "Waiting". As we know, there are many departments in a company, production, sales, marketing, delivery, IT etc; and they constantly exchange information, goods, human resources, skills and responsibilities. Often when one department is behind its schedule, and fails to deliver on point, the next department has to wait, and it falls behind its schedule eventually. In other words, delays in one-department causes delays in other parts of the company. In the end, the costs associated to these delays and waiting, add no value, further classifies as non-value-adding activities.
5. **Over-processing:** This type of waste is also known as, reworking, re-controlling and or correcting. These types waste occur when the quality of the product is low, and the company is forces to diagnose the product-defect. If a company is processing and controlling products to an extent where it is counterproductive, its known as over-processing. Kilpatrick, J, identifies this type of waste as, "non-value added processing", in short, the activities that does not add any additional value to the company.



6. **Underutilized human resource:** If a company's employees are not creating a greater value for the company in return it's a waste of human resources. It is a wastage of intellectual capital (Womack & Jones, 2003). There was several ways of underutilizing human resources, such as not signing enough work to the employees, having excessive (more than needed) employees on a job task, or not utilizing the skills and abilities of employees etc. Underutilization of human resource occurs for instance, when a company outsources a job task to an external company while having employees in-house; that could have finished the same job in more profitable manner, in terms of working and saving the alternative costs. Underutilization of the human resources is the type of waste that normally is left out of "list of non-value adding activities"; and many researcher just list sever types of wastes instead of eight.
7. **Defaults:** Defaults are the products that are produced with defeats in them. Four sub-wastages are linked to default-wastage. These four sub-wastages are as following, materials, work (time and overhead), product return transportation and compensations to customers' complains. Compensations are the reimbursement that the company has to pay, sometimes in form of cheaper or free product, cash or fines. Companies are often victim to fines and lawsuit settlements.
8. **Excess motion:** Excessive motion is type of waste that occurs when companies move around products, in a manner that is none-strategic, and uses excessive time and human resource. Kilpatrick. J, argues that, "unnecessary motion is caused by poor workflow, poor layout, housekeeping, and inconsistent or undocumented work methods".

Lean system suggest solutions to eliminate these eight types of waste through various different mental models, theories and Lean principles. Me as the author of this research would first prefer to present an overview of various different Lean building blocks and elements. Through various theories and strategies, the Lean Management seeks out to accomplish the most fundamental elements of Lean philosophy. These most basic elements of Lean Management are as following (Ansari):-

1. Elimination of waste.

2. Increase the reliability of equipment.
3. Strengthen the process capability.
4. Create continuous flow.
5. Lower the “inventory requirement throughout the production process, raw material, WIP (quantity of work in process), finished goods”.
6. Decrease the percentage of defected products.
7. Reduction of lead-time.
8. Improvement of error proofing.
9. Imbed the Kanban systems.
10. Standardize the work.
11. Establish in-station process control.
12. Level the production.
13. Improve tact time.
14. Quick changeover.
15. Encourage teamwork.
16. Better use of storage.

These basic Lean elements are achieved through various different Lean theories, such 5S, Kaizen, JIT (Just-in-time), Heijunka (production leveling) and Jidoka (act on abnormality). Lean theories would be explain one-by-one. The focus of Lean Management on the top is to stress on three major factors, the product quality, costs and delivery timing. The stability is accomplished through the “5S” and “Kaizen” theory. The 5S stands for, five different Lean elements that are supposed to bring the stability to the Lean structure. These five S’s are as following (Joel Cutcher-Gershenfeld):-

<b>In English terms</b>	<b>Original Japanese terms</b>
1. Simplify and sort	1. Seiri
2. Straighten or set	2. Seiton
3. Scrub or Shine	3. Seiso
4. Stabilize or standardize	4. Seiketsu

5. Sustain or self-discipline	5. Shitsuke
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The purpose of 5S is to create a well-organized, neat, easy and visual workplace, which altogether is foundation of standardized workroom. The core idea is to establish an environment where any unusual event is easily noticeable. As Ed Trish Seman (Quality Improvement Consultant at Five Hills Health Region), articulates in his lecture, *Pursuing Excellence*, “*Standardized work depends upon each tool always being in the same place ... a place for everything and everything in its place*”. Seman, believes that a neat and clean workplace environment leads to increased efficiencies, effectiveness, product quality, elimination of waste, and drop in non-value adding expenses. A standardized workplace have many benefits. The work place is a safer place for workers, because they can easily look around and protect themselves from hidden hazards. Workers can quickly search for tools they need, and thus save time; increase productivity. The company could lower the rate of defects and expenses of equipment maintenance by keeping the environment clean. The workers can decrease response time if they are working in an organized workplace environment. Further, if overtime the workplace begins to become unorganized again, they would be able to distinguish between an organized and unorganized workplace, and between what is needed and unneeded; normal and abnormal. Since workers have seen and worked in an organized environment (Seman). The “S” stands for “Sorting”. By sorting items, the company strives for removal of objects those that are not in need. Unnecessary items that should be removed from a workplace are such as, excessive supplies, useless containers & boxes, rarely used tools etc. There are many ways of executing the first “S”, such as by simply going over items that are not in need, further discussing with workers, re-evaluating the workplace area. There is a method known as, “Red tag strategy”. However, the Red tag strategy, is one way of sorting, the goal is to achieve a sorted out workplace area, in any which way it’s possible. The Red tag strategy is performed by putting red color tag on most, it not all, items at the workplace. Then the tag is removed when the item is utilized. After some time, a team of employees from different departments of the company can analyze the remaining items with still tag attached to them. Items those that are just used in certain seasons, months can remain in storage, for instance, until there is a need for them. In this manner, managers can straightforwardly identify items that are rarely used.

The second “S” stands for “Setting”. Setting means, as described by Seman, “*organizing the items that left, post sorting*”. Items should be arranged strategically, for instance, so that they are readily useable, easy to reach without removing additional equipment placed in front. They should also be placed in the “right” sequence. The second “S” is about creating a well-structured setting of items. A company can perform this strategy by, for example, putting signboards in order to guide people to certain departments, functions, items, tools and areas. A company can also use shadow boards, a board that is in a shape of symbol that represents the area, object and or activity; color-coding, can also be considered (Color-coding is using different colors to direct and represent something). The third “S” stands for “Shining”. Workplace should remain clean on daily basis, not just when its needed. Cleaning regularly is a preventive method that creates an environment, which is clean, hygienic and leaves a good impression on the workers and external stakeholders. If workers have bad health, due to unhygienic environment, they will tend to fall sick often and not show up at work. Unclean workplace also violates with workplace rules set by many governments and global organizations. The fourth “S” stands for “Standardization”. By standardizing, it means, to make the tools, equipment, functions, and machines common and standard. By standardizing, a company can cross-train its employees. By cross-training workers, a company can reduce overhead costs and eliminate confusion among users. For example, Toyota uses many car parts that are similar, in various different car models and cross the world. A Toyota worker in India can effortlessly fix a Toyota car, which is not even sold in India. As Seman, states in his lecture, Standardization creates common knowledge, consistent expectations, easy to follow, develops a consistency in task completion. The fifth and last “S” stands for “Sustainability”. After the system is created and procedures are followed, it is crucial to sustain the routines, so that company can continue to gain the benefits from 5S strategy. In order to make sure, that the system sustains, the company should focus of continues development & improvement of the system. Furthermore, by setting the routines properly at the first place, imbed the routines into company rules, train workers, create new workplace values, inspect & control, and encourage employees. The sustaining element is the factor that will eventually bring the change. Therefore, sustainability is important because sometimes it takes certain amount of time, before the returns and rewards begin to show. However, sustaining is one of the most challenging element; it craves great discipline and change in habit. The “Kaizen” technique is similar to the last “S” of the 5S strategy, Sustainability.

The definition of the Kaizen theory, according to Jim Huntzinger, is “*continuous improvement for the better or simply continuous improvement*”. In Japanese, the word “Kai” means “change” and “Zen” means “for the better”. Another writer, Masaaki Imai, states that “*Kaizen is the basic philosophical underpinning for the best in Japanese management*”. In his article, Huntzinger, he claims that the “Job Methods” was the origin to Kaizen strategy. Imai also discusses the origin of Job methods technique. He explains that a vocational instructor, Charles Allen, who used to train shipyard workers prior to the World War 1, developed a four-step method, in his training program to train the workers at Emergency Fleet Corporation of the United States Shipping Board. Allen’s lessons were written in a book published in 1919, and was later used as an instruction book by the instructors in industrial plants. In the study of Huntzinger, “Job methods” are described as following, “... *to make many small improvements on the job*”<sup>2</sup>. The four-step training method of Allen was called the “J” program. It contained four-steps, three step starting with the letter “J”, and are as following:-

1. Job Instruction.
- 2. Job Methods.**
3. Job Relations.
4. Program Development.

Alan Robinson, researcher and writer from University of Massachusetts, states that Allen’s Job methods were pre-cursor to Kaizen. Robinson states that, “*The aim of this program was to teach supervisors the importance and techniques of continuous improvement*”. That means that the Toyota, might have learned from Allen’s training methods and later developed the Kaizen theory. However, the continuous improvement in 5S is also a type of Kaizen activity. Taiichi Ohno once said that, “*Without standards there can be no improvement*”. In other words, Standardization through 5S is necessary, in order to achieve kaizen. Dr. J. Edward Deming evolved the Kaizen theory and called it as the “Deming cycle”. Deming cycle is also known as the “PDCA Cycle” or

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<sup>2</sup> War Production Board, Bureau of Training, Training Within Industry Service, 1943, Job Methods: Sessions Outline and Reference Material (Washington D.C.: U.S. Government Printing Office), p. 1

the “Kaizen wheel”. PDCA stands for plan, do, check and act. These four steps are continuously repeated with the purpose of accomplishing continuous improvement.

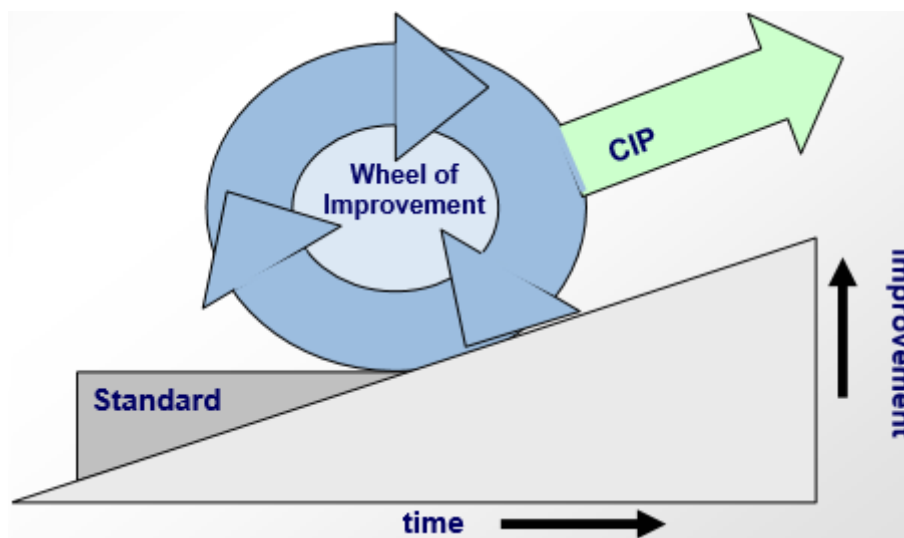


Figure.1. The Kaizen Wheel. Source: Kaizen Institute. Prof. Dr. Udo Venitz. Hochschule für Technik und Wirtschaft des Saarlandes – university of Applied Sciences.

