

Department of Management and Organization

Master of Science in Business and Economics

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# Exploring Lean Service

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How to implement lean in a service context

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The lean production concept has triumphed over traditional mass production (Krafcik, 1988) and is recognized as the new paradigm for production (Bartezzaghi, 1999). Given the success of lean production it has over the past two decades moved into the area of service. This transference to service is not fully understood, as it is not quite clear how to apply a manufacturing concept in a service context. Nonetheless, the application of lean service has manifolds outpaced the knowledge within the research field.

This thesis aims to understand how to implement lean in service context by exploring operational success factors and challenges affiliated with lean service from an organizational perspective. This thesis develops eight operational principles of how to implement lean service and further we uncover that people, undoubtedly are the single most important factor to successfully operate in a lean fashion. Academically, the main contribution lies within the appendix and the developed list of success factor and challenges in regards to lean service.

## **Acknowledgments**

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I would also like to express my gratitude to all the respondents who took a lot of their time to answers all of our questions. Without all of your insights this thesis wouldn't have come through.

/Eric Andersson Forsman

I could not have done this on my own and Eric Andersson Forsman you have been the best partner one could ever wish for. I have tried my best to test your patience, but even through my illness, you stood beside me. For that I owe you many thanks and my gratitude. Rainman, you certainly make it rain!

Niklas Modig, thank you for your support in good and bad times, both in terms of academia but also on a personal level. I am glad to call you my friend.

I think this thesis has thought the three of us a great deal of how fragile life is and that a thesis is just a thesis. With that in mind I am extremely proud of what we have accomplished.

Finally, a warm thank you to all the respondents who made this thesis possible, without your input this thesis would be a plain piece of reading.

/Dan Spinelli Scala

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## 1 INTRODUCTION

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*In this first section we would like to provide the reader with the “raison d’être” for this thesis. We will therefore briefly go through the lean concept and why we need to study lean service.*

Today, Toyota Motor Company is most commonly affiliated with superior quality and excellence. However, this reputation for excellence has not always been the case. In the post-World War II era, 1950, Japan was left in ruins and yet from the ashes Toyota Motor Company has established itself among the world’s top car manufacturers. It is the most peculiar Cinderella story and argued as the most influential “*productivity-enhancing management innovation since Taylor’s scientific management at the turn of [20th] century.*” (Schonberger, 1982 cited in Abdi et al., 2006, p. 191).

The success of Toyota can be explained by the Toyota Production System also known as TPS and Taiicho Ohno is recognized as the father of the TPS. He claims all he did was to make Henry Ford’s production-line more flexible and even attest that Mr. Ford would have done the same thing given the circumstances (Ohno, 1988). The TPS is remarkable, because it is a perfect adaption to its time and conditions (May, 2005). In 1950, the American car industry mainly focused on maximizing utilization from heavy machinery because it was there the capital investment lay and it was thought in order to maximize return on investment, the machines needed to constantly produce. At the time America was untouched by the war, in the sense that the war never reached American territory, thus infrastructure like technology and raw material was abundant, in comparative to the rest of the world. This was not the case in Japan, technology and raw material was scarce and there was an overall lack of funds. Therefore, Ohno started treating the resources’ as idle and emphasized quality and thus the production line became flexible and started flowing more effectively (Ohno, 1988). This phenomena, was coined lean production (Krafcik, 1988), because it utilized less resources, far less inventory and encompassed a faster production speed (Womack et al., 2003). As time caught up with America, this lean production has proven to be triumphant over traditional mass production (Krafcik, 1988) and is now recognized as the new paradigm for production (Bartezzeghi, 1999).

Lean is successfully being applied in various industries (Wood, 2004) and over the past two decades lean has moved into the area of service. This transcendence to service is not fully understood i.e. how to apply a manufacturing concept in a service context? Nonetheless, the application of lean service has manifolds outpaced the knowledge within the research field. It is within this new frontier of service production we chose to explore and dedicate this thesis. First, by understanding the current literature, then through an open-ended questionnaire to industry

experts we hope to understand and further enhance the present knowledge of how to implement lean in the service sector.

## 1.1 BACKGROUND

Lean Production has its origins from Toyota and the TPS, but the concept was made famous by the book *The Machine that Changed the World* (Womack et. al., 1990). Today, lean production is continuing its success and has been acknowledge as a superior production system (Kumar & Prakash, 2011). Given the success of lean production the trend today is the move of lean production principles into the service industry, such as lean banking (Elewaut et al., 2003); lean administration (Tischler, 2006); lean dealership (Kiff, 2000); lean government (Scorsone, 2008); lean healthcare (Fillingham, 2007); lean call centers (Clark, 2007) etc. Most of the literature focuses on providing success stories and often entails a value stream analysis on a case-to-case basis. Most of these success stories are based on the principles of *Lean Thinking* (1996) as Womack et al. entails five principles to follow in order to become lean. However, drawing back on the origins and looking at Toyota and the TPS, lean is so much more than this five step process. In fact, Toyota never used the word lean. The word lean production has its roots from Krafcik (1988) that first coined the term and set up the basic principles of lean production and ever since the lean concept has been widely interpreted. We chose to depict the evolution of the industry application and theoretical development of lean in a four-by-four matrix.

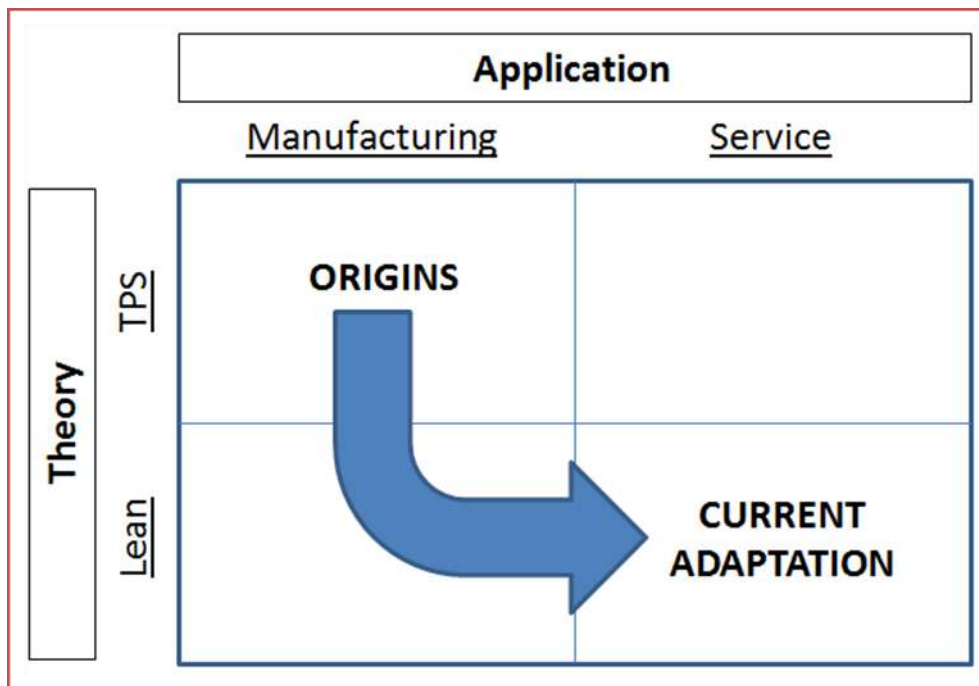


Figure 1.1- Evolution of Lean [Own model]

## 1.2 PROBLEM DISCUSSION

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Interestingly, although there exist no universally established lean production principles (Doolen & Hacker, 2005), yet lean has still transcended the move into the service industry. Pettersen (2009) argues that there is no consensus on the theoretical level of what lean production is, hence it is vital that organizations create an understanding and consensus before their adaptation of lean production.

In 1998, Bowen and Youngdahl pioneered the research field of lean production moving into services. However, research is still being conducted on this topic. This research is far from rich compared to all the many success stories of different cases concerning the application of lean in a service context. Åhlström (2004) contends that the lean production principles can be applied on a principle level in a service context although with some slight modification and consideration, due to the inherent difference in nature between service and production industries. This is interesting because as previously mentioned newer research indicates that there exist no lean production principles that are universally expected (Doolen & Hacker, 2005; Pettersen, 2009) hence there seems to be a discrepancy of what principles should be evaluated when adapting lean production in service context. Thus, it is quite possible that lean has further evolved when adapted into the service arena.

The difference between service and production might seem large at first, considering one is comparing car production to life insurance production. However, this difference should be down played considering Levitt's seminal article from 1972.

All industries are, effectively, service industries. Some industries merely have greater service components than others. Many so-called service industries such as fast food, mutual funds, and credit cards have applied manufacturing solutions to people-intensive service problems. To gain benefits, managers should consider the problems and desired output; how to redesign the process and install new tools that automate the job; and how to control people's behavior and channel their choices. The primary objective is to serve the customer's needs efficiently and effectively, and to make customer service an integral part of what the customer buys. (Harvard Business Review, 1972)

This means, that the difference exists in the collaboration with the customer and to serve and satisfy the needs of the customer, "*...one of the essential characteristic of service industries, that of the inherent variability created by the existence of the customer within the system*" (Silvestro et al., 1992, p. 63). Åhlström (2004) also attest that the adaptations of lean production principles into a service context are still in its infancy. Hence, the difficulty of defining "lean service" as there is an apparent research gap of actually understanding what contextual factors affect lean adaptation in a service context and to fully understanding lean service on a principal level.

The inherent difference between service and production might make it hard to uncover all the factors that could affect lean in a service context. Also, considering that most studies are done on case-by-case comparison, there could be apparent differences within what service archetype one operates in: professional services, service shop, mass services (Silvestro et al., 1992). Hence it becomes hard to account for all variables that might affect the production, given the inherently deep variations of the dimensions of services.

### 1.3 THE SUCCESS OF LEAN CONTINUES

The popularization of lean has escalated; we will even declare that we are currently entering a lean revolution. Given that rapid expansion of the adaption of lean service, research will sooner rather than later uncover the many complexities of “going lean”. Some research has proven that lean can fail in a service context (Bodek, 2008; Emiliani, 2011), corroborating the possible complications of lean adaptation spans across the entire organization.

The below graph depicts the amount of hits on “lean” “lean production” and “lean service” it has become rather frequent word in all of Swedish media. The word lean was mentioned 2 000 times in 2010, that means on average it was used 5,5 times on a daily basis.

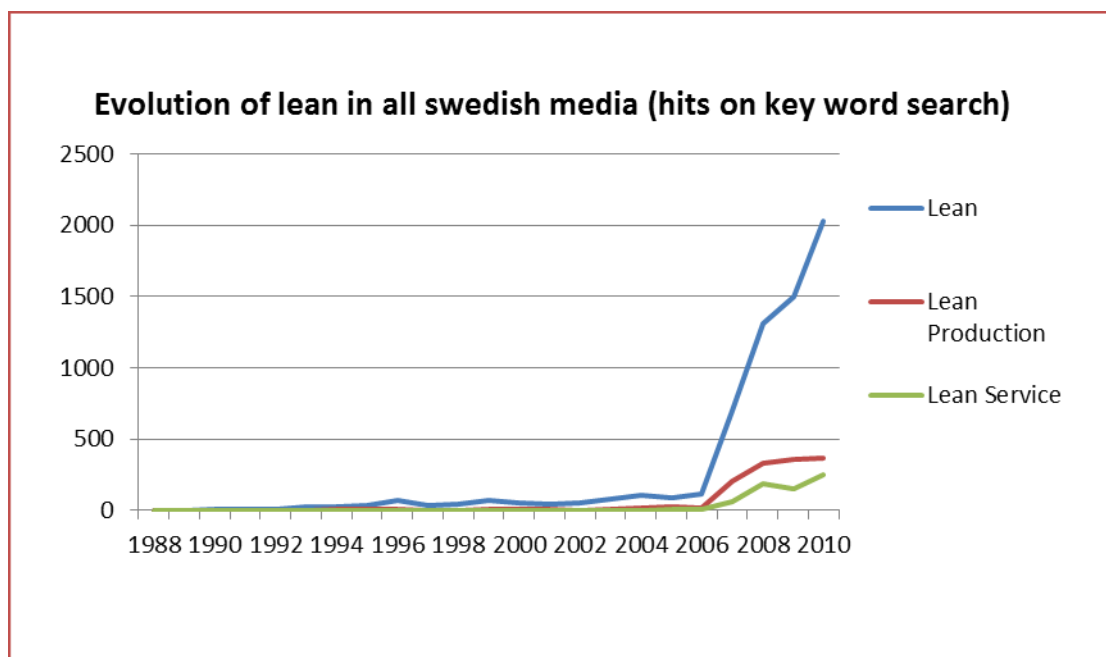


Figure 1.2 – Evolution of lean in swedish media. Retrifer AB, 2010 through SSE Library [online]

Moreover, lean in a hospital setting has spread rapidly over the last years (Bertholds, 2010; Borgström, 2010). According to *Läkartidningen* (Weimarsson, 2011), a Swedish medical journal, currently nine out of ten publically owned hospitals are actually applying lean, meaning it is more common than uncommon to operate in a lean fashion within a hospital setting. Unlike the

TPS, which is a production system, lean in a hospital setting should be viewed as a philosophy of change management on a local level and not as a method in order to be successful (Anhede & Lord, 2009).

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## 1.4 PURPOSE OF THE THESIS

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The fact remains that there are no universally accepted principles for lean production (Doolen & Hacker, 2005; Pettersen, 2009), hence even less for lean service. Therefore, we see a great need to explore and develop operational principles that can be associated with lean service. Thus, the purpose of this master thesis is to contribute to following research question:

1) *How is lean implemented in a service context?*

The relevancy of this research question will be highlighted in the following literature review by clearly identifying a research gap.

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### 1.4.1 SUB QUESTIONS

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In order to answer the above research question the below questions are also very relevant and in turn will be disseminated. These sub questions will constitute the overall approach of the entire thesis that ultimately will answer the above research question.

2) *What is lean?*

We find the subject of lean to rather unclear and thus needs to be explored.

3) *What are the operational success factors and challenges when implementing lean in a service context?*

In order to understand how something (in this case, the lean concept) should be implemented, we find it easier to focus on operational activities undertaken. This will in turn make the thesis more empirical.

4) *How does the success factors and challenges relate to an organization?*

This last question will hopefully provide profound managerial impact by constantly relating the success factors and challenges to the organization through a theoretical framework. The framework will provide a clear perspective of how to relate to the operational activities and serve as a mechanism for managing the data more effectively.

## 1.5 EXPECTED CONTRIBUTION

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First and foremost, we hope to provide a clear and concise answer of how to implement lean in a service context. Moreover, with this thesis we hope to develop and contribute to research field of lean service in two areas, both from a theoretical and managerial point of view. The theoretical contribution is threefold. Firstly, we aim to increase the current level of understanding of the lean concept. Secondly, we aim to uncover extensive lists with relevant challenges and success factors regarding the implementation of lean in a service context. Thirdly, we will identify the most relevant operational success factors and challenges by applying an organizational framework. The managerial contribution lies within understanding how these success factors and challenges relate to an organization, in order for the findings of this thesis to be applied in practice.

## 1.6 DELIMITATIONS

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The scope of thesis is to understand how lean is implemented in the service sector. Therefore, the thesis is limited to the descriptive area of theory building and reaches a little into the mapping territory as outlined by Handfield and Melnyk (1998). Another way to describe the scope of thesis is to say that it aims to explore the territory of lean service i.e. *what is happening, what are the key issues?* And try to identify the critical variables, by doing so de facto the scope lies within the realm of going from description to mapping area (Handfield & Melnyk, 1998).

## 1.7 DISPOSITION OF THESIS

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The thesis will be outlined as follows: after this introduction, the relevant literature will be reviewed and highlight the current research gaps within the field in order to motivate a relevant research question. Then we will continue by developing our research framework in order to “sort or filter” the empirical findings given this is an explorative thesis. Next, we outline our proposed method and research design. Thereafter we present the empirical data, followed by the analysis. In the synthesis we answer the main research question and relate our finding to the most relevant literature within the field. Lastly, we conclude this document by providing the main findings and a discussion for future research.

|                    |   |
|--------------------|---|
| Theory             | What we know and don not know about lean and develop a research question.   |
| Research question  | <i>How is lean implemented in a service context?</i>  |
| Research Framework | The theoretical structure that supports the research topic i.e. our "lean glasses"  |
| Method             | Outline the choice of method and how the analysis is structured   |
| Empirical Data     | Presentation of the results of the thesis   |
| Analysis           | Dissemination of the empirical data. The analytical process is divided into three parts, each related to the three distinct sub research questions. |
| Alpha              | <i>What is lean?</i>  |
| Beta               | <i>What are the operational success factors and challenges when implementing lean in a service context?</i>   |
| Gamma              | <i>How does the success factors and challenges relate to an organization?</i>   |
| Synthesis          | Provide a holistic perspective, answer the main research question, and relate to current theory   |
| Conclusions        | Summarizing the main findings of the thesis and concluding remarks  |

**Figure 1.3- Structure of thesis**

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## 2 LEAN LITERATURE REVIEW

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*In this chapter we will present a literature review on where lean research stand today. We will explain the origins of lean and how lean later has spread into multiple directions. We start off by describing the reviewing process.*

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### 2.1 LITERATURE REVIEW PROCESS

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In order to develop knowledge on the lean concept we developed a systematic keyword search in gathering information concerning lean. We used on-line databases ABI Inform Global, Business Source Premier, and Google scholar. Keywords used consisted of: “Lean”, “Lean Service”, “Toyota Production System”, “Lean Manufacturing” and “Lean Production”. We ended up with a comprehensive list consisting of 133 academic papers and 9 books which we studied, all the papers and books were read between researchers.

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### 2.2 ORIGINS OF LEAN SERVICE

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Everything started with Toyota and their development of the TPS. The production systems itself is largely designed by Tachii Ohno and in his book *Toyota Production System, Beyond Large-Scale Production* he describes the system and the rationale behind it. Ohno wrote the book in 1978 and in it, he explains that he tried to build a production system with the principal objective of producing many models in small quantities.

The essence of TPS is the absolute elimination of waste, which in turn is successfully executed through the two central pillars of the TPS: Just-in-Time (JIT) and Jidoka or Autonomation with a human touch or simply quality. Ohno explained that there are seven wastes that are dangerous to the company (1988, p.19-20).

1. Waste of overproduction(the worst one of them according to Ohno)
2. Waste of time on hand (waiting)
3. Waste in transportation
4. Waste of processing itself
5. Waste of stock on hand (inventory)
6. Waste of movement
7. Waste of making defective products

This is in short how Ohno himself described the core of the TPS. Toyoda Gōsei in the forewords of Ohno’s *Toyota Production System* (1988) provides perhaps the best illustration of the heart of the TPS when at work.

All we are doing is looking at the time line, [...] from the moment the customer gives us an order to the point when we collect the cash. And we are reducing that time line by removing the non-value-added-wastes. (Ohno, 1988, p. ix)

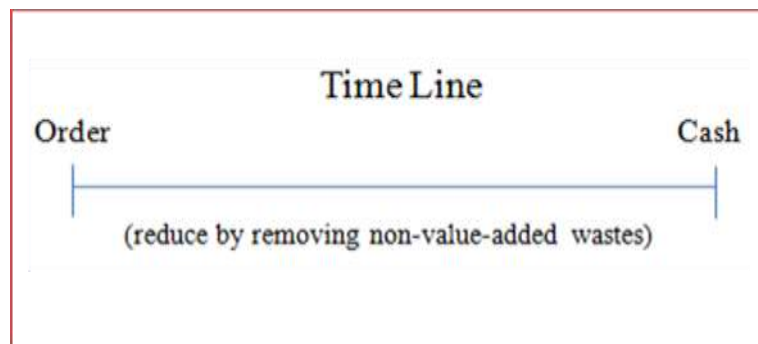


Table 2.1- Ohno, 1988 p. ix [book]

In 1988 John Krafcik, a MIT-researcher studied the TPS and in his study coined the term “lean” which is further defined by Womack as:

Lean use half the human effort, half the manufacturing space, half the investments in tools, half the engineering hours in product development, and far less inventory. (Womack et al., 2007, p. 11)

The MIT study later resulted in one of the best known books on lean *The Machine that Changed the World* written in 1990 by MIT-researcher James Womack, Daniel Jones and Daniel Roos. This was the first book published by westerner on lean, the book (at its simplest form) explains the difference between mass-production and lean production and why lean is superior. Womack et al. (1990) never offered a more specific definition of lean merely an extensive description of it. In 1996 two of the three authors to *The Machine that Changed the World* were back with another best-seller *Lean Thinking*. Womack et al. (1996) writes that the antidote to waste or *muda*, is lean thinking. Lean thinking constitutes five guiding principles that are to help lean practitioners making mass production companies lean:

1. **Specify value** from the standpoint of the end customer by product family.
2. Identify all the steps in the **value stream** for each product family, eliminating whenever possible those steps that do not create value.
3. Make the value-creating steps occur in tight sequence so the product will **flow** smoothly toward the customer.
4. As flow is introduced, let customers **pull** value from the next upstream activity.
5. As value is specified, value streams are identified, wasted steps are removed, and flow and pull are introduced, begin the process again and **continue until a state of**

**perfection** is reached in which perfect value is created with no waste. (Womack et al., 2003, p. 16-26)

Womack et al. (2003, p. 355) also added another waste to Ohno's list of seven wastes; the design of goods and services that does not meet the users' needs. Liker (2004, p. 29) also identified an eight waste; unused employee creativity. Lean thinking is an attempt by Womack and Jones (1996) to extend the philosophy of lean, and the guiding principles underlying lean to an enterprise level. These principles are adopted by many academic researcher; Emiliani (1998), Kiff (2000), Apte and Goh (2004), Atkinson(2004), Martinez and Sanchez (2004), Ehrlich (2006), Endsley (2006) and many more. What one must keep in mind is that these five principles are just a small part of what Womack et al. (1996) wrote in their book, and therefore most of the later studies has a different twist to these principles or differ in how they use them. For example, James-Moore and Gibbons (1997) also agree on the five principles of lean thinking but they add another ingredient to this definition:

Greatly reduced overhead burden by the use of matrix teams, simplifying information flow and processing, enabling flatter organization structures. (James-Moore & Gibbons, 1997, p. 900)

Emiliani (1998) writes about "*lean behaviors*" where the tremendous waste that normally exist in intra-and interpersonal relationships. Emiliani defines lean production in accordance with Womack et al. (1990), and lean behavior is defined as "*behaviors that add or create value*" (p. 619). Naylor et al. (1999) conducted an analysis over lean and agile manufacturing in the total supply chain, defining lean as: "*leanness means developing a value stream to eliminate all waste, including time, and to ensure a level schedule*" (p. 108) and secondly concluding that lean and agile being two different paradigms should preferably be coupled together in order to find the ultimate supply chain.

Spear and Bowen (1999) wrote an important article in the Harvard Business Review, which aimed to decode TPS and offer an explanation why it has been so hard to copy and adapt in other organizations. They conclude that lean is deluded since observers confuse the tools and practices with the system itself. In the article the authors try to make the implicit explicit. They identify four tacit rules that underlie the TPS:

1. All work shall be highly specified as to content, sequence, timing, and outcome. In order for the workers to learn the first rule Toyota has supervisors that pose questions to the workers while they are working; how do you do this work? How do

you know that you are doing this work correctly? How do you know that the outcome is free from defects? What do you do if you have a problem?