Authors, Grace Gorenflo and John W. Moran, defined the letter “P” as, “*Plan: The purpose of this phase is to investigate the current situation, fully understand the nature of any problem to be solved, and to develop potential solutions to the problem that will be tested*”. They are discussing the steps a company need to take in the planning phase. The core is to plan a solid Action plan. A company can achieve that through collecting data, understanding current process and the problems attached. In addition to identifying areas of improvement and opportunities, and identifying the potential roots of problems. The next step of the Deming Cycle is to implement the Action plan developed in the planning phase and the “D” for stands “Do”. During this phase, a company must collect the new data, such as unexpected observations, lessons learned and the new knowledge gained post implementation of the Action place (Gorenflo and Moran). The third step is to check, the C” stands for “Check”. During this phase, the new data is compared with the data collected previously, in the planning phase, to examine the difference. Then in the comparison process, a company might acknowledge whether there has been any improvements or not. Further, the new lessons learned and the knowledge gained is included into the Action plan. During the last phase, “A” which stands for “Act”, the results from all first three steps are used for the company’s benefit. Gorenflo and Moran, describe the last step of PDCA Cycles as “*This*

*phase marks the culmination of the planning, testing, and analysis regarding whether the desired improvement was achieved ... the purpose is to act upon what has been learned”.*

## 2.1 History of Service & Lean Service.

Let us look at the history of the service sector, before we begin to discuss upon integration of Lean into service industry. Selling service as a product and having a business concept that relies on only providing service and receiving payment for it, have been practiced since the times of classical Greece. It was the time, when young intellectual individuals paid to receive education (Cerioli, 2009). Humans were selling service as a product in other well-known historical times, such as in the Middle Age. During those times, service was sold in the form of transportation, through transporting goods, textile, animals and spices, via the silk route (Correa, 2006). Then around the times of industrial revolution and the raise of machines, service sector started to lose its importance, and thus the quality. In the crowd of, industries, factories and machines, the market turned its interest toward the development of assemble line systems, which was and still is, a major part of Mass production system. Henry Ford, started to produce his T-model cars which was highly adored by consumers, with the help of Mass production based factories, during early twentieth century (Leite & Vieira 2013). Yet, soon workers begin to dislike this type of work, where they had to perform same exact work task every workday, for several hours (Dennis 2008). Classic movie of Charlie Chaplin, *Modern Times*, is a good piece of art that shows how it was to work in factories during the times of Mass production. However, this type of production system created several challenges for companies. Meanwhile, Toyota in Japan, was not dealing with the same issues, because they had moved over to the Lean Management soon after the World War 2. Lean management had been a successful manufacturing strategy; Toyota is a great example. However, but why should one even consider using this type of strategy in a service company? How can a service-providing company benefit from Lean?

First, one has understand the size and significance of service industry in a macro prospective. Data presented in the study performed by Leite & Vieira (2013), displays the importance of service sector in the global market. Authors argue that the service industry accounts for the largest share of the global market, and plays a major role in job creation and the

overall growth of world economy. A table with data from the study conducted by Leite & Vieira's that they adopted from Sarkar, 2007:-

Table 1. Showing size of service industry, in percentage, in some of the major economies, from year 2005.

Number	Country	Percent service sector in GDP
1	USA	78.7
2	Japan	72.5
3	Germany	69.5
4	China	40.0
5	United kingdom	75.8
6	France	76.4
7	Italy	68.8

The service industry had its share at 58 percent in the world's GDP, at the beginning of the millennium; alone in the United States the service related income accounted for 79 percent of the overall employment (Fortes, 2010). Meanwhile, in the data created by IBGE, Brazilian Institute of Geography and Statistics, stated that post 2008, 55 percent of Brazil's GDP was produced through services. If the service sector accounts for majority of world's GDP, why should not it be important to eliminate the waste from this industry? Leite & Vieira articulate in their article, *"Currently, services are considered the center of economic activity, being one of the pillars of economy"*. To which another author adds, that there are mainly five types of service sub-groups (Cobra, 2004):-

- Businesses, such as banking, insurance & finance institutes, consulting, etc.
- Commercial market, such as maintenance, renovation, repair & fixing, etc.
- Infrastructure area, such as transportation & commuting, communication, etc.
- Social and personal market, such as eateries, hotels & motels, hospitals, supermarkets, etc.
- Public administration, such as governmental offices & agencies, educational institutes, etc.

The author, Cobra, also argues that the service companies has a major role in agriculture, industrial commercial activities. After having an overview over the size and significance of



service industry, one can straightforwardly appreciate the importance of strategically eliminating wastage for this industry. The question then raises, can service-providing companies use Lean Management to eliminate their “Muda”? Moreover, is there even a term called as “Lean Service”? If so, how new is Lean in service-providing companies? Furthermore, is Lean even helping service companies? One of the first authors to study the conversion of Lean Management principles, used in the manufacturing sector into the service sector, was Levitt (1972). He believed that service-providing companies could also benefit from this brilliant manufacturing elimination program. However, Levitt is not known as the “father” of Lean Service because his theories were still leaning towards Mass Production. Later almost three decades, two authors, Bowen & Youngdahl (1998), built their study based on previous studies of Levitt (1972). They completed their research by using the principles from Lean Management and transferring them into Lean Service principles (Leite & Vieira, 2013). They mainly studied the services in hospitals, fast food restaurants and an airline company. Yet, the principles of Lean Service are still evolving and improving, as the time goes by. So, the answer to the first question, whether service companies can use Lean Management strategy to their business plan, is “yes” they can. Later, in this research paper, results would be presented, from service companies that benefited from Lean Service. Further, the answer to the second question is also, yes there is a term called “Lean Service”, and its founding fathers were authors such as, Theodore Levitt, David E. Bowen and William E. Youngdahl (Leite & Vieira, 2013). The concept is new, yet Levitt first purposed it in 1972. According to Leite & Vieira, the definition of Lean Service, is similar to Lean Management, elimination of resource wastage through eradicating non-value adding activities, generating value for customers and achieving sustainability. However, the Lean Service allocates more of its principles and tools on the human factor. Several authors, such Bowen & Youngdahl, Swank (2003), Sarkar (2007) and Bicheno (2008), argue that Lean principles transferred to service sector should emphasize on “*reinforcing the importance of the human factor in the process of delivering services*” (Leite & Vieira, 2013). On the other hand, there are researchers and authors who dispute that Lean Service does not create any value for the company and its customers.

Collectively, several intellectuals claim that there are numerous imperfections and weaknesses with Lean Management being used in the service sector. Some state that the Lean Management is applied to the service sector without considering the real values of Lean

principles, and therefore it is a misfit (Arfmann, Barbe & Federico, 2014). According to Radnor and Johnston (2013), the government of the UK started to use Lean principles but unfortunately, the focus of this newly applied strategy was on just cutting costs, while avoiding the value creation for the customer. In addition, Seddon and O'Donovan (2010), argue that the Lean Service is a victim of the concept of failure demand. Which, Seddon and Caulkin (2007, p.17) defined as, "*demand caused by a failure to do something or do something right for the customer; it is the consequence of poor service design*". Whereas, Lean Service pro researchers present their concept that totally relies of customer satisfaction and generating value for customers. Nascimento & Francischini (2004), articulate that the definition of lean service is, "... *standardizable system of service operations made up **only** by activities that generate value for customers...*". Lean Service not just creates value for customers yet also brings the salesperson closer to the consumer. Because mostly in the service industry, the customer comes directly in the contact of the seller. In the world of service the customer is the focus because "*the human element is a highly relevant variable in the services sector*", stats Abid (2006). In order to deliver "good" service, there are two fundamental variables, according to Maister (1985), first one, the customer being the first, and second, the employees who is provides the service. Fundamentally, the two "laws of service" presented by recently mentioned author are as following:-

1. First, comparing the difference between the customers' expectations and the perceptions of service delivery. If they have received better service than they had expected, they will tent to leave satisfied.
2. Second, is based on first impression of the service. If the first impression is satisfying, it will affect the whole service experience.

Another author, Burgess, performed a research study involving four different case studies, and concluded with, that there is "*...no firm evidence*" found that indicated any effect from the Lean implementation (Arfmann, Barbe & Federico, 2014). A statement from one of her relatively recent study concluded with following statement, "*... no firm evidence that lean implementation improves performance at an organizational level...*" (Burgess, 2012, p. 288). Other researchers, such as Seddon and O'Donovan in their article from year 2010, argue that Lean methods helping companies to advance is a false belief. They elaborated on their claim by stating that, managers' knowledge about their business on daily basis and actions taken thereafter improved their performance; not the knowledge about Lean methods. For instance, once Ohno (1988), directed

his managers to gain knowledge about their business, by assigning them to stay several weeks on the shop floor so that they could learn about their production processes. The business decisions taken after the managers' stay at the shop floor were influenced by their learnings and their better understandings about company's production processes, not by their knowledge about Lean methods. Therefore one cannot call the improvement as a result of "knowledge from Lean principles", one should rather call it as a "knowledge about operations", Operations knowledge (Arfmann, Barbe & Federico, 2014). Overall, there is no proper framework for Lean Service, instead managers are using single or few Lean tools and methods, which indicates a theoretical gap in the definition of, Lean Service. Some of the anti-Lean Service authors articulated in their article, *"there is a clear theoretical gap when it comes to defining and profiling the conceptual framework of lean service ... with little empirical support"* (Suarez-Barraza, Smith, and Dahlggaard-park, 2012, p. 368). To which Arfmann, Barbe & Federico (2014) added, *"...there seems to be no lean service framework we have to ask if it is really the lean transformation, the application of single lean tools and methods or something else that creates observed performance improvements"*. Does these arguments mean that, Lean methods cannot work for service-providing companies, due to the lack of proper framework and no evidence of improvement? If these assertions are true, then the conclusion for this research paper is clear. Let us look at the research question again, which is as following:-

*"How would lean management philosophy impact on a company that provides service as its product?"*

Based on recently stated claims from anti-Lean Service intellectuals, Lean principles and methods would not have any positive impact on a company that provides service as its product. After conducting some research, there were found evidences and frameworks that supported Lean Service. There were Lean principles and methods imbedded within the concept of Lean Service. That means, the research can still be conducted, and it is possible that Lean Management philosophy does have an impact on a service-providing company; an impact that generates positive results. Let us look at the other side of arguments and evidence concerning Lean Service.

Beginning with the core principles of Lean Service, which fundamentally root from original Lean philosophy, aka elimination of muda, continuous improvement and creating value for customers. The principles of Lean Service are as following (Womack & Jones, 2005):-

Lean service principles
1. Find the solution for customer's problem by assuring that all goods and service work, and they work properly together.
2. Use customer's time efficiently, do not waste it.
3. Fulfill customers' desires completely.
4. Fulfill these requirements wherever (location) the customer demands them.
5. Fulfill customers' wants whenever (timely manner) the customer demands them.
6. Continuously in search for solution that collectively reduce the customers' time and botheration (Kaizen).

The four most common tools of Lean Management adopted and implemented by the Lean Service are (Leite & Vieira, 2013):-

1. Value Stream Mapping, also known as (aka) VSM.
2. Production Balancing, aka Heijunka.
3. Just-in-time, aka JIT.
4. 5S Standardization, aka only as 5S.

First, one has to understand the tools of Lean Service. The last tool listed on the list, 5S is earlier mention in this paper. Let us look at the rest of the tools. VSM is a systematic mapping, in specific sequence, to track all of the stages in a production process. To have an overview over the flow stream and steps of process, that a product goes through. According to Rother & Shook (1999), it does not matter if a process stage is adding value to the product or not, VSM should include all of the stages. VSM presents the production flow that tracks products from the point they are in the form of raw material to the point consumer buys them. Rother & Shook argue that, VSM can be used in service sector. Elaborating on their claims, Leite & Vieira articulated that, several researchers (shown in Tables 3 & 4) claim that there are service-oriented companies that use VSM, to improve their processes and cut cost. According to them, it is mainly because the occurrence of flow stream, in service delivery is somewhat similar to the flow of manufacturing, *“similarly to manufacturing, the service sector also has direct relation with development, preparation and delivery of service to customers, and these steps, activities or processes are*

*easily mapped using VSM concepts*". Another tool adopted by Lean Service is, "Heijunka", Japanese term for Production Balancing. Production Balancing is seen as one of the pillars of TPS, which helps companies to reduce their inventory to a productive level, by using resources efficiently, eliminating high costs, and boosting the flexibility of processes. Furthermore, using this method, companies improve their ways of purchasing supplies, effective & efficient use of equipment, in addition to better processes and improvement of their team planning (Leite & Vieira. 2013). But, how is Production Balancing used in Lean Service? Research shows that some companies in service sector use Production Balancing. This Lean tool has eliminated some of the most common types of wastages that Lean seeks to eliminate at the first place, (eight common types of wastages are mentioned earlier in this study). According to Leite & Vieira (2013), Production Balancing is seen in the healthcare industry (mainly in hospitals), in the form of setting the flow of right patients through health services and surgeries. On the other hand, in restaurants, Production Balancing have been used to avoid meal order interruptions and delays in arrival of meals. Furthermore, in the financial sector, Heijunka, is used to balance the distribution of credit approval processes (Leite & Vieira, 2013). Authors enhanced their claims by stating that, in the absence of Heijunka, the achievement of the next listed Lean Service tool, JIT, is not possible. For Slack et al. (2002), JIT is "*...a paced technique, aiming at improving global productivity and eliminating waste. It comes as a consequence of the use of a balanced production*". Before we look at the benefits of JIT in a service-providing company, let us first understand JIT tool.

With the help of JIT, companies can produce their products in the timely manner, quantity that's needed and the quality which is demanded by the customer. In a research done by two students and one professor from two different institutes, Akbar Javadian Kootanaee<sup>3</sup>, Dr. K. Nagendra Babu<sup>4</sup>, Hamidreza Fooladi Talari<sup>5</sup>, the purpose of JIT is defined as "*... provide the goods in the time as promised when the order is placed by the customer*". In their research titled as "Just-in-Time Manufacturing System: From Introduction to Implement" they also articulated that, JIT system is not as simple and straightforward as it seems, the company that adopts to JIT has to deal with challenges such as, coordination problems within supply chain, culture

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<sup>5</sup> Student in Master of Accounting, Islamic Azad University of Noor.

challenges, emotional and rational resistance to change and decreased safety stocks. The JIT system is different from the traditional production system. The traditional system was based on “Push Production” whereas the JIT system is based on “Pull Production”. According to the recently mentioned study, the Push Production is the type of production that “pushes” the materials to the next process station/level regardless of the station availability, customers’ demand and the level of resources. Therefore, the Push Production increases the amount of products in work-in-process (WIP) and abundances of inventories and thus wastage, in the form of overproduction. However, the Pull Production is a production system where the products “are pulled” to the next station, based on the availability of the station, customers’ demand, and obtainability of resources; those that are needed to produce the product. Thus, therefore the Pull-Production is a vital element for Lean, because it reduces overproduction of inventories, levels of WIP, products that are waiting in line, storage expenses etc.

There are three main elements of JIT that are important, in order to deliver a high quality product in timely manner without overproducing. They are known as, people, plants and system. Firstly, a company that want to implement JIT, has to include its people (employees) into the transformation process. According to Kootanaee, Babu and Talari, the company has to inform, employees from all of the relevant departments to minimize the risk of conflicts during the implementation process. The company might want to emphasize and convince its employees that the profits from JIT is a long-term process. In the short-term, the company might use some of the profits to make drastic production system changeovers, from traditional to JIT. The Pull-based system, JIT, also requires full management support and support from the government & lawmakers. Managers from all relevant levels must be involved in the transformation process. The second element of JIT is to change in plant layout. There are four sub elements that shape Lean based plant layout and they are, Demand-pull production, Kanban, Self-inspection, Continuous improvement. The JIT production system requires plant layout to be based on supreme flexibility and “... *arranged according to product rather than process*” (Kootanaee, Babu and Talari). The whole idea of rearranging production layout is to increase the effectivity through providing a production environment where the workers can easily move around, and work on product at different stages. Lean requires companies to use “Demand pull production”. The Demand-pull production is a type of production system that relies on customers’ demand for

a given product; and not least the level of quality and delivery time that is expected by the customer. Kanban is a Japanese term for “signal”. Often this signal is in a form of a tag in certain color or a card placed all over the plant. On these tags, there is information such as product serial number, quantity, required process and delivery destination (Kootanaee, Babu and Talari, 2013). In this manner, the company can sort products in terms of production processes, shipment locations and through other similarities to save resources and still maintain high quality. Self-inspection is quality control system that emphasize product defects to be fixed effectively and efficiently; by correcting defected products at the same place they have occurred. Continuous improvement is a philosophy of constantly improving and evolving. The mindset behind the continuous improvement is to raise the benchmark whenever the previous aimed target is accomplished, yet new benchmark must be realistic. Authors from most recently mentioned article, articulated regarding continuous improvement, *“This will allow a company to constantly improve upon its operations, product and, ultimately, its customer satisfaction”*. The third element of JIT is reevaluation of the system that involves planning for production activities and material usage. Lean encourages companies to use MRP and MRP 2 systems. MRP stands for material requirements planning, which is a computerized program that helps companies to evaluate amount of material they need for their production. MRP 2 stands for manufacturing resource planning, which is also a computerized program that helps companies to evaluate amount of financial resources they need to complete their production (Kootanaee, Babu and Talari, 2013). However, these elements of JIT are irrelevant for a company that provides service instead of physical products. Therefore, unrelated for this research. Yet the other JIT tools can benefit a service-providing company by meeting the customers’ needs on time, providing what is needed, with the help of Pull System. According to the research of Leite & Vieira (2013), JIT benefits companies in service sector through allowing them to deliver service on time, more efficiently and at the reduced costs. The costs are dwindled because the company is providing the service at the right amount, right place and at the right time, with the help of minimized facility, equipment, materials and employees’ capacity (Slack et al., 2002). However, there are some challenges concerning to the implementation of JIT.

#### Challenges with JIT

Before a company adopts JIT, they should think about potential problems that they might have to face post implementation of this system. There could be several challenges such cultural differences in terms of workers' negative outlook, workers' lack of knowledge concerning this system and or incomplete implemented JIT. Another issue could be the lack of safety stocks. Safety stock is a type of buffer that companies rely on in times of high customer demand. If one looks at a company that provides service, the safety stocks are the employees that provide service, and the equipment they need, in order to perform. Cutting back on "safety employees" can cause problems in times of raised demand. As the authors stated in recently mentioned article, *"Safety stocks can act as a buffer for companies to fall back on to offset inaccurate demand forecasts"*. One of most challenging issues related to implementation of JIT is emotional and rational struggle among employees. Emotional struggle is mental unacceptance to change and adoption of a new method; lack of willingness to learn something different and let go of the previous routine and the habit. Whereas rational confrontation is lack of acknowledgment related to the change the system will bring; often its lead by the deficiency of core information and details concerning the process (T.C.E. Cheng and S. Podolsky, 1996). In a service-providing company, change in employees' attitude towards new theories and system is essential to the majority of success. Since, in the end of the day, its the people who are working for the company will be responsible for carrying out the job tasks. There lies the difference between manufacturing and service-providing, service highly depends on the human element (Leite & Vieira, 2013). Service sector is more about the ease and comfort, and the price follows. According to Womack & Jones (2005), author who designed the concept of Lean consumption, *"The idea is not that the customer shops less but shops with less difficulty and disruption... companies should adopt practices to eliminate inefficiency in production processes, and it is now the moment to take initiatives to deliver consumption experience more efficiently and with less sacrifice."*

However, there are several other claims by authors who do not believe in Lean Service. Another claim is that there is a lack of evidence, that shows Leans methods and principles can improve performance of service companies. There are results obtained from the service-providing companies that have been using Lean methods and principles to their business strategy. Despite the fact that, Lean Service is still a debatable concept, and many researchers have strong opinions about the theory, many global & large companies have been using Lean Service principles. Leite



& Vieira (2013) have studied around twenty-five major companies, such as McDonald's, Wal-Mart, Southwest-Airlines, Grupo Fernando Simao, Shouldice Hospital, Tesco Retailer and Jefferson Pilot Financial Company and many more. The results adopted from the study performed by Leite & Vieira (2013) confirms the following data:-

Table 2. Showing the results from *Lean Service* companies using lean principles.

Name of the company	Results and benefits
McDonald's	Created a safeguard to enhance the service quality
Wal-Mart	Eradicated the need of storing excessive inventory in-house, for instance in Wal- Mart warehouses and stores.
Southwest-Airlines	Increased the service experience level for customers and reduced the service expenses, through flow and the speed of the service delivery.
Grupo Fernando Simao	Increased the time allocated to customer's value from being at 53 per cent to 94 per cent. In addition, they decreased their service costs by 30 per cent. Further their operations raised the time of adding value from being at the level of 27 per cent to 50 per cent.
Shouldice Hospital	Significant change in recovery rates of patients, strategic capacity usage (better operation room availability), and simultaneously drop in the costs.
Tesco Retailer	Accomplishment of reaching service level beyond 96 per cent and becoming market leader in its own segment, in the United Kingdom.
Jefferson Pilot Financial Company (Swank, 2003)	Improvement in operating activities and increased revenues, while lowered the labor cost by 26 per cent and mistakes & errors by 40 per cent. On the other hand, they reduced time of processing a request by whole 70 per cent.

The improvements and benefits from the Lean Service is an exchange, in terms of interchanging resources with positive results. For Bowen & Youngdahl (1998), the results achieved from Lean Service can be described as *“tradeoffs between efficiency and operations with low cost and flexibility”*. In other words, in order to increase the quality of customer service and customer value creation, lean companies might want to escalate their resources dedicated to human-resources management, aka HR department. Moreover, “Yes” the framework & methods of Lean concept in the service sector are not straightforward. I agree with opposing arguments, mentioned earlier, made by authors such as Suarez-Barraza, Smith, Arfmann, Barbe & Federico

and Dahlgaard-park regarding Lean Service framework. The implementation of Lean principles and methods are vastly depended on the nature of the service. Thus, service activities in a hospital are different from service activities in an educational institute, further service activities performed in a fast-food chain are unlike the ones performed in an airline company. For instance, in the transportation industry, its important to consider lean logistics (Chopra & Meindl, 2004). The equipment must be up-to-date in terms of technology, to meet customers' needs and wants, through increased performance and quality of service. Thus, it reduces the customer-waiting time. Further, Chopra & Meindl (2004), elaborate that it's a process of learning through adaptation, *"Suppliers should understand the customers' needs, apply lean methodologies to their processes and adopt themselves to customers"*. In the airline industry, the companies want to reduce the aircraft time on ground (Leite & Vieira, 2013). Therefore, often the slogan of airline companies is *"low cost / low fare"*. According to Leite & Vieira, Lean Service in an aircraft company, *"...customers are partially involved in some activities to reduce this time... the crew requests all passengers to collect their trash and magazines. Besides reducing ground time it helps reduce expenses with cleaning"*. Another, example of Lean Service in hospitals. Management at the hospital tries to sort out different types of patients who needs specific types of procedures. So that hospitals can increase their performance by lowering waiting time, easily identifying the patients, surgery tools and rooms required (Leite & Vieira, 2013). Whereas, retailers, focus more on the strategic location for their stores. So that customers can easily determine whether a certain company is usually located in the city, in neighborhood or on-line. In other words, Womack & Jones's (2005) Lean Service principle, *"offer what customer wants, where he/she wants it"*. Combination of Lean models can be applied to a service company, depending on the nature of their operations (Leite & Vieira, 2013).