2. Every customer-supplier connection must be direct, and there must be an unambiguous yes-or-no way to send request and receive responses.
3. The pathway for every product must be simple and direct.
4. Any improvement must be made in accordance with the scientific method under the guidance of a teacher, at the lowest possible level in the organization. (Spear & Bowen, 1999, p.98)

In 2001, Toyota released a 13-page booklet called *The Toyota Way*, not to be confused with Liker's book in 2004 with the same title. In this booklet, Toyota describes the culture associated with the company and working with TPS. If the TPS rest on two pillars, JIT and Jidoka, the culture is also built around two central concepts, *Continuous Improvements* and *Respect for People*. These two pillars can further be dissected into elements. *Continuous Improvements*, is then broken into *Challenge*, *Relentless search for Improvement (kaizen)*, and *Genchi Genbutsu* (go to the source and see for yourself), then *Respect for People* has two elements *Respect* and *Teamwork*. These pillars and elements summarize the culture at Toyota and they are deeply rooted into their way of both thinking and working. Emiliani (2009) have done some research regarding this document along with many other researchers such as Liker (2004), who attest that the TPS along with *The Toyota Way*, the internal document make out the DNA of the company and his work has largely been influenced by these two documents

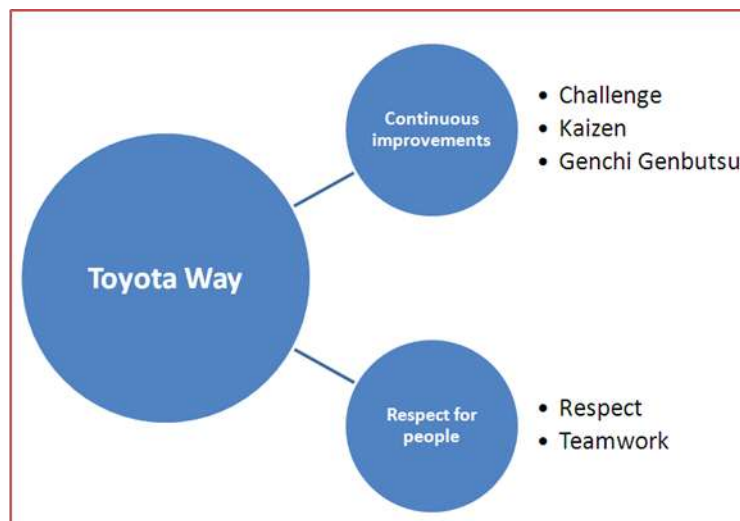


Figure 2.2- Toyota way. Toyota Motor Corp 2001 [Adapted model]

Allway and Corbett (2002) defines the lean approach as a focus of:

[...] eliminating non-value activities from work processes by applying a robust set of performance change tools and emphasizing excellence in operations to deliver superior customer service. (p.45)

Shah and Ward (2003) describe lean as:

Lean production is a multi-dimensional approach that encompasses a wide variety of management practices, including JIT, Quality systems, work teams, cellular manufacturing, supplier management etc. in an integrated system. The core thrust of lean production is that these practices can work synergistically to create a streamlined, high quality system that produces finished products at the pace of customer demand with little or no waste. (p. 129)

Liker (2004) defined lean as 14 principles in his book *The Toyota Way*. Atkison (2004) concludes that lean is a concept and strategy by itself - not a cost reduction tool. May (2005) use TPS and Womack (1996) as a foundation, and then speaks about lean thinking in combination with knowledge work. Åhlstrom (2004) recognize this confusion concerning lean production. He offers a definition built on Womack et al. (1990) and further developed by Karlsson (1992).

Hines et al. (2004) make a clear distinction that lean exist on two levels, strategic and operational. On the operational level tools and various techniques are utilized, but on the strategic level, called Lean Thinking, is lean a holistic approach or way of thinking and relating across the entire organization on all levels.

Shah and Ward (2007) also recognize the need for a single definition of lean production and offer:

Lean production is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer and internal variability. (p. 791)

**Conclusion:** The lean concept is rather confusing at a glance, it has its origins from Toyota and the TPS. However, lean does not have a simple and common accepted definition.

## 2.3 LEAN SERVICE

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Lean production marveled the manufacturing industry with impressive results of improved performance by shorter lead-times, lower cost, higher customer and employee satisfaction (Shah & Ward, 2003; Sriparavastu & Gupta, 1997) and thus the idea of lean in services began to root.

In 1998 Bowen and Youngdahl wrote an article called *Lean service: In Defense of a Production-line Approach*. In their article they defend the thoughts of Levitt (1972:1976) saying that manufacturing logic has, and should still, be transferred to service operations. Mass production could teach service operations plenty, but it had a major limitation concerning the efficiency-flexibility trade-off. Mass production presents the customer with low-cost, high volume offerings at the expense of flexibility. Lean production, however, offers both efficiency and flexibility at the same time. The authors summarize their definition by saying:

Lean manufacturing pays more attention to customer product preferences through increased flexibility and employee wants through higher involvement management practices. At the same time, it performs well on efficiency, quality and speed. (p. 213)

They do however end their discussion by acknowledge that they are aware of that there are still differences between the Toyota lean manufacturing environment and an attorney's office.

In 2005 Womack and Jones presents six principles of lean consumption. In 2006 Liker and Morgan develops 13 principles in *The Toyota Way in Services*. The same year Manos et al. (2006) writes about lean healthcare based on principles in the TPS. Tischler (2006) defines lean in the service industry as "...to create more value while reducing waste and cost for everyone." (p. 32) and is done by using three principles:

1. Let the customer say what is value to them
2. Reduce nonvalue adding activities in the system, causing process speed to increase.
3. Faster process speed positively relates to less waste, less cost, less work in progress (WIP), less complexity, higher quality and happier customer. (p. 32-33)

**Conclusion:** The lean concept is spreading into more areas; lean banking (Elewaut et al., 2003); lean administration (Tischler, 2006); Lean dealership (Kiff, 2000); Lean government (Scorsone, 2008).

## 2.4 EVALUATING THE SEMINAL WORKS

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It is clear from our literature review that there are two particular researchers within the field of lean (not taking Ohno or any other Toyota affiliated people into account) that stand out and are more cited than others – Womack and Jones, and Jeffery Liker.

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### 2.4.1 WOMACK AND JONES

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Womack and Jones along with Roos, as previously mention, made the lean concept famous through their book *The Machine that Changed the World* (1990). However, it was in 2001 with the republication of *Lean Thinking*, the concept really was taken to the next level. Maybe, it was because of the recession and organizations needed to do less with more. Regardless, the five principles that were introduced in the book offered a very functionally oriented solution to create flow throughout the organization and that organizations should work with customers and suppliers. The principles of lean thinking are not nearly as holistic as the TPS concept; however these principles have above been applied time after time in various case studies with a lot of success.

#### 2.4.1.1 ANALYSING LEAN THINKING

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Womack and Jones propose five principles of Lean Thinking (1996). These are five very concise principles and put into an organizational context one realize the short comings of five so precise principles. If one conceptualize an organization into four levels of hierarchy; corporate (the mission and vision of the entire corporation), business (the particular business division), functional (e.g. HR, finance, operations, marketing etc.), and operational (the day-to-day activities undertaken by each function). Further, compare the five lean thinking principles with these hierarchical levels of an organization and then some shortcomings of the five lean thinking principles are revealed from this organizational viewpoint.

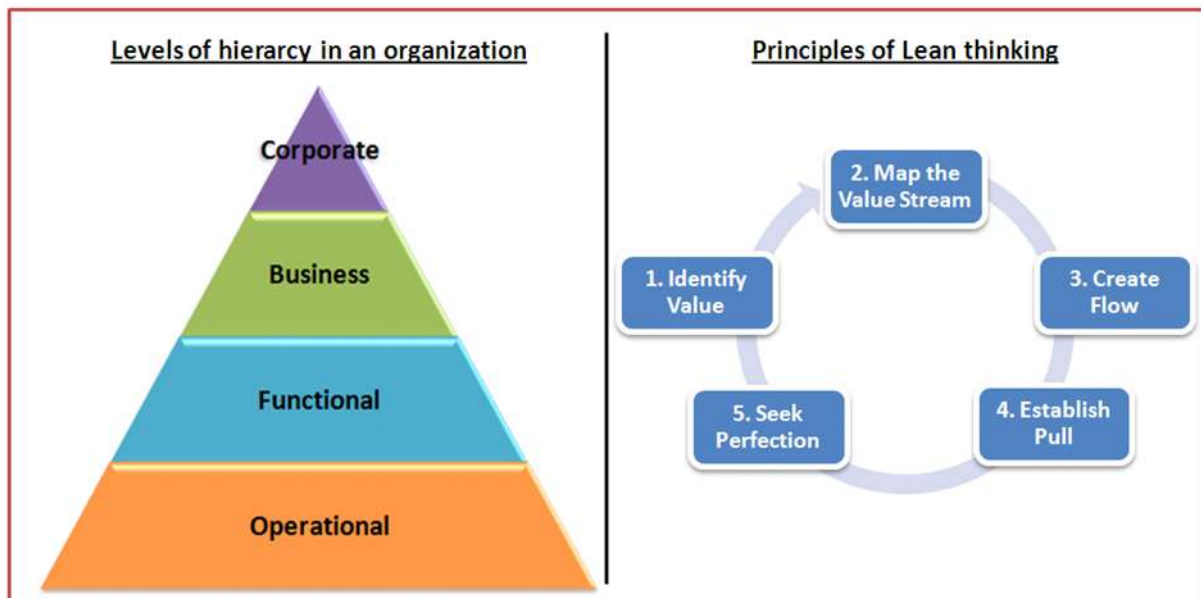


Figure 2.3- Comparative model A. [Own model] & Womack, J., & Jones. J., 1996. Principles of Lean thinking. p. 16-26 [Book]



**Figure 2.4- Comparative model B. [Own model] & Womack & 1996. Principles of Lean thinking. p. 16-26 [Book]**

Womack and Jones' five principles mostly deal with an organization from a functional and operational perspective and in conjunction with its suppliers and customers. Hines et al. (2004) state that lean thinking (not the same as Womack and Jones five principles although labeled the same name) lies within the sphere of strategy and lean production with affiliated tools support lean thinking. This is not adequate when analyzing lean service from an organizational perspective. In essence, these Lean Thinking principles are effective to create and synchronizing flow, but they are not all encompassing through the entire organization. Our literature review, so far, indicate that lean service span over the entire organization. Hence lean is much more than just securing flow. However, when reading *Lean Thinking*, Womack and Jones discuss more than just functionality and operations, they capture a much broader perspective in their book, but their five principles fail to do so. This failure is more explicit in the after words of *The Machine That Changed The World* (Womack et al., 2007) argued by Seddon et al. (2010), while Ohno (1988) states that without standards it is impossible to improve, he promotes individual learning, which in turn foster organizational development.

Standards should not be forced down from above but rather set by production workers themselves. (Ohno, 1988, p.98)

This is the vocal point of standardization according to Ohno, however, he also indicates that even writing down standards can hinder continuous improvement, because the process of writing might make it hard to incrementally improve over time because the process becomes fixed on paper. Regardless, individual learning through a scientific method is essential for organizational learning (Spear & Bowen, 1999). This is the point that Womack et al. undermine, because they advocate that standards should be pushed top-down by management. This is a common perception when lean is advocated as tool or method.

The work process itself, along with the management process, must be absolutely standardized by managers, and by manufacturing and industrial engineers as well, before a work team can have any hope of improving it. Standardization in this context means creating a precise and commonly understood way to conduct every essential step in every process. (Womack et al., 2007 p.290)

**Conclusion:** the lean thinking principles are only flow oriented and do not capture the entire holistic nature and interrelatedness of lean. Thus, these principles should be categorized as a tool because the fundamental idea of lean thinking relies on the notion of value and defining value. Further, the entire “going lean” processes from then forward rely on the value stream map and improving it efficiently. This thinking might fail to involve the entire organization in the “going lean” transformation.

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#### 2.4.2 LIKER

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Liker wrote *The Toyota Way* in 2004, not to be confused with Toyota’s internal document with the same name. The main difference between Womack and Jones, is that Liker captures the holistic perspective just like the TPS and it is not as operationally oriented as *Lean Thinking*. This is because his work is at large based on the TPS and *The Toyota Way, internal document*. Although, Liker provides a holistic view and captures most of the elements reflected in the TPS, at a first glance his model seems straight forward, but it is rather confusing when analyzing and it is not a complete accurate view of Toyota and the TPS.