Table.3. Represents matrix with names of researchers with types of Lean tools they have applied (Adopted from Leite & Vieira, 2013).

Lean tools → Authors ↓	JIT	Heijunka	VSM	Training	Kanban	Pull System	5S	Other tools & practices
Cuatrecasas (2004).	X	X						X
Womack & Jones (2005).		X	X	X				X
Lee et al. (2007).	X				X			X
Ahlstrom (2004)	X					X		X
Bowen & Youngdahl (1998).	X			X				X

Allway & Corbett (2002).		X	X					
Swank (2003).		X					X	
Song et al. (2009).		X	X	X			X	X

Table 4. Represents list of areas that researchers have applied Lean Service to (Adopted from Leite & Vieira, 2013).

Researcher	Industry from service sector
Cuatrecasas (2004).	Hotels.
Womack & Jones (2005).	Cars sell, call center and retail store.
Lee et al. (2007).	Retail store, logistic and storage.
Ahlstrom (2004).	Hospitals, public services, road maintenance, infrastructure, railroad transportation and education.
Bowen & Youngdahl (1998).	Foods services, hospitals and air transportation service.
Allway & Corbett (2002).	Hospitals, call centre, bank & financial service, insurance services, virtual company & technology and commercial kitchens.
Swank (2003).	Insurance services.
Song et al. (2009).	Bank & financial service and mechanical & electrical services.

There is a fundamental challenge to Lean Service. Lean management is usually used in manufacturing setting and was created to eliminate wastages in an assembly line environment. There is a well-known differentiation, at the fundamental level, between service and manufacturing company, which can potentially challenge Lean implementation in a service organization (Alessandra Laureani, 2012). There are five key characteristics of service. These characteristics can create problems for Lean tools. Distinguishing key factors of service are: intangibility, perishability, inseparability, variability and lack of ownership (Gronroos, 1978, Parasuraman, Zeithaml, and Berry, 1988, Vargo and Lusch, 2004). Intangibility, which is also known as lack of ownership, cannot be measured like physical products. By perishability is meant that service cannot be stored, therefore service companies attempt to push through services, creating high WIP; thus products are waiting in line for available capacity. Inseparability is a nature of service as a product. It means that the service provider, company employee, is the product to the customer. So, if the service is sloppy, customers perceive that as a low quality product. Variability means, often in manufacturing setting, Lean seeks to reduce process variation, to establish stability & cost efficiency in processes. In a service setting, variability is imbedded. For instance, it is difficult to serve a client in exact same manner as the last time. Researcher such as, David Arfmann, argues that intangibility, lack of ownership, needs

further research, but does not answer the question on how would this characteristic of service will hinder Lean. I could not find how intangibility can raise costs. Many researchers, argue that tangibility is a risky factor, because companies cannot measure inventory, which takes us to the next variable, perishability. The fear of high WIP, can be substituted with no storage cost and overproduction waste, thus intangibility can actually work in favor of the company. However, perishability can make implementation of Pull-system challenging, since companies have to push services; by being available all times instead on adopting make-to-order concept. Inseparability is quit challenging to remove from service-companies, because it is the very nature of service. Variability in service delivered can be a problem and danger to the quality and demand of the product, in terms of maintaining the stability. Fortunately, the lean principle, 5S standardization, plays the major role in achieving stability and sustainability.

### 3.0 Research structure and methodology

The research structure and methodology sector will enlighten the reader upon various elements of this research paper. Mainly this section will discuss the research methods, in terms of approach that has been taken in order to answer the problem thesis. Furthermore, the research techniques and theories that were chosen for this research paper will be discussed. Since, it's a research paper, the purpose is to gain knowledge concerning specific problem thesis. Authors, Saunders, M., Lewis, P., and Thornhill, A. (2009), stat, in their study relating to research methods for business students, that the mindset behind research methods should be developing new knowledge, "*development knowledge in a particular field*". However, research methods will follow the general structure of answering, what, why, when, where and how, for each research method applied.

#### 3.1 Theory

The soul of this research paper is in it's theory. The theoretical backbone in this research is information concerning Lean principles and Lean in service companies. However, there are no hypothesis that are being tested, yet there is some prior knowledge. I am personally interested and have knowledge about Lean methods and the potential benefits from Lean Management.

However, my interest for Lean and knowledge about its previous success can potentially build a risk of bias interpretation. Therefore, I as a researcher understand that Lean in service can be completely different ball game, than Lean in manufacturing. While, new theories and hypothesis would be developed in this research paper. Further could these new hypothesis be used in other researches and studies. Having that said, they would still be hypothesis, which again leaves room for more research and exploration.

### 3.2 Research Strategy

Research strategy is a planning process, in order to find a suitable method/s to conquer the problem thesis in a strategic manner. The challenge is to choose analytical strategy to summarize and extract reliable and valid results from the data already collected. More the chosen method is contradicting, higher the chances for receiving invalid results, and thus the research would be considered as an “unreliable research”. There are mainly two ways of analyzing the collected data, inductive and deductive.

The analyzing method chosen for this research paper is inductive. Since this research paper is a form of qualitative study, inductive approach is meant to yield results from qualitative data, such as raw text from interview texts/recordings, comments etc. David R. Thomas defines inductive approach in one of his articles, by articulating that this method takes detailed readings of raw data further draws concepts, themes and models through data interpretations from the data. Whereas the other approach, deductive method, is meant to put already existing hypothesis to test. Further, concludes with whether the assumed theories and hypothesis were true or false. Author defines deductive approach as, “*...data analyses that set out to test whether data are consistent with prior assumptions, theories, or hypotheses identified or constructed by an investigator*” (David R. Thomas, 2006). In this research paper, there are no hypothesis, therefore it becomes crucial to take inductive approach. Moreover, in this research paper, the study is seeking for answers those that can conclude the problem theses. In detail, the purpose of inductive approach is to establish solid links among research objectives and the raw data; to ensure high level of reliability and validity of results. Further, the theories are developed, in order to present the extracted results in a logical format for the research observers. The detailed description of reliability and validity is discussed in section “Research Challenges”.

### 3.3 Selection of Service Company

Many companies were applicable for this research, yet to acquire manageable quality research with focused discussion, only one company was selected. However, it was not challenging to find a company that provides service. Follo Taxi was not difficult to search for because I myself have worked in this company for approximately three years. Prior to my employment in this local company, my father have worked in it for nearly fifteen years, since year 2001. Successes and failures of Follo Taxi have been experienced on personal level.

Follo Taxi is a regional cab company located in southeast county, Akershus, and further in the region of Follo, in Norway. Follo Taxi was established in 1989, with the help of collaboration among individually operated local taxi companies. Prior 1989, there were several cab companies in the Follo region. Follo Taxi is neither owned nor managed by the Norwegian government, rather it is a private cooperative company, in Norwegian it is called “Samvirkeforetak” (SA). The Follo cab owners collectively own their company, through purchase of company share. The company policy states that, a cab owner does not necessarily have to be a shareholder, yet every shareholder of the company must be Follo cab owner. Furthermore, the shareholders of the company have elected company chairperson, Morten Strønen, to manage the company. The company manages approximately seventy cabs in seven different Follo municipalities. Besides, from the standard four passenger taxis, there are also six seater standard size cabs and further up to sixteen seaters vans. Therefore, the customer segment of Follo Taxi has great variation. Customers of Follo Taxi, besides regular people who need taxi, are such as, regularly transported school kids & patients, handicap & individuals on wheelchair, customers in large groups and etc. A customer can order Follo taxi by calling, emailing the company and through the Follo Taxi mobile application. The information regarding facts of Follo Taxi was retrieved from company website ([www.follotaxi.no](http://www.follotaxi.no)).

The decision to select Follo Taxi for this research paper was taken, firstly, because it is a service-providing company. Secondly, there are being held company meetings almost every month, and the main agenda in these meetings have been topics such as:-

Stronger competition from other cab companies, such as Uber, Oslo Taxi, Norges Taxi.

Raising expenses.

Availability of cheaper and more convenient alternatives for customer, thus loss of customers and customer segments.

Drop in quality of service.

Being victim of change in external environment, such as restaurants being shutdown, establishment of new places out of Follo region and people using less taxi.

In the nutshell, Follo Taxi is facing challenges that can possibly bankrupt the company. Thirdly, it is midsize company, not too big and not too small to research on. Further, it is interesting to test a service-providing company, which is currently not using Lean principles. It is also tranquil to scan through company documents. Lastly, another advantage of selecting Follo Taxi is that, its limited within the Follo region. Therefore, it is manageable to conduct interviews from customers and employees without being concerned too much about the regional differences etc.

### 3.4 Data Source

When collecting the data, there are mainly two types of data, Qualitative and Quantitative; and also Mixed methods. The data type that has been selected for this research paper is the Qualitative data. Qualitative data is the data collected in form of point-of-views, words, images, for instance interviews, surveys, conversations etc. Mixed method data is a combination of Qualitative and Quantitative data. Mixed method data is *“research in that inquirers draw liberally from both quantitative and qualitative assumptions when they engage in their research”* (John W. Creswell, 2003). Whereas, Quantitative data is defined as the data collected in mathematical format, in numbers, exact measurements, percentages (Johnson, B., Christensen, L. 2008, Lichtman, M. 2006).

It's an exploratory research, so the more focus will be on collecting Qualitative data. There are no hypothesis; a bottom-up approach would be more suited for this research paper. An exploratory research is where the research tries to find hypotheses through exploring from the data collected (Johnson, B., Christensen, L. 2008, Lichtman, M. 2006). While there are mainly three types of sub-data, primary, secondary and mixed. Primary data is collected by the researcher her or himself, whereas secondary data is retrieved from other sources, while mixed data is a mixture of both (Nicholson, S. & Bennett, T. 2008).

### 3.5 Interview

In this research paper, one of the main research method is the interview. The interview guide will be designed for three different stakeholders, company leaders, employees and customers. An interview guide contains set of questions related to problem thesis topic. The interview is essential for a Qualitative study, to receive open-ended responses and reflections from the chosen interviewees, stat Johnson, Christensen (2008), Lichtman (2006). While, there are none presumed notions or hypothesis, the interview will produce exploratory data and learnings.

There are several types of interviews for research study such as, structured, semi-structured and group etc. The format of interviews would be open, also known as “Open interview” or Semi-structured. In a semi-structured interview, there are many open-ended questions and some of them are even developed simultaneously during the interview. While the topic and purpose of the interview is previously decided and is clear to the interviewer. An Open interview helps to generate open-ended responses, explore, discover, without limiting, controlling or creating bias answers. Whereas, in a structured interview, the questions are sets with alternative answers, mostly in a form of check boxes. Semi-structure interview gives the interviewees more room for expressing their thoughts, emotional-feeling, and point-of-views. It can open up for a deep dialogue and the interviewees might come up with potential solutions for the problem matter at hand (Edwards & Holland 2013). Furthermore, Edwards and Holland (2013), articulate concerning semi-structured interview that *“In general the interviewer is interested in the context and content of the interview, how the interviewee understands the topic(s) under discussion and what they want to convey to the interviewer”*.

The purpose of the interview is to gain knowledge about Lean impact and implementation. Further, the responses from company leaders, employees and customers are important to gain knowledge on how the Lean principles and methods would work for the selected company. The topic of the research paper will be thoroughly explained to the interviewees before beginning the interview. The interviews taken from the customers will show the customers’ prospective, an external viewpoint. In this way I will learn how does the company looks from the outside. In addition, I will pursue knowledge about how important is the company reputation, performance-level, development of the company for customers.



The interview will be performed in the company offices, in separate rooms. It is challenging to set precise interview duration time, yet it is assumed to last from one to two hours. The interview will be voice-recorded and typed in laptop. The permission for voice recording will be requested beforehand. Furthermore, information such as names, gender, job titles and other similar will be anonymous. The interview responses will be coded and analyzed.

### 3.6 Data reduction and analyses

In this section, the methods for Data Reduction and analyses would be discussed. Firstly, we have to understand, what Data Reduction is? Why is it important for a research? And how is it performed? Data Reduction is a method of compressing all of the data gathered from the research. However, that does not mean that some of the data should be left out, its rather about exacting the essence from the data. Data analyzing is an important process because in this manner the researcher can filter the needed results from the data collected. On the other hand, data becomes more controllable and it is easy to manage, in terms of presenting to others; because the data transforms into a logical and readable format. There are probably several ways of reducing the data, but usually the data is reduced by analyzing. There are four main methods for analyzing the data gathered, and they are as following, Content analyses, Grounded theory, Thematic & Narrative analyses. For this research project, Grounded theory method is used. With the help of Grounded theory, new theories are developed and furthermore it is guided by the Inductive approach. While, there are no prior theories and hypotheses, therefore this method is suitable for this research paper. The compressed data will support the new theories developed and show how they are interconnected. During early 1960s, Barney Glaser and Anselm Strauss developed the method of Grounded theory. In one of the Glaser's articles, he defines Grounded theory as, "*a general methodology of analysis linked with data collection that uses a systematically applied set of methods to generate an inductive theory about a substantive area*" (Glaser, 1992). The next obvious question that comes to one's mind is, how does the Grounded theory work?

The first step of the Grounded theory is code all of the material collected. After coding the data, it's sorted into different categories, to acknowledge the essence. Thereafter new theories are developed, also known as the "Findings". It is a three-step procedure. Coding is a systematic method of exacting results from the data. There are two types of coding, Substantive and Theoretical coding. Substantive coding is where the researcher takes the raw data and looks for

patterns, by analyzing and categorizing. Whereas, Theoretical coding is looking for patterns through connecting substantive codes, in other words viewing the bigger picture. Both coding methods are used in this research. Theoretical coding is performed post substantive coding. Glaser summarizes relationship between both coding methods by articulating, “*Theoretical codes conceptualize how the substantive codes may relate to each other as hypotheses to be integrated into the theory*” (Glaser, 1978). Further the author simplifies by stating that Substantive codes break down the data while Theoretical codes “*weave the fractured story back together again [into] an organized whole theory*” (Glaser, 1978). The components for coding are, for instance the words, categories, sentences from interviews and other documents. Thus Grounded theory method is ideally suited for Qualitative study where the data is mostly extracted from the interviews and observations.

Post the Data Reduction and analyzation, the results would be clear. From those results, it would be easy to draw conclusions for the impact of Lean principles on a service-providing company. Furthermore, new theories will help in the development of the new hypotheses for Lean Service.

### 3.7 Research Challenges

In order to produce a quality research, one has to think thoroughly through Reliability and Validity aspects of the study. If the degrees of Reliability and Validity are low, then the results will also follow, and thus unreliable and not valid Findings. These two aspects are essential in setting the quality of the research, higher the Reliability & Validity, thus higher the quality. The definition of Reliability is whether the results can be trusted, in other words can one rely and depend on the results shown in the study. Nahid Golafshani, describes Reliability in one of his articles, as whether the results is replicable and contains the dependability and consistency. Whereas, Validity is whether one has found right results for the right problem topic. Validity is more about the measuring instrument, in terms of whether the measuring instrument is computing what it is supposed to compute. However, if the measuring instrument is reliable that does not automatically means, that it is also valid. For instance, a weight machine might be reliable, giving us the right weight measurement, but maybe it is not answering the questions that the researcher is looking for.

As a reliable measuring instrument, three Open interview guides have been used in this study; for the employees, customers and the management. The Open interview approach is chosen to increase the level of reliability, yet there will be still some doubts and debates. As we all have different prospective on the knowledge we perceive, thus our understanding about information can differ. There are two prospective included in the interview process, first one of the interviewee, and second one of the interviewer. In an Open interview its challenging to receive same or similar responses from the interviewee individuals, because they interpret the questions differently and respond to it in a unlike manner.

Besides Reliability, there is Validity. There are three different types of Validities within the Validity element of a research; and they are as following, Construct validity, Internal validity and External validity. According to research guru Robert K. Yin, these three types of Validities in addition to Reliability are the maximization components, a combination of both “*develop rigorous and robust case study design*” (Bedrettin Yazan, 2015). This research paper ensures to take care of Construct validity through, building consistent linkage between what problem-topic intends to find and the actual Findings. Yin, defines Construct validity as creating chain of evidences. In this research paper, I am seeking for chain of evidence that support each other before I draw conclusion. In other words, interview data from different parties at Follo Taxi, the management, employees and customers should show some kind of pattern or linkage, among and cross groups. Yet, there is a challenge of misconception. However, Internal validity ensures that the researcher does not, misunderstand the data thinking that there is a pattern while there is not. Yin, argues that through creating analytical techniques such as pattern matching is one of methods to avoid misinterpretation of the data. Therefore, the interviews will be typed & conducted by me; and hopefully most of the interviewees will allow me to audio record their interviews.

External validity is the degree of generalization of the study and the results. Yin, claims that External validity can be achieved through analytical generalization. Thus, thinking through whether the study can be used as a “rule of a thumb”, in other words, does the study apply to various different situations? For instance, if Lean principles help Follo Taxi in eliminating their waste, does that mean that all service-providing companies can take benefits from Lean? That is challenging to conclude. One has to look at the selected company whether it is a valid, typical

and suited company for the research. Therefore, the research also retrieves results from previous studies about Lean Service, performed by other researchers. Generalization brings us to positivism versus interpretivist. Positivism occurs when the researcher just for the sake of positive results, establishes facts in her or his favor. Whereas, Interpretivist seeks the understanding through interpretations from data, and is more exploratory (Yazan, 2015). Crotty defines positivism as “... *established facts, or at least as close to established fact as [their] research has enabled [them] to reach*” (Crotty, 1998).

### 3.8 Role of the researcher

The role of the researcher in this paper is to maintain non-bias and ethical attitude at all times. Further, there is responsibility of delivering what have been promised in the Introduction Section. Most of the theory and facts in this research paper are supported by providing names and other information about the researchers and authors. I as the researcher has the role, in this study, to firstly, make my problem topic clear and logical to the reader and then gain pre-knowledge from theories and studies. Further, the task demands me to explore, research & learn. Thereafter analyze the information in a quality manner. Then finally inform the reader on my findings and results.

### 3.9 Ethics

In this research paper, the theory and the collected data is treated in an ethical manner. In other words, the content of this research paper is Reliable & Valid, reframed from plagiarism, and follows the anonymity of the interviewees. There are three elements within ethics of data management, as the study from University of Minnesota’s Center for Bioethics (2003), concludes:-

*“the ethical and truthful collection of reliable data”.*

*“the ownership and responsibility of collected data”.*

*“retaining data and sharing access to collected data with colleagues and the public”.*

So, ethics in data collection is described beyond the truthfulness and ownership of the data. The researcher must also share the study, without editing out material or manipulating in her or his own favor.

## 4.0 Analyses

This is the analyses section, where the data would be coded. I will present one example of coding for each selected stakeholder, in other words, three examples. The selected examples are typical interviews, which represents the majority of the interviews within specific type of stakeholder. However, all the interviews are coded and included in the research. Interviews shown in examples are translated from Norwegian into English.

*Example 1. Descriptive coding. Interview conducted from Follo Taxi Management. Different colors are used to code, sorting and characterizing the interview text.*

<p>Follo Taxi was established 1989, I have been with the company since then.</p> <p>But I had been driving taxi since 1983, that six and a half years till 1989.</p> <p>Follo taxi creates value by providing a transportation service. This company has created jobs for above two hundred people, included full- part time drivers. ... There is a lot of unnecessary activity that comes with the way this company is organized. Whereas our competitors UBER just need mobile phone to operate the traffic. According to current rules &amp; regulations, we have to follow many rules, that new taxi company such UBER doesn't have to follow, so they save a lot of money there. But we cannot call these activities of information storing and other systems as a waste, because it's demanded by today laws.</p>	<p>Experienced board member &amp; taxi driver.</p>
<p>The whole structure of this industry is based on waste of time, where the driver is standing for several hours, which is very ineffective. In this industry when there is low demand, the supply increases, and when the demand in high, the supply decreases. It has to do with the availability, more work, less available cars, less work, more available cars. The dispatch distributes calls to the cabs, that's the resource provided by the company. The employees at the dispatch have less local knowledge, in different cities, about the</p>	<p>Defining the value.</p> <p>Company having challenges &amp; difficulties.</p> <p>Resource wastage (Time).</p>

<p>addresses and roads. Drivers should have the local knowledge about the addresses and roads.</p>	<p>Wastage elimination potential.</p>
<p>At the company meetings, usually the good drivers meet up, not the bad ones. The bad ones are not interested in participating; this is also one of the weakness of this organization. I inform my drivers, but a lot of cabs owners do not even meet up for the meetings thus do not inform their drivers. Then there is lack of information. Another thing is that those who receive information letters from meetings, many of them do not even understand, and they call back to receive these letters in their native language (Urdu). But according to Norwegian laws in general, if the company language in Norwegian then these documents &amp; letters should be in Norwegian, and the drivers should be able to read them. That is also waste of time, the translation process. There is corruption in the system, a lot of drivers have paid (15000 Norwegian Kroners) to pass the State test, however there is no money receiving, in this manner, when taking the Follo Taxi test, which a local test.</p>	<p>Communication gap.</p> <p>Resource wastage (Rework) Poor communication.</p> <p>Lack of standardization.</p>
<p>Follo Taxi should decide how many taxis there should be available and where they should. Under current system, this control is in the hands of</p>	

<p>individual drivers not in the hands of Follo Taxi. Therefore sometimes there is overcapacity (excess), too many cabs available. While at other times there is not enough capacity, shortage of cabs. This overcapacity drives the price up, since more drivers, shortage of supply, thus price per call increases. Then the customer choses other alternatives, such as bus, train &amp; private car.</p> <p>Technology is up to date, sometimes the workers do not mistake, while other times also the customer does mistake, in terms address &amp; phone number. On average customer, the waiting time in cue in one minute before they are served. There is a company application for smart phone, but only one percent uses it, we launched this application couple of month. So people are not fully aware of it, hopefully more customer will use this in the near future, it are marketing it. There are elderly customers who do not prefer to use smart phone application, for them we have telephone system running.</p>	<p>Resource wastage (Overproduction).</p>
<p>Research shows that the driver on average uses thirty percent of her/his time to generate earnings, rest of seventy percent is waste of time, standing and waiting for call.</p>	<p>Wastage elimination potential.</p>

Example 1. Categorization and sub-categorization.

Interviewees	Experience	Define value	Resource wastages
Board Member 1.	“I have worked with Follo Taxi since 1989, since establishment”.	“Follo Taxi provides transportation service”.	“Seventy percent of the time, workers are not generating money”.
Board Member 2.	“I have worked with Follo Taxi for at least sixteen years”.	“Drives people from A to B, creates jobs in society”.	“Do not count your working hours, they are too many unproductive hours”.