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##### 2.4.2.1 ANALYSING LIKER’S TOYOTA WAY

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Liker presents his 4P model and 14 associated principles, from a first glance looks very effective but with a more detailed academic analysis it is perplexing. There are many issues that are confusing; we will here only present three of these issues in order to provide a basic understanding of why Liker’s model is so confusing.

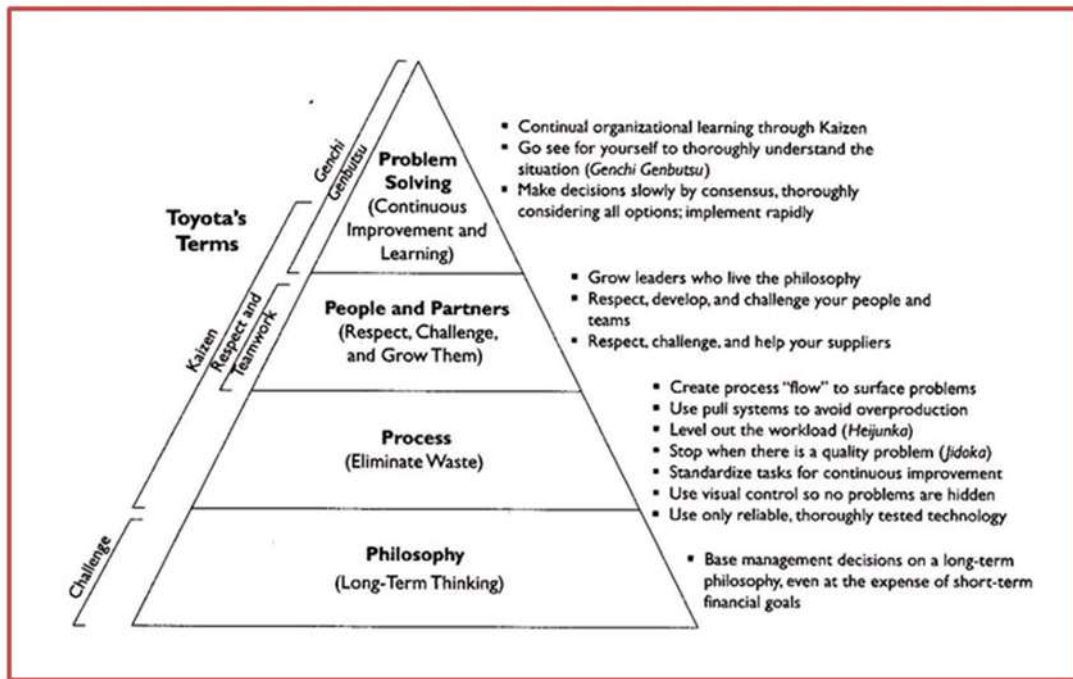


Figure 2.5 – 4P model. Liker ,2004. p.6 [Book]

First, the four “P’s” refer to different aspects of factors from an organizational perspective. People and Partners, Processes are clearly two organizational factors i.e. inherent to all organizations. However, Philosophy, and Problem Solving are activities undertaken by an organization not two organizational factors i.e. these activities might not always be carried out by all organizations. Therefore, it becomes hard to relate these organizational factors to one and other, because it is not like comparing apples-to-apples. Second, under Processes, there are many fundamental lean concepts and principles that fall under the same category. For instance, under Processes Liker talks about, flow or *JIT*, *heijunka* (leveling of the work load), *Jidoka* (quality or automation with a human touch), standardization, visual controls, use reliable technology. Now, Liker was heavily influenced by Taiichi Ohno and the Toyota Way internal document (2001), he even states that these two documents are the DNA of Toyota. Relating back to the TPS and the teaching of Ohno, he clearly makes a distinction between *JIT* and *Jidoka*, and states that these are the two pillars of the TPS. Other concepts that are brought up in Ohno’s book (1988) are methods and tools supporting these two principles e.g. visual controls support *Jidoka*. Liker does not have this clear distinction and therefore it becomes confusing. Third, under Processes Liker brings up the concept of flow in order to surface problems and also standardization and then improve on those standards i.e. continuous improvement. Then under Problem Solving, he again brings up the concept of surfacing problems and continuous improvement. He mentions *Genchi Genbutsu*, (when there is a problem which cannot be solved, let the supervisor know the problem and then he should go see for himself or herself in order to thoroughly understand the problem) which is again, according to Ohno, also a method that supports the principles *JIT* and *Jidoka*.

**Conclusion:** Liker's 4P model is fusion of various aspects of both the TPS and *Toyota Way*, therefore Liker have created a hybrid and mixed certain concepts which might make it hard to conceptualize and implement. However, we acknowledge the popularity of the book and the 14 principles Liker offers in the 4P model.

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## 2.5 SUMMARY OF LITERATURE REVIEW

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Although the TPS is rather clearly defined and well researched, lean is not as clearly defined. We might find a definition of lean production, but which one is the right one? Shah and Ward (2007) speaks about two general points of view on the highest level; one can either regard lean from a philosophical perspective with guiding principles and goals just like Womack et al. (1996) do. Or one can regard lean as a set of tools and methods like White & Chaiken (2008) do.

Within lean production there exist no universal framework "*...a universal set of lean practices is not fully specified in the research literature,*" (Doolen & Hacker, 2005, p. 58). There are slight nuances of different lean production principles from study-to-study, although they are similar in nature, but not identical. Lean production is multidimensional across the entire organization and involves all functionalities. This conceptualization of lean production as multidimensional is widely accepted by most researchers and is central aspect of the lean concept (Doolen & Hacker, 2005).

Given there are no universal principles on the subject of lean production, there is almost a complete lack of lean service principles, which has led to a bewilderment of ideas out there. Åhlström (2004) attests that the principles of lean production translated to the service industry are in its infancy.

In retrospect of this literature overview, one quickly realizes how perplexed and largely used the lean concept has become. It encompasses a wide range of issues all from synchronizing flow to the culture of the organization. Case in point, the lean concept has evolved over time with its origins within the factory of Toyota and as the concept has developed is has become more confusing and vague over time.

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## 2.6 RESEARCH GAP

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Our literature review indicates that current research mostly focuses on a case-to-case basis. Often these case-to-case research projects entail a value stream analysis or mapping, thereafter explain the impact and success of the lean implementation (Jones et al., 1999; Bushell et al., 2002; Swank, 2003; Emiliani, 2004; Apte & Goh, 2004; Su et al., 2006; Hines & Lethbridge, 2008).

These types of research design are good because they highlight the potential impact of lean service. However, as with any single case type study, generalizability becomes difficult. There is research that have incorporated multiple case studies, but they exist in few numbers (Spear, 2005; Hines et al., 2008; Esain et al., 2008; Radnor, 2010) and still do not take into account what makes service into service and how lean should be implemented in such a context.

There is also the type of research that aims to conceptualize lean service on a principle level (Bowen & Youngdahl, 1998; Åhlström, 2004; Womack & Jones, 2005; Liker & Morgan, 2006; Joosten et al., 2009). There is a fundamental problem with this, because other researcher claims that the principles of lean production are not yet fully established (Doolen & Hacker, 2005; Pettersen, 2009), thus it might seem rather rushed to focus on developing principles within the area if lean service, if there is not a fundamental consensus regarding the principles of lean production. However, though we would argue that there is a growing consensus among the literature that aims to conceptualize lean. Although there is not a full convergence, but divergent issues at hand are minor.

This highlights a research gap, current research focus mainly on adapting lean service on a principle level. The big contraction is that there are no universally established lean principles, not even in production. Regardless, current research overlooks how it should be implemented. This might be due to the great variation introduced by service but still the solid foundation of lean service is lacking. Further, our literature review showed that most research mainly focuses on applying tools and techniques in service setting. This overshadows the entirety of what lean really is. One thing that is evident from our literature overview is that lean involves many different aspects and together these aspects as a whole creates lean, i.e. lean has an interrelated systemic nature to it. A great analogy would be that of an orchestra, together as whole all the instruments and musicians can play a symphony, hence to uncover each musician's role in playing an instrument is good, but far from complete in understanding the complexities of the entire symphony.

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### 2.6.1 CONCLUSION

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The lean concept in itself is not completely fully understood, especially lean service. Therefore, it is hard to adapt a concept not yet fully developed. Also, some research take into account the inherent difference between service and manufacturing, but not fully explain how to adapt the lean concept. Given that lean service is such an underdeveloped research subject, it is also very possible that not all the variables affecting lean service adaption has been taken into account e.g. very specific contextual factors that are industry unique. Another possibility could be that since there is a discrepancy of consensus regarding lean production principles it is quite possible that

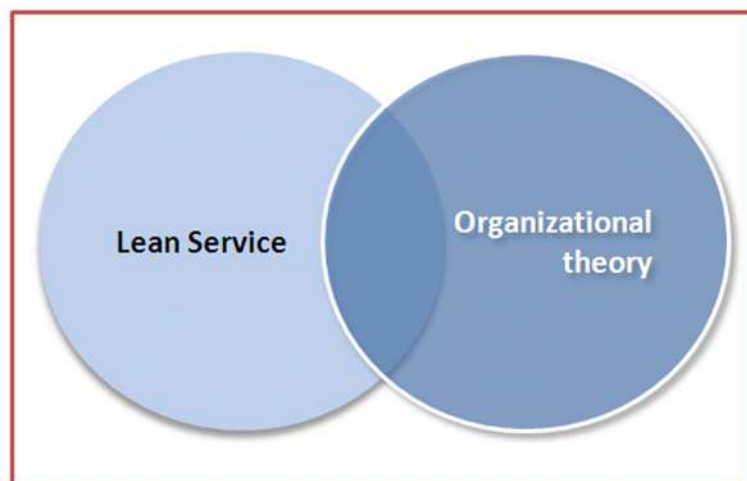
lean has further evolved when adapted into the service arena. Therefore, we see a great need to explore and develop operational principles that can be associated with implementing lean service. Thus, we must understand the certain success factors and challenges associated with these principles in order to answers the research question - *How is lean implemented in a service context?*

### 3 RESEARCH FRAMEWORK

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*In this section, we outline the research framework that will be adopted in this thesis. The research framework constitutes our view how to disseminate and answer the research question.*

The purpose of a research framework is to account all the critical assumptions. The research framework is a theoretical structure that supports the research topic. In turn, it strengthens the thesis based on 1) critical evaluation 2) connection to current theory 3) articulating assumptions 4) identify the limits of generalizability (University of Southern California, 2012). Since this thesis will explore *How is lean implemented in a service context?* In turn, we will disseminate the operational success factors and challenges when implementing lean service and how these success factors and challenges relate to the organization. Thus the research framework utilized will need to entail lean service and we chose to incorporate organizational theory in order to effectively “filter” the empirical findings.



**Figure 3.1 – Critical assumptions. [Own model]**

#### 3.1 BACK TO THE ORIGINS LEAN SERVICE - TPS

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The literature review outlined the perplexities of lean and in fact we know very little of what lean service really is. Therefore, the literature offers very limited choice in determining what type of research is best suited. Almost by default this study is that of the explorative type (although not entirely true, more on this in the methodology). The question then becomes what issues to explore?

On a conceptual level (see figure 3.2.), there are organizations that do not operate lean and then there is Toyota. What is the difference between these types of organizations? To find an answer we chose to explore certain issues around the origins of lean, namely TPS. This will in turn make the entire thesis more empirically driven, than just exploring lean service.

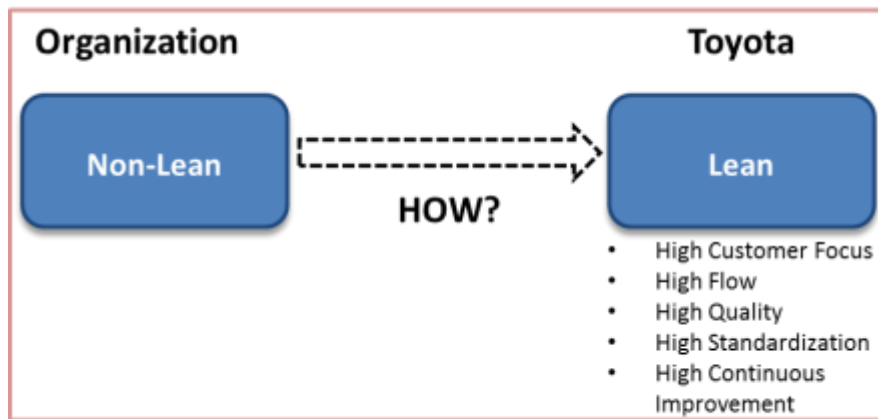


Figure 3.2 – Conceptual visualization. [Own model]

Lean, however, is more than just TPS, as the literature review details. It involves various interrelated principles that work together across the entire organization systematically. Therefore, we chose to disseminate operational characteristics from the TPS in order to be more concrete and very precise in terms of questions, i.e. more empirical driven. Thus, the question then becomes what are the operational characteristics of the TPS?

The Toyota Motor Corporation explicitly state five core concepts of the TPS: 1) Customer Focus 2) Flow 3) Quality 4) Standardization 5) Continuous Improvement. These five core concepts are represented by house at Toyota.

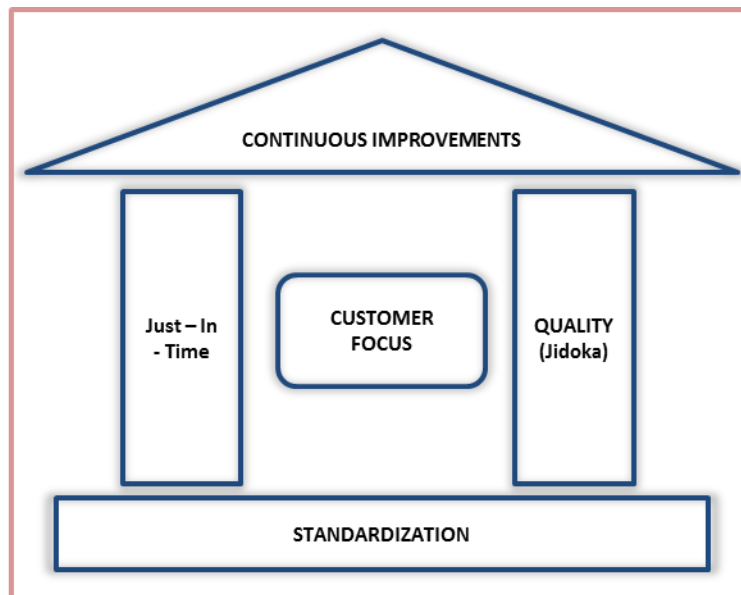


Figure 3.3 – Toyota house. Toyota Motor Corporation 2001 [Internal document]

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### 3.1.1 CUSTOMER FOCUS

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Essentially, customer focus it is a state of mind, to make every employee across the entire value stream conscious and customer oriented.

Create and develop advanced technologies and provide outstanding products and services that fulfill the needs of customers worldwide. (Toyota Motor Corporation, 1992)

Ultimately, everything should be produced in accordance and to the benefit of the end-customer. It is a complete surrender to this mindset, a promise to abolish waste. However, it is not always easy to recognize what constitutes as value for the customer, thus it becomes difficult to separate value from waste. Therefore, value must be clearly defined and changes over time. The motto used at Toyota is simple – customer first! *“Customers come first; then the dealers; and lastly, the maker.”* (Toyota Motor Corporation, 2002).

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### 3.1.2 FLOW

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Flow is established by adhering to the principle of Just-in-Time, which means only to produce *“(1) what is needed, (2) at the time needed, (3) in the amount needed.”* (Ohno, 1988, p. 26). Further, flow production is made to order, meaning the order is place by the customer then that in turn triggers the order of raw materials needed and so forth up the value stream. This is achieved most effectively and efficiently when all the waste is eliminated i.e. *muda, muri, and mura* (the three types of wastes (Ohno ,1988)). Thus, production is created according to Just-In-Time and flow is established, the emphasis is place on just.

Flow means that value is added to the product in each process while the product flows along. If goods are carried by a conveyor, this is not work flow, but work forced to flow. The basic achievement of Toyota production system is setting up manufacturing flow. This naturally means establishing a work flow. (Ohno, 1998, p. 130)

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### 3.1.3 QUALITY

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In the aftermath of World War II, Toyota was mainly concerned about producing high quality goods (Ohno, 1988). Because during this time Toyota had become extremely inefficient and as Just-in-Time controls the parts delivered to the production, implicitly if done correctly, eliminates the need for any inventory at all. However, Ohno realized that in order for Just-in-Time to be effective, quality must be impeccable *“Parts must be flawless and defects must be eliminated before progressing along the line.”* (Toyota Motor Corporation, 2004). Thus, the second pillar of the TPS was introduced. Workers were informed to constantly *“eliminate muda, mura, muri completely.”* (Toyota Motor Corporation, 2004). Out of these discussions came about

the famous kanban system (Ohno, 1988). Quality is also supported by the andon system (visual control) that indicates where the problem has risen and empowered employees to stop the production line. Ohno was very unconcerned about the short-term implication of stopping the production line, because he was convinced that this system would ultimately prove to be more effective in the long-run.

Further, Eiji Toyoda, Executive Vice President, Toyota Motor Co., Ltd., 1960-1967, put words into the quality control process by the notion of "*building quality into processes*," (Toyota Motor Corporation, 2005) the fundamental issue that "*the idea behind an inspection is to eliminate the need for inspections*." (Toyota Motor Corporation, 2005). Meaning, if the entire system is rigorously followed, i.e. standards meticulously adhered to. Then inspections, according to Toyoda in perfect world, would become unnecessary.

Moreover, the *customer focus* or *customer first* concept is also reflected in the quality aspect, "*High Quality Starts with The Customer*" (Toyota Motor Corporation, 2011).

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#### 3.1.4 STANDARDIZATION

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Standardization is the basis for improvement, sometimes certain the standards is rigorously followed and sometimes it is ignored (Imai ,1986). Because without functioning standards the output of any process will shift ever slightly and in fact just become one variation of the intended output. Once waste is eliminated from the process, the high production efficiency has to be maintained.

High production efficiency has also been maintained by preventing the recurrence of defective products, operational mistakes, and accidents, and by incorporating workers' ideas. All of this is possible because of the inconspicuous standard work sheet. (Ohno, 1988, p. 21)

A good standard work sheet should incorporate and combine materials, workers and machines. Then the TPS also introduce three elements of procedure: 1) Cycle time 2) Work sequence 3) Standard inventory. Cycle time relates the time allocated to make one unit or piece. Work sequence defines the sequence of operations and not the order of processes along the products flow (Ohno, 1988).

Lastly, incorporating the workers' ideas is essential part of organizational learning and a key take away from the TPS. Ohno even attest how hard it is to write a functional standard work sheet, because often it takes a lot of experience and deep understanding (Ohno, 1998). This way of learning is the opposite of Fredrick Taylor's method of scientific management (Taylor, 1947), where everything outlined and timed according to the standards set by management. Taylor believed that the standard should be pushed top-

down and workers should work. Womack et al. (1990) expresses similar concerns in regards to standards.

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### 3.1.5 CONTINUOUS IMPROVEMENT

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Continuous Improvement is to incrementally improve over time, which is *kaizen* defined. Improvement should be directed to the above mentioned areas, customer focus, flow, quality, and standardization. However, the most insightful way to understand what continuous improvement means in relation to the TPS is depicted in figure 2.1 (please refer back). The visualization of this figure is simply brilliant because it breaks down everything to one sentence which captures the quintessence of what makes TPS unique and offers a very profound and uncomplicated way of relating to continuous improvement. It provides a distinct focus point - reducing the time between customer order and cash collection by reducing non-value-adding wastes.

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### 3.1.6 EXPLORING TPS

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The TPS concept is an extremely intricate system and involves many concepts that are interdependent. Ultimately, we settled on exploring the success factors and challenges relating to each of the TPS areas. Thus, we chose to depict lean service with the TPS framework, because it makes the thesis more empirical. All areas of the TPS system were explored except for Continuous Improvement. This was excluded because of the concept Continuous Improvement is quite simple; to apply the other four principles incrementally better over time. Thus, essentially the concept of Continuous Improvement is not adding new value. However, in a production system it is unconventional to allocate time to think about improvements across all elements in the production chain.

Therefore, four out of the five core concepts of the TPS, will further be explored: 1) Customer Focus 2) Flow 3) Quality 4) Standardization. Then we choose to focus on success factors and challenges in regards to operational characteristics of the TPS and thus our empirical outline can be explained by figure 3.4.

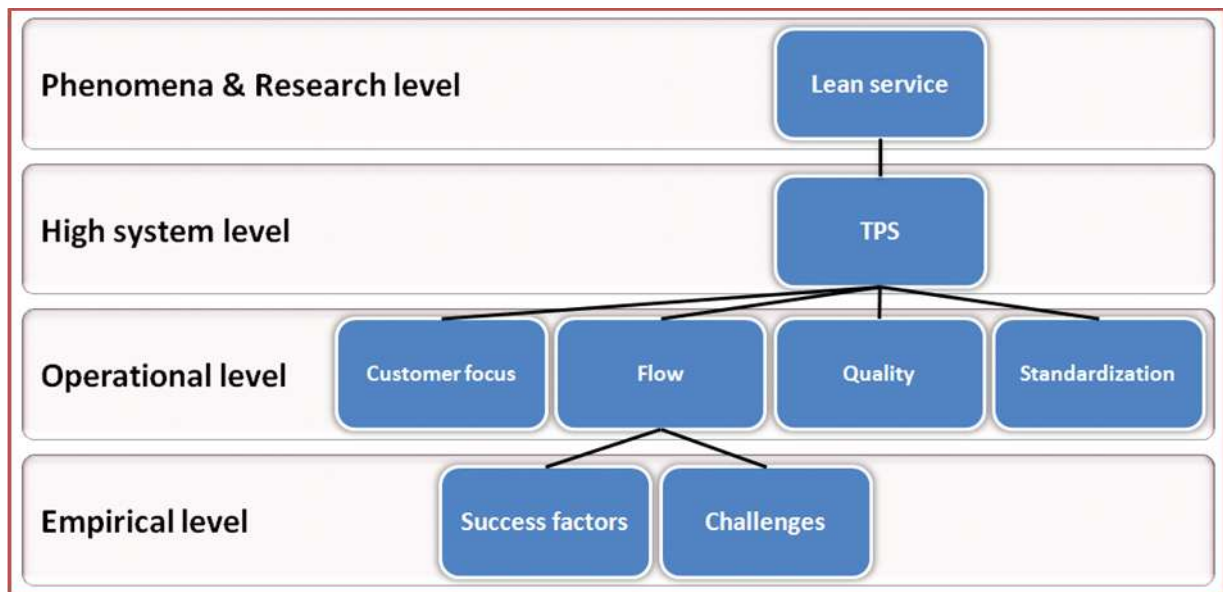


Figure 3.4 – Empirical outline. [Own model]

### 3.2 ADOPTING AN ORGANIZATIONAL PERSPECTIVE

Now that the foundation of what topics to explore in this thesis have been settled, then naturally there is a need to adapt a “sorting instrument” or a mechanism to “filter” the data. Therefore, we decided to structure and utilize organizational theory in order to classify the data i.e. a research framework. As the literature review entail, lean at its core is multidimensional and spans over almost the entire organization. This involves different functionalities within the organization and coordinating among these functions, all from working close with suppliers to maximizing the value to the end-customer. Also, lean holds a vertical scale of how people should behave from the top management to the lowest level of operation. Lean empowers people all across the organization and thus heavily influences the culture of the organization. Given the interrelated and systemic nature of lean, we find an organization perspective to be very appropriate in order to uncover and understand all possible issues when exploring success factors and challenges within lean service.