Board Member 3.	“I started working for your Follo Taxi ten years ago”.	“It gives the people comfort and time saving value”.	“I’m glad that my family does not know, how much I just sit at work without actually working”.
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*Example 2. Descriptive coding. Interview conducted from Follo Taxi Employee. Different colors are used to coding, sorting and characterizing the interview text.*

<p>I am very service oriented person, who likes to put service as his first priority at work. I like to work with people. I am no sales-person; I like to work with service. It doesn't matter where I work, as long as I work with service. Follo Taxi for me is a company that has dark future. This company has been a good company, but not it is not. There are many reasons to that, maybe because a lot of things are not working as they are supposed to work. I do not look at Follo Taxi as my future workplace, if this company continues to go in the same direction as today, started from five to six years back.</p> <p>Workers in this company do not work as a team, they just work for themselves, and for their own benefits. Workers do not work towards the same goal, I think a lot of employees do not even know what the goal is. I have worked in many companies, but I have never worked in a company that is managed so poorly, so messy and unorganized. There are no consequences for workers poor performances. Drivers are missing the humanly element, they treat customers as if they were physical products, while driving them. They are not service oriented.</p> <p>The value company creates is the service to people, I am the product of service, myself. We give the good feeling to people, that maybe has a positive impact on their health. We give people free riding to hospital, because most of those calls</p>	Presents himself as a service oriented person.
	Company is under great challenge.
	Lack of participation & communication.
	Defining the value.



are paid by the government. Service is crucial in all of areas of this type of work.	Transportation waste.
We are wasting our resources, year after year the sales are dropping because of our poor service. We lose money when we always have to drive back to the taxi stand, to get calls, which did not exist before. We use to receive calls wherever we were, and drivers used to save their & customer's time, and the fuel.	Not striving for perfection.
No, employees do not talk about these things among themselves. I have tried couple of times, but no one want to talk about wastages. I have also tried to talk about the bad service provided by our company, but it just shows that people are too lazy to discuss and do not think as a union.	Customers waiting, lack of flow.
I think a balance between push and pull system works best, in terms of availability for customers. We should know our customers, and understand when the supply should be more and less. We should understand the pattern of demand. I have also heard that the customer do not get what they ask for, for instance they have to wait for a long time [on phone] before they are served.	Some rework, lack of stability
I have experienced rework and mistake from the company couple of time, but it can be eliminated, by using your brain. If the address is too far away, and it does not make any sense one can call and recheck. I know the reason for the mistakes, and it is because at times, it's very busy at the dispatch and they apparently have typos.	Things should be sorted, straightened and employees should have self-discipline.

<p>I have never been late at customer's house, because my car is always clean and things are sorted out. Therefore I start early, so that I can check if everything is at it's place, so that I do not have to find them later. Yes I am willing to talk about these wastages if the management is willing to hear about them.</p> <p>Anything that works to eliminate these wastes should be implemented.</p> <p>Anything that can improve things around us, in an open manner, where people who are not contributing are participating should be implemented.</p>	<p><b>Lean management can have an impact.</b></p>
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Example 2. Categorization and sub-categorization.

Interviewees	Define value	Resource wastages.	Lean's 5S
Employee 1.	"...transportation facility for people in the Follo region".	"I think time wastage is very common".	"Sometimes some drivers don't put child seats back at its original place, thus the next driver cannot find the right child seat".
Employee 2.	"Helps them to reach to hospital, school, train-stations".	"Cancelled call which is not informed to the driver, it complete waste of time"	"I think cars should stand in line so that the customer don't have to run back and forward amongst cabs, and get frustrated".
Employee 3.	"Follo Taxi adds value by transporting	"Too much availability is also kind of wastage, and not being there when	"I haven't been late because of not clean car, but I have been late because I couldn't find

	people, fulfilling their needs”.	needed is also wastage of ... money”	the child seat at the taxi stand”.
Employee 4.	“The value company creates is the service to people”.	“We lose money when we always have to drive back to the taxi stand, to get calls, which did not exist before.”	“my car is always clean and things are sorted out. Therefore I start early, so that I can check if everything is at it’s place, so that I do not have to find them later”.

*Example 3. Descriptive coding. Interview conducted from typical Follo Taxi customer. Different colors are used to coding, sorting and characterizing the interview text.*

Value creation in my eyes is, adding value to the society. Making a change, not just economically for yourself but also for the community. Follo Taxi adds value by providing service of transportation, which is more comfortable than most of public transportation types, yet its more expensive alternative also.	Value for customers.
Looking from the outside of the company, it looks like they do not strive much for perfection.	Challenges in the sustainability factor.
Yes, I would like to give my opinion, if I am given the chance to do so. Of course, I do not have all of my time to meet at Follo Taxi office, but at least once, I would like to share my opinion, if they do not mind. Moreover, I want to tell all the things that I like of Follo Taxi.	Availability of customer’s opinion.
(When asked upon wastes of company).	Inefficient routes and unproductive time.

<p>Maybe there is a fuel waste, when the driver do not know the efficient directions to the destination. There is also waste of time when they [taxi drivers] are just standing at the taxi stand, doing absolutely anything at all, unless they are doing something else besides work, but they are not adding value to the company.</p>	<p>Poor service, lack of self-discipline.</p>
<p><i>(When asked upon timely pick-ups &amp; drop offs).</i></p>	<p>Lack of stability</p>
<p>We mostly get picked on the right time, but there have been few times when we were late. But those few times were important for us to be on time. It was during the time when I had to reach for my daughter's appointment at AHUS [hospital].</p>	<p>Lack of JIT.</p>
<p>Often during weekends, its very unbalanced, sometimes we are overwhelmed by the responsive and fast service, yet other times we have to wait; in the cold weather outside the taxi stand, a lot of times we have chosen rather to walk home instead of hiring a taxi.</p>	<p>Positive attitude towards waste elimination system.</p>
<p><i>(Have you often waited in the telephone que, of Follo Taxi?).</i></p>	
<p>We have waited for long time in the phone ques, especially during the weekends. Now there is an app, but I am not so perceptive with that, I have not even downloaded, maybe I should.</p>	
<p><i>(Should Follo Taxi implement a systematic wastage organism?)</i></p> <p>Yes, if that procedure really helps to eliminate the waste, then they should. At least elimination of wasted time have to go, hopefully without raising prices, they are already very high.</p>	

*Example 3. Categorization and sub-categorization.*

Interviewees	Define value	Resource wastages.	Lean's 5S
Customer 1.	"Making a change, not just economically for yourself but also for the community".	"There is also waste of time when they [taxi drivers] are just standing at the taxi stand, doing absolutely anything at all..."	"Looking from the outside of the company, it looks like they do not strive much for perfection."
Customer 2.	"Transporting people from one place to another".	"Sometimes there are too many cabs just standing there at the taxi stand".	"There are many taxis that are not clean, and it's very often".
Customer 3.	"Follo Taxi is a convenient transportation form".	"I wonder, does the marketing helps when the final product is not satisfying?"	"If I am going to pay for a taxi, I would rather have clean one".
Customer 4.	"Help people reach places, when they really need to".	"Driving wrong routes, and not choosing hybrid cars".	"Follo taxi is not evolving with the time".

#### 4.1 Discussion

In this section, I will discuss the findings by cross analyzing interviews conducted from all three stakeholders. The three stakeholders are the three different types of groups, the customers, employees and the management. Cross analyzing is looking at the findings, collected from different sources, and seeking for correlations and impacts. There is a reason to believe that

cross analyzing can increase the reliability of the study. Since, one group can be bias or have a lack of whole information or might not tell the truth, for different reasons. While on the other hand, for a researcher it is crucial to have the “whole” information, not be bias, know the truth and see the bigger picture, in order to conclude the study properly.

If we begin to gaze from the inside by looking at the management’s point of view, they seem to be clear on the value creation of the company. Follo Taxi managers agree that their company creates value by transporting people from one place to another. Most of the managers have been working in the company for some period, from the range of twenty seven to ten years. I assume that they have probably been involved in many decision-making processes and have valuable information for this research paper. They stated that the most of the employees’ time is wasted, by doing nothing. One of board members said, *“seventy percent of the time, workers are not generating money”* which is much more than the half of the time they are at their workplace. While another board member states that, *“I’m glad that my family does not know, how much time I just sit at work without actually working”*. These comments clearly show that the time resource is wasted. In addition to that, employees were more or less on the same page. In this study, employees are the taxi drivers, not the taxi owners. Since taxi owners, has the stock in Follo Taxi, technically they own the company, collectively. Even thou, taxi owners also drive their own taxis but they are seen as the managers, since they make the decisions, hire people to take calls at the dispatch and own the hundred percent of the stocks in the company. So therefore, the term “employee” is referred to the person who drives the taxi, but does not own it.

The arguments from Follo Taxi employees showed a great potential for Lean Service implementation. They also seemed enthusiastic about eliminating the waste from their company. Many of the employees were even irritated and impulsive on the issues of waste. Therefore, many employees do not see their future in this company, and would rather go and work somewhere else. One employee says, *“I do not look at Follo Taxi as my future workplace, if this company continues to go in the same direction as today...”*. Looking from the researcher prospective, there is a lot of room for Lean Service in this company. Other important elements for becoming a successful company were also lacking. Employees opened up themselves in front of me and I was able to look into other areas, where I discovered the dark future of this company. There was lack of sustainability, self-discipline, standardization, simplification, cleanliness in many areas and

thus showing great potential for Lean Service principles. Employees claimed that the taxi stands at different locations were not tidy, most of the time, and they could not find stuff, and therefore they were late to serve their client. More specifically, they said that there were many equipment stolen from the workplace, others were broken and some were never returned back after borrowing. One of the employees stated in her/his interview, *“I have worked in many companies, but I have never worked in a company that is managed so poorly, so messy and unorganized”*. Employees claimed that if their company was more systematic and well organized, then most of the waste could have been avoided. Therefore, the company would have had better future, in other words, they would have achieved sustainability. They also agreed that to create a system, to eliminate the waste, create value and maintain sustainability they have to think as a team. Work as a one unit, starting off by changing their current structure.

A structure where the company time, human resources and transportation is considered as a company resource. Having said that, money resource is also being waste in Follo Taxi. One of the employees' comments, *“Workers in this company do not work as a team, they just work for themselves and for their own benefits”*. Drivers explain how they waste resources through excessive motion. The current system do not take under consideration the resources that are being wasted. Another employee claims that driving back to the taxi stand is complete waste of his or her time, fuel and energy. The current structure of the company, requires drives to drive back to the taxi stand. However, one of company's previous slogans claimed the exact opposite, which was *“the nearest cab will pick you up”*. Yet most of employees explain that this is a false statement made by the company, one says *“We lose money when we always have to drive back to the taxi, to get calls, which did not exited before”*. While another taxi driver says that, sometimes when a customer waves at them they have to stop and say *“you have to wait for another cab”* even if they are available. It is because the taxi that has just dropped a customer have to drive back to the taxi stand. Customers and employees look at this system as a waste of time. Let us use a similar scenario in a different service-providing, company. If a customer at a restaurant, waves at the waiter to order the meal, but the waiter says *“I'm sorry, I cannot take your order”*, even if he/she is available to take the order, and customer has to wait for another waiter to be available. Driver has to use the time to drive back, the time he/she could have used to generate value for the company. If there are too many cabs and that is the reason to distribute calls in this manner, then I would consider that as a waste known as overproduction, in Lean Service, overcapacity.