Choosing an organizational framework is, again, a balancing act; therefore, we acknowledge Weick’s three dimension of characterization of social theories.

[...] it is impossible for a framework to simultaneously be general, accurate and simple. The three dimensions are always in conflict with each other. (Weick, 1979 cited in Åhlström, 2004, p. 548)

With this in mind we decided to use an updated version of Leavitt’s organizational multivariate framework (1964). These variables will constitute our view of the organization, as they particularly stand out but also interact with each other (Leavitt, 1964). The purpose for using

this framework, as previously mentioned, is to have an effective filtering mechanism in order to condense the data. Below we outline the definition of the framework which in turn acts as a classification key.

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### 3.2.1 ORGANIZATIONAL CLASSIFICATION KEY

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Leavitt's framework originally consisted of the following four variables:

1. Task
2. Structure
3. Technology or Tools
4. Actors or People

Given that the original framework is from 1964 we saw a need to update these variables to; processes, structure, resources, and people.

We define **processes** as the reason for existence, so mainly anything concerning an activity that is in line with what the company does, including manufacturing and services tasks.

With **Structure**, we mean systems of information and communication, work-flow, involvement of top management, transparency issues, incentives, cross-functionality, authority and roles dealing with issues of who, or any type of system integration.

By **resources**, we mean tools, problems solving, performance management and measurements, visualization, education, value stream analysis, finances, computers, machines, programs. However, important to note is that we see a very small difference between resources and process.

Finally, roughly speaking, by **people** we mean that what exist within the human domain such as values, principles, understanding, knowledge, know-how, definitions, reflection, success stories, management control, long-term endurance, expectations, collective responsibilities, goals.

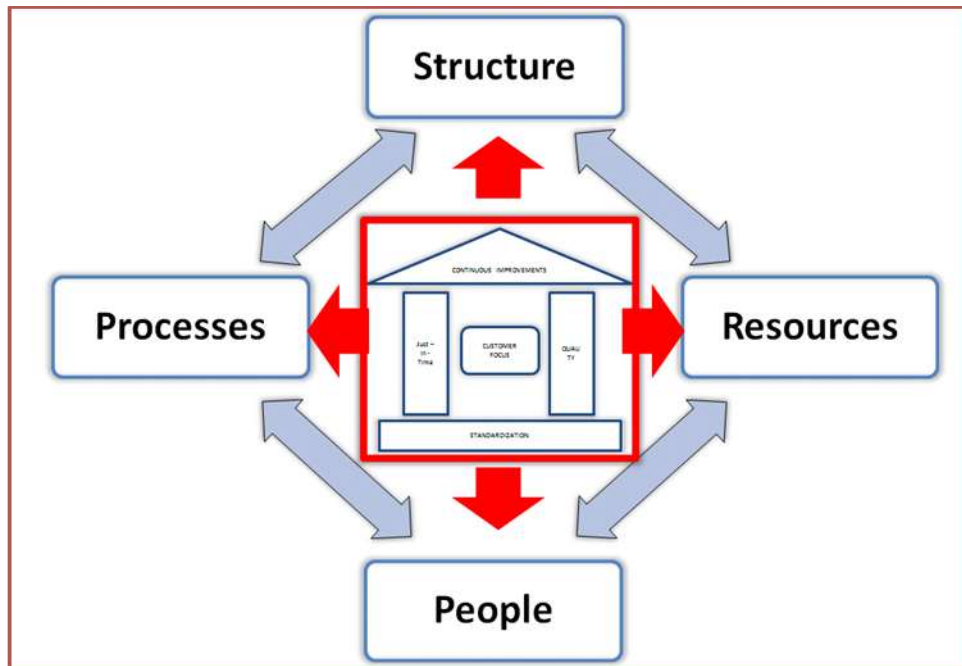


Figure 3.4 – Research framework. [Own model]. Consists of Toyota Motor Corporation 2001. [Internal dokument]. & Leavitt 1964. Organizational multivariate framework. p. 51-77 [Book]

It is important to note that the variables are highly interdependent (much like the lean concept itself) and therefore a change in of these might cause another expected or unexpected change in any of the other variables. Also, important to note, the above described parameters were developed in an exploratory fashion, meaning we started with Leavitt's original boundaries but in the process of classifying what challenge or success factor we saw the need to slightly update his boundaries. These boundaries provides the basis for how we view an organization, given the interdependence of these variables it has certain inherent flaws.

|                       |                 | Leavitt<br>Organizational framework |           |        |           |
|-----------------------|-----------------|-------------------------------------|-----------|--------|-----------|
|                       |                 | Structure                           | Resources | People | Processes |
| TPS<br>Four TPS areas | Customer focus  |                                     |           |        |           |
|                       | Flow            |                                     |           |        |           |
|                       | Standardization |                                     |           |        |           |
|                       | Quality         |                                     |           |        |           |

Figure 3.5 – Research framework, Matrix format. [Own model]. Consists of; Toyota Motor Corporation 2001. [Internal dokument]. & Leavitt 1964. Organizational multivariate framework. p. 55-77 [Book]

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## 4 METHOD

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*This chapter will explain the choice of method for this thesis, as well as outline of the entire research and analytical process. The research processes is divided into a pre-study and the main study. In turn the analytical process is broken down into several smaller steps relating to the sub research questions. Lastly, this chapter ends with a discussion on reliability and validity, followed by a critique of the method.*

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### 4.1 RESEARCH PROCESS

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#### 4.1.1 BACKGROUND

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In order to provide the reader with full comprehension of this thesis one must understand the background for the research project. The project was originally initiated by a consultancy agency and they had a distinct question that they wanted an answer to. Hence, extensive time and effort was spent on researching the subject and developing questions for the questionnaire to fulfill the third agents request, this was done mainly because there was a preconception that lean service could be quantified and tested with a deductive approach across a wider range of industries. The idea was to develop a tool that was able to assess the degree of “leanness” an organization exhibited in a service context. Then it would be possible to assess what organization that actually in practice are the best one i.e. finding the best practice of lean service.

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#### 4.1.2 PRE-STUDY

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Given this background, we set forward to solve this issue. The purpose was to assess a lean service organization and develop a quantifiable tool in order to make this assessment. Therefore the research approach and method was easily defined; deduction and quantitative. The design was determined to be descriptive. We set out to develop our hypothesis and then start the research. In accordance with figure 4.1 (Handfield & Melnyk, 1998) we thought we could start our research with step five - **Theory validation**, create certain hypothesis and from there develop a tool able to assess the degree of leanness of an organization.

1. **Discovery:** uncover areas for research and theory development
  - What is going on? Is it interesting enough to research?
2. **Description:** explore territory
  - What is there? What are the key issues? What is happening?
3. **Mapping:** identify and describe critical variables
  - What are the key variables? What are the key themes, patterns or categories?
4. **Relationship building:** identify linkages between variables, causal understanding
  - What are the patterns that link the variables? Can an order in the relationships be identified? Why do these relationships exist?
5. **Theory validation:** test the developed theories, predict future outcomes.
  - Are the theories robust? Is predictive capability validated? Are there unexpected behaviors?
6. **Theory extension/refinement:** expand the map of the theory, better structure the theories in light of observed results
  - How widely applicable/generalizable are the developed theories? Where do the theories apply? What are the constraints?

Figure 4.1– Handfield & Melnyk 1998, p. 320-339 [Article]

We found the task to be challenging, as the literature review provided a perplexed picture of lean, it was difficult to develop a hypothesis based on it. Nonetheless, we developed a questionnaire that aimed at theoretically determine organizations' "leanness". It was 20 pages in length and we had "discarded" 190 questions along the way and 8 different versions that were 15 pages or more in length. We conducted a pretest of the questionnaire on three individuals, one peer review and two external tests on potential respondents. Our idea was to test the validity of the survey before going "live" and all individuals were invited to give feedback on the questionnaire. However, after reading their feedback and in combination with the confusion in the literature review, we decided to radically switch approach in our research project. After two and half months the survey item was still not satisfactory, it was excessively long and we feared no respondent would want to answer such a survey and also the answers from the pretest made no sense.

This pre-study made us completely revert to the basic question, "what is lean?" and from there develop and design the research project, as Rossman and Wilson (1991) would have expressed it, we turned the idea around and had now a fresh new insight - we do not know what lean really is, therefore it impossible to assess.

As it turned out, we had to start with step two in accordance with figure 4.1 (Handfield & Melnyk, 1998) – **Description**. The purpose for this thesis will thus be and identify how is lean successfully implement lean in a service context and thus the aim of the main study is to research step three – **Mapping**. This provides a clear scope for the thesis and makes the

decisions in regards to method easier. Figure 4.2 below depict the turn of events and summarize our methodological choices rather well and as we settled on to design an exploratory research project.

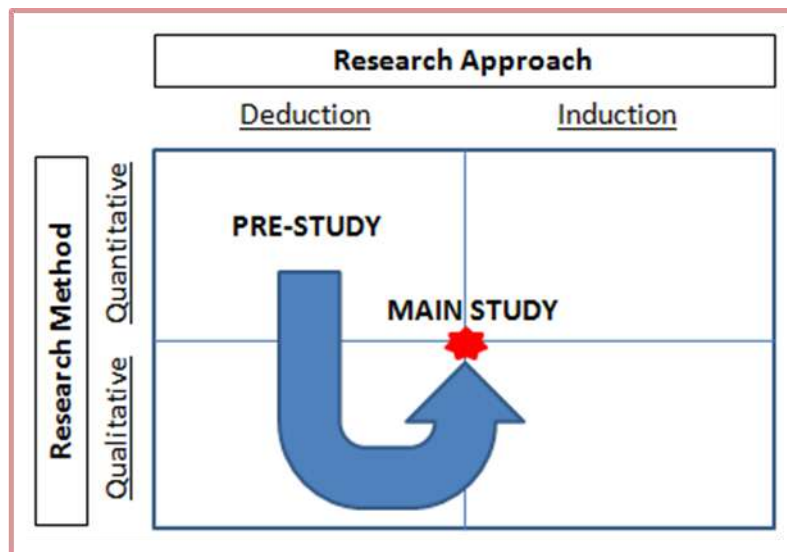


Figure 4.2– Research structure. [Own model]

#### 4.2 MAIN STUDY - RESEARCH APPROACH

The starting point for any research project is to determine whether the purpose of the project can be fulfilled with one of two broad approaches of research, induction and deduction. In essence, they are each other's opposites and therefore important to separate what approach the researcher actually will initiate (Hair et al., 2007).

A purely inductive approach involves no previous knowledge at all, however it might as Alvesson and Sköldbërg suggests become troublesome to develop a sound research question from this perspective. The end goal of induction is to be able to develop hypothesis and later create theory. The deductive approach is the opposite, where theory is tested in order to explain certain cases of reality (Alvesson & Sköldbërg, 1994).

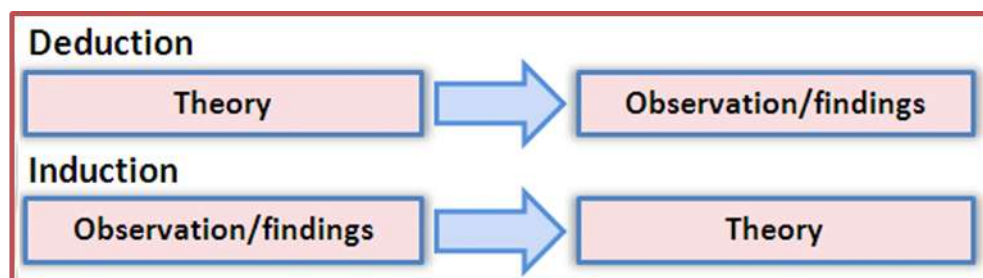


Figure 4.3– Deduction vs. Induction. [Own model]

Lean in a service context is in its infancy Åhlström (2004) thus a deductive approach at a glance would be troublesome to conduct. On the other hand, an inductive approach might be difficult because of theory generation or a general framework and providing a starting point or research question Alvesson and Sköldberg (2000).

However, Alvesson and Sköldberg (1994) argue for a third approach, a mid-way between induction and deduction namely abduction. Abduction in simple means the ability to see patterns, to reveal deep structures (Hanson, 1958). A general look through the broad outlines of theoretical and empirical research field followed as quickly as possible by a leap into one's own empirical material (Alvesson & Sköldberg, 2000).

The abductive approach combines empirical findings and theory, and in comparison to induction and deduction, it also contains an element of understanding and reflection. It allows the empirical area to evolve and the theory to be adjusted throughout the time of the study (Alvesson & Sköldberg, 1994).

For this research project, at first glance the inductive approach might have seemed best suitable, however given the fact that a literature review was conducted in order to develop a research question and that we aim to provide an analysis based on existing theoretical frameworks, **our approach is abductive.**

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#### 4.3 RESEARCH METHOD – QUALITATIVE VERSUS QUANTITATIVE

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There are two basic methods of research within the social science: quantitative and qualitative methods.

Quantitative methods often involve some sort of measurement and testing hypothesis through various statistical and mathematical analyses, which in turn can lead to either a rejection or acceptance of a hypothesis. The strength of the quantitative method is to reach certain latent and underlining factors not at first apparent. The qualitative approach is to create a deeper understanding of the research subject. Focus is on the phenomena while relating to the bigger picture where one tries to seek an explanation (Hair et al., 2007).

Quantitative methods can be used in order to convince a reader as the results become more precise and generalizable, it is regarded when using quantitative methods that the researcher's objectivity becomes easier to question. While on the other hand the weakness of a quantitative method is the missed possibility to uncover the deep underlining factors, which might only be discovered by qualitative methods. The strength of a qualitative method is just that, rich material and uncovering underlying structures, but the weakness is the opposite of the

quantitative methods strength, reliability, validity. Generalizability should always be questioned when using a qualitative method (Bryman & Bell, 2007).

For long these methods have split researchers, but however in more recent years Rossman and Wilson (1991) have given three advantages of combining the two approaches:

1. Enable confirmation or corroboration of each other via triangulation;
2. Elaborate or develop analysis, providing richer detail
3. Initiate new lines of thinking and turning ideas around, giving a new insight

In our research, **we have utilized a mixed approach**. The approach of the research is of the qualitative kind, but for the collection and analysis of data we have utilized quantitative techniques. Thus, leveraging the strengths of both methods and minimizing the weaknesses. This has been particularly useful in relation to the third advantage, turning ideas around.

#### 4.4 RESEARCH DESIGN

**We find the exploratory research most suitable** because exploratory studies are appropriate fit when the problem is hard to define and vague in nature and or little theory is available. Exploratory types of studies are often “*designed to discover new relationships, patterns, themes, ideas etc. Thus, it is not intended to test specific hypothesis*” (Hair et al., 2007, p. 154) instead generate hypothesis for testing in future research.

Indeed we are in early stages of research within the area of lean in a service context (Åhlström, 2004). Further a lot of previous research seem very contradicting to each other on certain parts. The fact remains that there are no universally accepted principles for lean production (Doolen & Hacker, 2005), hence even less so for lean service. Therefore, we see a great need to explore and develop operational principles that can be associated with lean service. Often exploratory research based on qualitative techniques; however it is possible to use quantitative approaches to. There are many situations when exploratory designs using qualitative approaches are suitable (Hair et al., 2007).

|                          | Pre-Study    | Main study  |
|--------------------------|--------------|-------------|
| <b>Research Approach</b> | Deduction    | Abduction   |
| <b>Research Method</b>   | Quantitative | Mixed       |
| <b>Research Design</b>   | Descriptive  | Explorative |

**Figure 4.4– Methodological choices**

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## 4.5 DATA COLLECTION

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Primary data was collected through an electronic self-completion survey. This quantitative survey technique gathers data economically and efficiently from the population allowing generalizations to be made about given factors (Cohen et al., 2000). The survey was an open-ended survey questionnaire or experience survey (disregarding from a few relevant descriptive background data), which is the only method accepted in an explorative study when the aim is to enlighten a phenomena that has not been previously studied (Malhotra & Grover, 1998).

Since these questions were of the open-ended format one fear would be the overwhelming amount of raw data this survey would generate, which is a very important shortcoming of this design – a hazard of all qualitative research (Miles & Huberman, 1994). In order to cope with this, the qualitative analysis tool *NVivo* was used reduce data, in order to make the data more manageable before drawing conclusions and generating hypothesis. Also, for the same reason i.e. an overwhelming amount of data, Leavitt's updated organizational framework will further "filter" and make the data more manageable.

The questionnaire that was developed encompassed 22 questions, all were analyzed. However, in this thesis only nine questions are presented. Eight questions are related to success factors and challenges in regards to the TPS framework. One question is related to understanding "*what is lean?*" The other questions are not within the scope of this thesis, in addition, these nine questions proved to have the strongest correlation, which made easier to streamline and make this entire thesis more cohesive, please see appendix 12 and 13.

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### 4.5.1 IDENTIFYING THE SAMPLE

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A variety of methods was used in order to obtain the sample, in order to develop a population or data set, which is a representative sample, it is generally recommended to follow set of well-defined procedures. We used the procedure outlined by Hair et al., (2007) and can be classified as an exploratory sample.

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#### 4.5.1.1 DEFINING THE TARGET POPULATION

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This research project's target population will be the best practitioners of lean in the Swedish service industry and data sources will be their subjective opinion, knowledge, mind etc. One of the major obstacles for conducting this study was to actually figure out what the unit of analysis would be. We believe that it is impossible for an individual to give a fair and representative answer for an entire multinational organization. Hence, we settled for the obvious, their individual opinions, thoughts, impressions etc. because the nature of this research is not to set up a cause and effect analysis.

|                       |   |
|-----------------------|---|
| <b>Element:</b>       | All individuals in an organizations, private, public, and government with some knowledge of lean. |
| <b>Sampling unit:</b> | Lean experts knowledgeable within the service industry  |
| <b>Extent:</b>        | All possible experts within the Sweden  |
| <b>Time:</b>          | 17 <sup>th</sup> of November 2010 to November 30 <sup>th</sup>                                    |

**Figure 4.5– Defining the target population**

#### 4.5.1.2 CHOOSING THE SAMPLE FRAME

In a perfect world the sample frame should be accurate and complete, however, in reality the sample frame is often flawed in a number of ways:

- It may not be up to date
- It may include elements that do not belong to the target population
- It may not include elements that do belong to the target population
- It may have been compiled from multiple lists and contain duplicate elements as a result of the manner in which the list was constructed

These criteria are very dynamic as they are all in conflict. However, due to the process of identifying relevant experts within field of lean service, the task itself might be overwhelming and that is only considering the identification, therefore a good enough approach would be justified if we in the survey item can assess their knowledge base. Hence, the sample frame was explorative mostly derived from participation on professional societies/organizations, such as *Lean Forum*, published listings, web site listings, direct contact with researchers and practitioners.

#### 4.5.1.3 SELECTING THE SAMPLING METHOD

This step is dependent on the nature of the study, objective and time available. Traditionally, the sampling methods are divided in two broad categories, probability and non-probability sampling. In our research we have used two main methods. Judgment and snowball method was mostly used to as the primary means to sample. Judgment or purposive sample method, also known as theoretical sampling (Alvesson & Sköldberg, 2000) was used in that sense that we do not include everyone from our sample frame, it is done with purpose in order to capture knowledgeable experts within the field. The snowball sampling method was utilized in the sense that respondents were free to recommend other potential respondents. It must be mention that with any non-probability sample, it will always be hard to ensure representation of all the elements and thus hard to generalize the findings.

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#### 4.5.1.4 DETERMINING THE SAMPLE SIZE

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One must account for three dimensions: degree of confidence from the true value, precision of the estimate, and the variability. The true nature of the above dimensions is always be hard to prove, therefore should be questioned. Usually these dimensions are more relevant and easier dealt with in a descriptive or casual research design. We utilized a subjective approach, the sample size we settled for was, more than 30 would suffice, the electronic collection tool would be deactivated once a 100 was reached, and if more than 50 respondents answered this would prove valid enough to reach theoretical saturation (see section 4.6.3 *Theoretical Saturation*).

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#### 4.5.1.5 IMPLEMENTING THE SAMPLING METHOD

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From the sample frame we purposive chose respondents and called them asking for their participation, while at the same time asking for other respondent they considered knowledgeable in the field of lean service, utilizing the snowball method.

- November 17<sup>th</sup> 2010– we emailed the electronic survey to the purposive chosen respondents.
- November 19<sup>th</sup> - the survey was sent to three more respondents from the sampling frame.
- November 26<sup>th</sup> - first reminder.
- November 29<sup>th</sup> - last reminder on the morning of the deadline.

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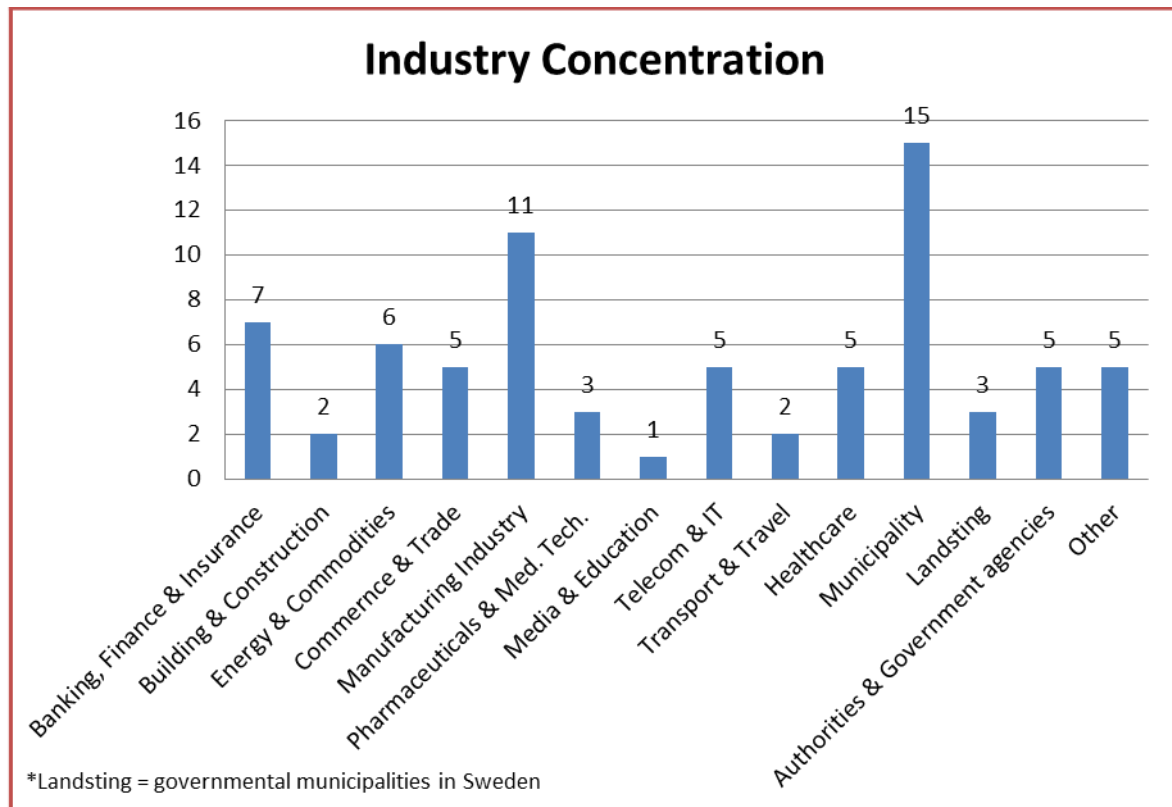
### 4.5.2 DATA RESULTS

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- 70 percent - response rate, collected 63 out of 91 respondents.
- 1 hour and 34 minutes - trimmed average completion time.
  - The word trimmed relates to the average time it took to type the answers in the survey. This indicates that the respondents carefully evaluated each question before answering.
- 28 hours and 11 minutes - real average completion time.
  - The time is long because it measures the total time it took from the start of the survey until it was finished.
- 4.8 years – average, experience working with lean service.
  - 0-20 years -interval
    - We question the maximum amount of experience because the term lean production was first coined 23 years ago in 1988, lean service even less, thus we find 20 years of experience questionable.
    - For those respondents with 0 years had required relevant knowledge from either education or research.