During the weekends, there are too many taxis available, way beyond the customer's demand. The demand is not constant in most of the service companies; it is rather based on season (months of the year), various days of a week, and hours in a day. Supply should be reflected by the demand, both over and under supply is a form of wastage. One employee says *"Too much availability is also kind of wastage, and not being there when needed is also wastage..."*. There seems to be a lack of stability in the service provided. For instance, if there are just needed three employees at a barbershop, yet there are five available, two are counterproductive, thus waste of resource; unless they are adding value in some other way. Employees are positive in implementing Lean Service strategy. They have the faith that they will be better off if Follo Taxi can save their resources. Many of the workers were excited to hear the idea of Lean implementation. Especially, when they were told that there is a possible systematic method to eliminate waste. Yet, the management needs to be more convinced about the idea of Lean implementation, and assurance that Lean might bring positive results for them. Without the agreement among managers it would be difficult to examine the Lean impact. Moreover, a drastic change in the way the company is operated is needed immediately. They need more than just couple of board meetings to make these changes. While, employees and customers, are the ones that experience most of the waste happening, so it was ideal to interview both of them groups.

Customers' prospective were also helpful even thou they are acting as an external group. I believe that a verification of arguments strengthens the quality of data collected, in terms degree of truth in the statements made by employees and the board members. Value for customers, from customer's prospective, is different from the value stated by the management and the employees. Most of the board members and the employees stated that the value creation is simply transportation for customers from one place to another. Yet, some of customers claimed that Follo Taxi should also give something back to the local community, give away sponsorships for instance to kids who play sports and be more involved in community services. However, when customers were asked upon of company's resource efficiency and effectiveness, they said following statements:-

Most of the time there are too many taxi during the weekends.

Often drivers chose the inefficient routes.

We had to wait for a long time in telephone ques before we were served.



Sometimes we had to wait for so long time, for a taxi to arrive, that we rather decided to call back the company and cancel the taxi.

However, similar to employees, customers also had a positive attitude towards Lean Service. They showed great interest in whichever way, that could eliminate the waste from Follo Taxi, and partials also to save their own personal time. While the management defended the company, by saying that the wastage in this type of work cannot be avoided, and thus they have to accept the waste. On the other hand, they were skeptical in considering Lean Service principles. Does that mean, since services cannot be stored as physical products, service companies just have to accept the waste? What about the Lean Service principles, such as JIT, VSM, 5S standardization and Product Balancing, cannot they eliminate waste in a service-providing company?

## 4.2 The Findings

In this section the Findings from the research study will be seen from the theoretical prospective, in order to examine the impact of Lean principles. However, this would be done with the help of the literature that has been considered for this research paper. Furthermore, in this section possible reasons for Findings will be discussed.

In the results, it has been clear that Follo Taxi was a suitable company for this research. Clearly all three stakeholders agree that Follo Taxi is using its resources wastefully, and something must be done. Therefore, the selection for a company as a “lab-rat” for this paper was a successful task. The linkage between Lean principles and a potential impact on a service providing company also been accomplished. Though it does not automatically means that Lean principles will definitely bring positive effects on a company. However, in the Findings it is clear that resources are wasted and there is a lot of room for elimination of these wastages. On the other hand, Lean principles echoes in Follo Taxi challenges. Actual results from Lean service is not so easy to produce, because it would take at least a year or two before the results are yield, good or bad. These actual results take certain amount of time in order to be significant and visible to the company, yet first they have to make drastic changes and implement Lean principles deep down the strategy of the company. Further, live it through understanding and communicating cross the company. Good news for Follo Taxi is, that the employees are willing involve, and contribute in company, customers are supportive and managers acknowledge that there is a problem. Fortunately, the problem is identified. However, the impact requires lot of confidence,

education, patience, self-discipline, rapid culture change, time and capital before it's fair to examine these results. The way the management is handling situations and the current structure of the company, create doubts, lack of directions and tons of waste. Most of the doubtfulness and messy structure, which further causes most of the waste, is due to misunderstood company's goals and willingness to work as a unit, as one of the employees stated. Not knowing the goals of company, or misunderstanding it, shows the nonexistence of solid communication and awareness of how much the company is wasting. Both parties, management and the employees, have to work together to eliminate their unnecessary waste and build up their reputation.

The main Lean principles in Lean Service are, Just-In-Time, Value Stream Mapping, 5S standardization and Production Balancing (Heijunka). They can be extremely helpful for, Follo Taxi. Collectively from the articles of Lean Service, these four Lean principles are seen as potential tools that can be used in a service sector (Leite & Vieira, 2013). If Lean is implemented in a service-company, these four Lean principles are crucial. The first principle, JIT, is quit important, because in a service providing company, there aren't physical products being produced, company is selling service, by using it's time. Therefore, not meeting customers' needs on time, while wasting their own time, it waste of a major resource. In addition, time cannot be stored, whereas time used on physical product can be stored, indirectly obviously, because these physical products can be stored. Follo Taxi wasting their time is complete waste of one of their major resource, and thus JIT structure and mindset can have a positive impact. Production Balancing and JIT are interdependent and close related. As earlier mentioned, Production Balancing seeks to avoid overproduction and underproduction. Almost all the interviewed employees, most of the board members and customers claimed that there are always too many taxis at certain times of the week, it's a lack of Production Balancing. In a service-company there should not be more employees than needed, and in order to optimize employees, Production Balancing can be considered. Production Balancing in service does not always mean cutting down on human capital and time, it simply means balancing the production; in other words, if more resources are required then it must be supplied. By achieving Production Balancing, companies have half way achieved JIT phenomenon. Since if the supply is reflecting the demand, and let us assume that the demand it at the equilibrium point, then there would "never" occur a shortage or a surplus of services sold. Coupling between the theory from Lean Service articles and data collected from Follo Taxi illustrates firmly that Lean principles can have major impact

of service companies. However, motivation, involvement and integration of company's employees and management has to be at place to succeed and generate positive experience for everybody. While, it is not so straightforward to simply agree on implementation of Lean Service, and expect positive results. Company has to take big steps, change things around so the Lean principles can actually generate results, and work as it is supposed to. Mainly because then the results received from Lean Service would be valid to examine. If the Lean principles aren't implemented properly; then it is misleading to draw conclusions. The decision to change the structure and implement Lean Service system thoroughly has to come from the top, from the management, because employees cannot make those decisions. However, they should be well informed, educated and motivated to follow the changes made. Most of the employees and board members, claimed that a service company cannot fully adopt JIT, and avoid over- and under production. Meanwhile, I would rather call over- and under production as "over- and under capacity". The reason for calling the Production Balancing as, "Capacity balancing," is that service companies have capacity to offer to their customers; the waste that occurs is when the capacity is over or under than the capacity demanded by the market. Qualitative data and articles are pointing towards importance of VSM and 5S standardization, before there could be any impact to examine from lean service principles.

As we can see in Follo Taxi, the company is having major challenges. Employees and customers are complains over things and areas that are primary objective for 5S standardization program. For repetition, 5S standardization stands for five activities beginning with letter "S", and they are, to shine, sort (straighten), simplify (set), stabilize and sustain (self-discipline). Lack of 5S standardization are seen from problems addressed by employers. The need for 5S program becomes significant when employees say:-

"...drivers don't put child seats back at its original place"	<b>Lack of sorting equipment, setting properly, and further sustain the system.</b>
"..I have been late because I couldn't find the child seat at the taxi stand".	

<p>“...cars should stand in line so that the customer don’t have to run back and forward amongst cabs..”</p>	<p><b>Lack of sorting cars.</b></p> <p><b>Lack of simplifying for customers; so that it’s easy to address their cabs.</b></p> <p><b>Lack of self-discipline to sustain.</b></p>
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Lack of 5S standardization, are also seen from customers’ addressed problems. To grow, Follo Taxi must sustain. Like any other company, sustainability is crucial for growth and avoidance of painful unexpected events. For instance, expenses from drastic makeovers, marketing campaigns or dumping of products. Furthermore, in case the company lacks sustainability and have to face unpredicted events. Follo Taxi must consider 5S standardization to avoid future costs and to reduce their current expenses. From the prospective of two of the Follo Taxi customers, the company is not evolving. One of the customers claims that, *“Looking from the outside of the company, it looks like they do not strive much for perfection”*. While other customer stats that *“Follo Taxi is not evolving with the time”*. Customers do not see improvements in Follo Taxi, while Taiichi Ohno claimed, *“Without standards there can be no improvement”*. Deming Cycle is one of the methods to practice Kaizen in a company, of Dr. J. Edward Deming, containing cycle of PDCA (plan, do, check, act). The wheel of Deming Cycle encourage companies to focus on continuous improvement. In striving for perfection, one of the methods are to involve different groups of stakeholders to the company meeting to get the actually ground-level knowledge upon challenges and potential ideas to solve those problems. Both Qualitative data and Lean Service articles support the idea of involving individuals from different areas in the company meetings. Most of the employees want to share their ideas and ground-level experiences, only if Follo Taxi is willing to hear their difficulties and thoughts. For instance, one of the employees says, *“Yes, I am willing to talk about these wastages if the management is willing to hear about them”*. To make employees feel involved and important for the company, the key seems to be the Communication. Employees want to share their ideas and concerns. Some say that, the Follo Taxi listens to their concerns and makes changes, but the implementation process is unfortunately quit poor, and nobody follows the new rules. There are almost no consequences for not following the rules. There is a need for internal control that ensure consistent following of company rules & regulations.

On the other hand, respected service providers are not keeping their workplace shined. While employees complain that company is unorganized, the cabs are not either organized. It is difficult to say whether it's company's or the employees duty to keep their cabs clean, but from the customers' point of view, it's the responsibility of Follo Taxi. One of the customer stats that, *"There are many taxis that are not clean, and it's very often"*. Another customer commented on the same issue saying that, *"If I am going to pay for a taxi, I would rather have a clean one"*.

There are also customers who complained saying that, drivers often do not find their own things, such as pens to sign, paper for receipt printer, coins/change to give back etc. I perceive untidiness as a time wasting variable, yet not just for the company's drivers but also for the customers. Thus, Lean Service principle, 5S standardization, can act as a resource saver for Follo Taxi. Within the Lean Service, keeping clean and scrubbed, should be a part of workplace culture, almost as an internal language that everybody understands; and it requires change in the company structure. Reason behind dirty & messy cabs, seems to be the lack of, striving for perfection, communication, good culture, productive company meeting, seriousness at work etc. The good culture and communication seems to be lacking because of the confusion in roles & responsibilities and emotionally distant relationship among cab owners and employees. Resources can also be saved by improving communication, if the roles & responsibilities are communicated properly then there would be less confusion.

In order to benefit from the Lean Service principles, a service company must create & evaluate VSM. It seems as if Follo Taxi is not following VSM or any similar strategy. The reason behind the importance of VSM is to create a flow, maintain stable JIT supply & sustainability, and thus which will improve overall performance. All stages in value creation must be re-evaluated. As authors, Rother & Shook (1999), stated in their article, that it does not matter if a process stage is adding value to the product or not, VSM should include all of the stages. Unfortunately, Follo Taxi is poor in most of five aspects of VSM, and shown below:-

Steps of VSM	Status of Follo Taxi
Define value	Employees and the managers were able to define the value they should be creating.

Identify the value stream	Somewhat misunderstood by the employees and taxi owners.
Make the value stream flow	There is not stable value stream flow.
Implement a Pull System	Company is pushing supplying, thus results in overcapacity & excessiveness.
Strive for perfection	There is no strive for perfection & sustainability.

Results conducted from the research study changes some aspects of already known theory. Production Balancing in Lean Service is more specifically a Capacity Balancing, as earlier mentioned. In a company that only provides service none physical products, the product is the service itself while the capacity is adjustable thus a form of production component. It is the very nature of service, inseparability. Conclusively to optimize or balance the production, a service company might want to balance the capacity. On the other hand, in a service company it can be challenging to apply JIT completely. One of the main reason is that, there have to be some supply of service, so that the customer can be served when he/she arrives. For instance, in a situation when there is no customer at the barbershop, the barber has to accept the waste of time and other resource attached. Therefore, the complete adoption of JIT is pragmatically difficult. Which means that Capacity Balancing can also be challenging, because they are mutually depended. As in one of the Lean articles, author Slack articulated, “*JIT is ... technique, aiming at improving global productivity and eliminating waste. It comes as a consequence of the use of a balanced production*”.

#### 4.3 Generation of hypothesis

***Lean principles can potentially benefit a service-providing company.***

The impact of the Lean principles can be understood through significance of some of the Lean tools. Moreover, the impacts can also bring wonders, yet there are some challenges. Let us first look at the significance of Lean principles, in the concept of Lean Service. The main Lean

Service principles are such as JIT, Production Balancing/leveling, VSM, 5S standardization, and Training. Employees need to be trained at following rules & regulations and learn to adopt to the change. Production Balancing is Capacity Balancing because service is inseparable in its very nature. It is the capacity, in terms human resources, that the company provides to the market. A complete JIT can be challenging in service sector, because at least one individual, who is providing service, has to be available at all times, in order to sell. However, the main goal of Lean is to eliminate the waste in resource usage. Therefore, the balancing of JIT is crucial, in other words, there should be enough supply of service at all times, yet try to avoid the surplus of service. For instance, in Follo Taxi, there are too many cabs waiting for several hours without any call, while at other times, there are none. Therefore, the Capacity balancing must be considered. On the other hand, to create a smooth ride over all, VSM is a significant principle. Beginning with defining value for customers, what does the customer pay for? What is the valuable for customer? A company can collect the data for “value for customers” through collecting Qualitative data, in form of interviews, discussions or Quantitative data, in form of surveys and numeric data. Further, in order to cut waste, it's important to identify activities that create value, while those that do not create value must be eliminated from the process, to avoid waste of motion, time, and capital. Looking back at the Follo Taxi, the time that is wasted by cabs drivers must be eradicated, especially when there is surplus of taxis during the weekends.

The third step is to create a value flow. Activities should run smoothly without unnecessary interruptions. Workers must know what they are supposed to do and how they should do it. For example in Follo Taxi, drivers should know addresses, efficient routes and practice quality customer-service. Similarly, a waiter must have control over table numbers and meals, avoiding wrong deliveries of food. The fourth step is about implementing a Pull system. However, Pull system is a victim of perishability. Training is also helpful in Lean Service. Employees must perform their responsibilities and job tasks well. Debatably, service cannot be stored, therefore service companies seek to push products and cause high WIP. Therefore, the implementation of Pull system can be challenging, and thus service companies have to tolerate cost associated with availability of the service provider. Yet, as we have seen in the case of Follo Taxi, over availability is non-value generating, lack of Capacity Balancing, time & human resource wastage and have many other disadvantages. In a service company, mixture of Pull and Push system could be ideal. The last step of VSM, “striving for perfection” is the element of

sustainability. In order to sustain and maintain the growth of the company, it's crucial to involve, at least, some of the main stakeholders. Lean principles encourage companies to gain knowledge from individuals from different areas of the company during the decision making process. Kaizen is another method of sustaining, through continuous growth. Deming-wheel is also helpful in a service company.

Customers of Follo Taxi often complained that the company was not up-to-date. Outdated system, increasing competition, messy routines calls for change. Since market is “always” evolving, a continuous modification is beneficial; also because drastic makeovers usual costs tremendous amounts of capital. 5S standardization keeps the company in check, whether it's manufacturing or service. The results from the research demonstrated how the lack of 5S standardization caused resource wastage. Authors such as Swank (2003) and Song et al. (2009), articulated in their studies that 5S standardization is proven to be beneficial in service companies such as insurance, bank & financial services and mechanical & electrical services.

#### 4.4 Limitations during the research

For the most part research went as planned. The research limitations those that were assumed prior to the study were fairly accurate. The problem topic of this research paper was to predict the impact of Lean principles on a service-providing company. The time limit did not allow to examine the actual results. The central limitation in this research paper is the lack of implementation of Lean principles in a service-providing company. Yes, there have been done some prior research studies on effectivity and efficiency of Lean in the service sector, but the theory is still debatable. Several studies disagree and argue that Lean principles fully or partly does not benefit service companies. The implementation process of Lean itself in a service company might have raised further unthought-of and unpredicted events. Furthermore, challenges that could have raised additional questions on the validity of Lean Service.

However, even most of the precautions were taken to maintain the validity and reliability of this research paper, some interviewees still seemed little doubtful whether they could open up themselves to me. Yet, the questions and the topic in the interview guide were valid and reliable. The interviews took more time than expected, to perform and later to code. On the other hand, some interviewees were having language difficulties. They could not communicate, neither in



Norwegian nor in English, properly. Fortunately, I can speak four to five different languages, so that helped. Since this research paper is typed in English, the translation had to be done very carefully to avoid the lack of missing information, biasness & misinterpretation. It was also bit challenging to make an appointment with employees, since most of them were off from work due to the winter vacations and Easter holidays. Some of the employees did not had time to interview at their workplace, so the interviews were conducted at their home and at other places; I had to drive around to their preferred locations.

## 5.0 Conclusion

The purpose of this research paper was to study, the impact of Lean Management philosophy in a service-providing company. Lean is a systematic approach of eliminating all forms of waste and encourages continuous improvement. I researched and I believe it is fair to say that the Lean can have a positive impact on a service-providing company. However, there are some challenges due to the nature of the service as a product. Conclusively, companies such as Follo Taxi can drastically improve by implementing Lean to their business structure. Four most common tools of Lean Service are such as, Value Stream Mapping (VSM), Production Balancing, Just-In-Time (JIT) and 5S standardization. The complete implementation of Pull-System, which is a part of Value Stream Mapping, can be challenging. Mainly because, availability of service provider is essential in most, if not all, service oriented companies, and thus there will be availability cost, even thou in the times of no consumers. Production Balancing can be defined as “Capacity Balancing”. Since the capacity of service-availability should be managed to cut waste, because the product itself is the service. Meanwhile, other elements of VSM and 5S standardization are straightforward in their usage. However, many researchers claim that there is no proper framework for Lean Service, and therefore it’s obscure and baseless theory. Ongoing debate about the validity of Lean Service is what makes this research even more interesting.

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## Appendix

### Interview guide for employees

1. *Could you tell me little bit about yourself and about the company (Follo Taxi) you have been working in?*
2. *How do you perceive Follo Taxi? (in a good and bad way)*
3. *How have your experience been with your workplace?*
4. *Could you inform me on what kind of values does Follo Taxi create in the society?*
5. *How is this value created, walk me through the process?*
6. *Have you ever heard of Lean Management? And do you know what Lean Management means? IF the answer is no! Explanation will be given, yet the next question will be in simpler vocabulary.*

*Explanation: Lean is a systematic method of elimination waste from a company. Any kind of wastes. For instance such as money waste, time waste, human resource waste, intellectual waste etc.*

7. *According to your knowledge does it seems that Follo Taxi is a victim, to one or more or any kind, of wastages? Directly or indirectly wastage of, money, capital, time, human resource or intellectual skills.*
8. *Do you feel that wastage of company resources is a subject of discussion among employees or within the company?*
9. *Do you believe in being available for customer all times or provide them service when they demand for it? (testing whether they are pulling or pushing)*
10. *Do you feel sometimes that there are too many or too less taxies available for the customers?*
11. *How and how many resources are provided when you and your colleagues need them? Are they provided in timely manner*
12. *Have you ever waited in line for Follo Taxi service?*
13. *Your comments on rework, mistakes, reordering of the calls?*
14. *Do you think there are any methods to eliminate these kinds of wastages?*

- 15. Did you ever felt that you were late to the customer and or to work because of your workplace, taxi stand and the car, was not clean, sorted, standardize and straightened?*
- 16. Are you willing to contribute your ideas and thoughts in the company meetings, where your ground skills are heard and thought upon?*
- 17. Comment on methods of waste elimination (Lean). If they are implemented to Follo Taxi would they have an impact? Good or bad*
- 18. Do you think Follo Taxi should implement it?*

#### Interview guide for customers

- 1. Could you tell me little bit about yourself?*
- 2. Do you or have you ever used Follo Taxi? For how long have/had you been customer of Follo Taxi?*
- 3. How have your experience been with the company? Do they deliver promised service?*
- 4. What is value creation in your eyes that you receive from Follo Taxi?*
- 5. According to you, does Follo Taxi strive for perfection?*
- 6. If opportunity given, would you like to participate in contributing ideas to the work methods to Follo Taxi?*
- 7. Have you ever heard of Lean Management? And do you know what lean management means? IF the answer is no! Explanation will be given, yet the next question will be in simpler vocabulary.*

*Explanation: Lean is a systematic method of elimination waste from a company. Any kind of wastes. For instance such as money waste, time waste, human resource waste, intellectual waste etc.*

- 8. Do they have any kind of wastages in your eyes?*
- 9. Do you get picked up on time by Follo taxi? Further do you reach your destination on time with Follo Taxi?*
- 10. Are there times when you have to wait in line either on the phone to Follo Taxi or for the taxi to arrive for you?*
- 11. Have you ever reordered your taxi, because they did a mistake in your order?*
- 12. What would you comment on availability of Follo Taxi?*



- 13. Does any kind of non-standardization cause problems in quality of service? IF more explanation needed, such as route variations, variations in procedure (when it comes to the payment methods, communicating with the driver, child seats etc, allowed to sit in the front or not etc.)*
- 14. Do you believe that a procedure to eliminate wastages would help Follo Taxi?*

## Interview guide for the management

- 1. Could you tell me little about yourself and your role in the Follo Taxi? (Name, position title etc will be held anonymous).*
- 2. How long have you been with the company?*
- 3. Could you inform me on what kind of value does Follo Taxi create in the society?*
- 4. How is this value created, walk me through the process*
- 5. Have you ever heard of Lean Management? And do you know what Lean Management means? IF the answer is no! Explanation will be given, yet the next question will be in simpler vocabulary.*

*Explanation: Lean is a systematic method of elimination waste from a company. Any kind of wastes. For instance such as money waste, time waste, human resource waste, intellectual waste etc.*

- 6. According to your knowledge does it seems that Follo Taxi is a victim, to one or more or any kind, of wastages? Directly or indirectly wastage of, money, capital, time, human resource or intellectual skills.*
- 7. What is management doing to eliminate these types of wastages?*
- 8. Do you feel that waste of company resource is subject of discussion among management/leaders?*
- 9. Do you believe in services being available for customers all times, or just when they demand for it? (testing whether they are pulling or pushing)*
- 10. When and how many resources are provided to the employees? Are they provided in the timely manner?*

- 11. Is it overproduction possible in a service company or in Follo Taxi for instance?*
- 12. Are you willing to let employees and or customers to contribute in company meetings, where they can share their ideas and thoughts?*
- 13. Do you think if methods of waste elimination are (Lean) implemented to Follo Taxi could it have an impact on the company? Good or bad*
- 14. How old is the technological- and procedure system of the company? (to check excess motion-time waste, reworks, waitings)*
- 15. How often does callers have to wait in line to order a taxi?*
- 16. Do you think these types of wastages should be eliminated, and is it possible to eliminate them in a service company, and for instance Follo Taxi?*



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