- 4 years – median, experience working with lean service.
- 51 or 54 - unique organizations.
  - Depending on the definition of a unique organization.
- 75 respondents started the survey, but only 63 successfully completed the survey.

The below table 4.6 indicates the industry concentration of the respondents.



**Figure 4.6– Industry concentration**

## 4.6 DATA REDUCTION

The data source was set on the minds and opinions of the individuals in the survey. Since the survey questionnaire was of the open-ended format, the raw data was overwhelming and qualitative analysis tool *NVivo* was used to reduce the data before further analyzing the data. Our approach was inspired by grounded theory, first published in 1967 by Glaser and Strauss, and it has come a long way since those days. We use the word inspired because given the time frame we could not be as rigorous as needed to state that we have followed a strict grounded theory outline. We have used it in an observational manner in line with content analysis, but applied several of grounded theory principles. The tools utilized in grounded theory are (Bryman and Bell, 2007):

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#### 4.6.1 THEORETICAL SAMPLE

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Involves a purposive or judgment sample and discussed in length in the section 4.5.1.3 *Selecting The Sample Method*.

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#### 4.6.2 CODING

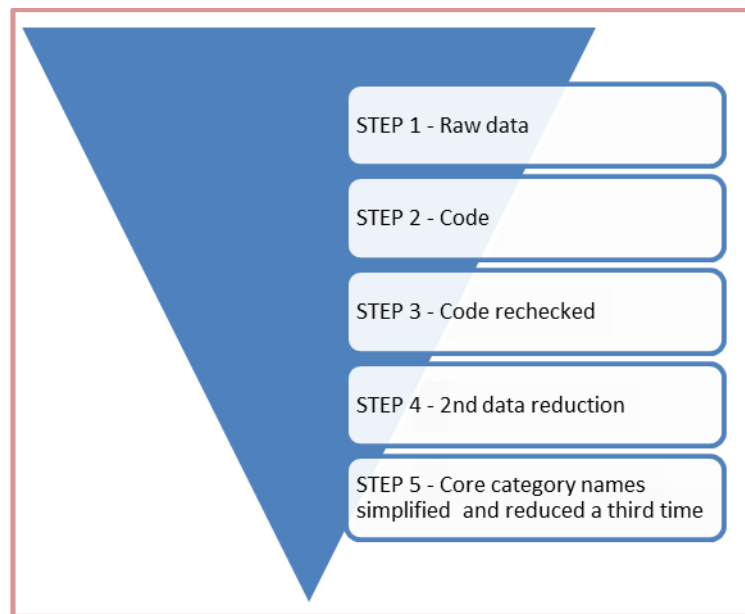
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Coding is by far the most time consuming matter in grounded theory, we first utilized an open coding scheme (Strauss & Corbin, 1990), which is represented by the models in form of diagrams. These were again checked in order to see if we actually have been correct in our coding, which lead to another reduction in data.

The paradigm of coding is to code data for relevance to whatever phenomena are referenced by given a category – Conditions, Interactions among the actors, Strategies and tactics and Consequences. Alvesson and Sköldbberg (2000) suggest three main tactics to manage these paradigms. First, write memos on theoretical ideas – may be discursive, such as diagrams and matrices, tables, out of memo writing the theory gradually emerge in which the properties of two categories are related to each other. Secondly, find a **Core Category**, the central concept around which the others resolve. Third, draw diagrams, or what is often called models of the way categories are related to one another. In Strauss's illustrations this is simply done with boxes and arrows, obviously more advanced models can be envisaged.

We have utilized all three strategies. In regards to the first sub question – what is lean? We have only utilized the strategy one and two, as this question is rather separate from our theoretical and analytical framework. In the regards, to identifying success factors and challenges, the third strategy is extremely relevant and is clearly depicted in under data analysis. The coding strategies one and two are done in an extremely rigorous manner as illustrated by figure 4.7.

As the figure displays, the coding was double checked against both researchers code in order to uphold objectivity and reliability.



**Figure 4.7– Coding strategies 1 & 2. [Own model]**

The outcome of the questionnaire after coding the questions of concern would thus be lists of success factors and challenges relating to these operational characteristics of lean service, see appendix 14 – *Empirical Data*.

---

#### 4.6.3 THEORETICAL SATURATION

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When the collection and the coding of the data have reached a point where it will no longer reveal any new information theoretical saturation have been reached (Alvesson & Sköldbberg, 2000). In our case, we believe we reached theoretical saturation given the massive extent of codes and the detail attention to the coding strategy (see figure 4.7). The complexities of the codes will be discussed more in detail in the section 5 *Empirical Findings*.

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#### 4.6.4 CONSTANT COMPARISON

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The focal point of grounded theory is the never ending constant comparison of codes, but the trend in qualitative analysis is that it is more implicit than explicit, meaning that the researches makes sure that there is a close connection between the data and conceptualization (Bryman & Bell, 2007).

The end goal of grounded theory is always to inductively generate new theory and then compare relevant theory to what the contribution would be (Alvesson & Sköldbberg, 2000). Our approach differs, since we hold the stance of abduction in order to easier formulate a research question and to employ a research or theoretical framework which in turn makes the analysis more effective, efficient, reliable and objective.

In theory building research, no matter how inductive the approach, we need to have a prior view of the general constructs or categories we intend to study, and their relationships. Building a conceptual framework will force the researcher to think carefully and selectively about the constructs and variables to be included in the study (Voss et al., 2002).

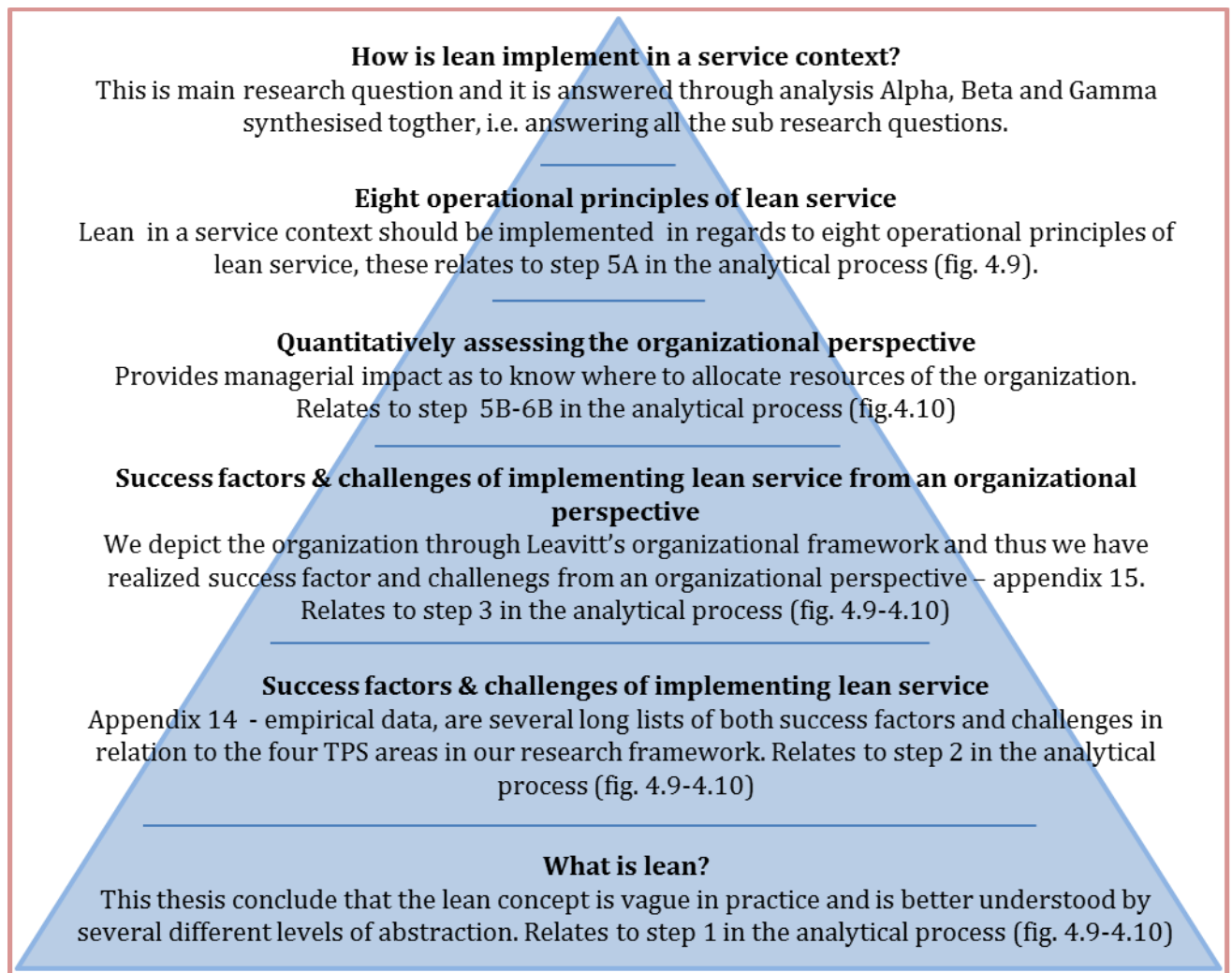
Eisenhardt (1989) argues that a priori specification of constructs is valuable because “*It permits researchers to measure constructs more accurately*” (Voss et al., 2002, p. 201).

At a more practical level, reminders of the study’s purpose helps the researchers to stay on target and keep information gathering as efficient as possible. (Stuart et al., 2002, p. 424)

#### 4.7 DATA ANALYSIS

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The analytical process of this thesis is very complex and constitutes different levels of contribution. It is important to understand these different levels of contribution, otherwise it becomes hard to follow the reasoning behind the analytical process. Figure 4.8 depicts these different level, on the highest level we develop eight operational principles of how to successfully implement lean service and on the lowest level we try to understand the lean concept. We want to denote the choice of wording relating to the word principle, we discussed using *pattern* instead but ultimately settled on *principle* because the word pattern refers to *majority tendencies* as this is not quite the case (more on this later on) and the word principle in this sense relates to guiding which is a more accurate intent of researchers when utilizing any phrasing of *operational lean service principle*. Figure 4.8 makes it easier to comprehend each step in the analytical process and why they are there.



**Figure 4.8– Contribution levels. [Own model]**

#### 4.7.1 ANALYTICAL PROCESS

The analytical process is broken down into three distinct steps, analysis Alpha, Beta and Gamma. Analysis alpha, relates to the first sub question – *What is lean?* This question serves the purpose of a control or test question, given the perplexities of the literature. We want to uncover if lean in practice is just as vaguely defined as in theory.

Analysis Beta, aims to identify and answer *What are the operational success factors and challenges when implementing lean in a service context* and identify the most important success factors and challenges. Analysis Gamma quantifies the answers and adds more depth to the organizational framework. We have included two figures 4.9 and 4.10 that illustrate the complexity of the analytical process and they function as a road map of the analytical process. These two figures capture many different elements in the analysis, but still provide a clear focus. Analysis Gamma aim to answer *How the success factors and challenges relate to an organization?*

Both analyses Beta and Gamma build on the same foundation, step one, two, and three, but ultimately results in two different findings. Analysis Beta is completely driven by qualitative techniques as outlined in grounded theory. Analysis Gamma also incorporates an element of quantitative techniques. Hopefully, together all three analysis will provide and answer to the main research question – *How is lean implemented in service context?*

Also, the reader should recognize that step 2 and 3 in figure 4.9 and 4.10 is just another representation of our research framework (see figure 3.4 and 3.5).

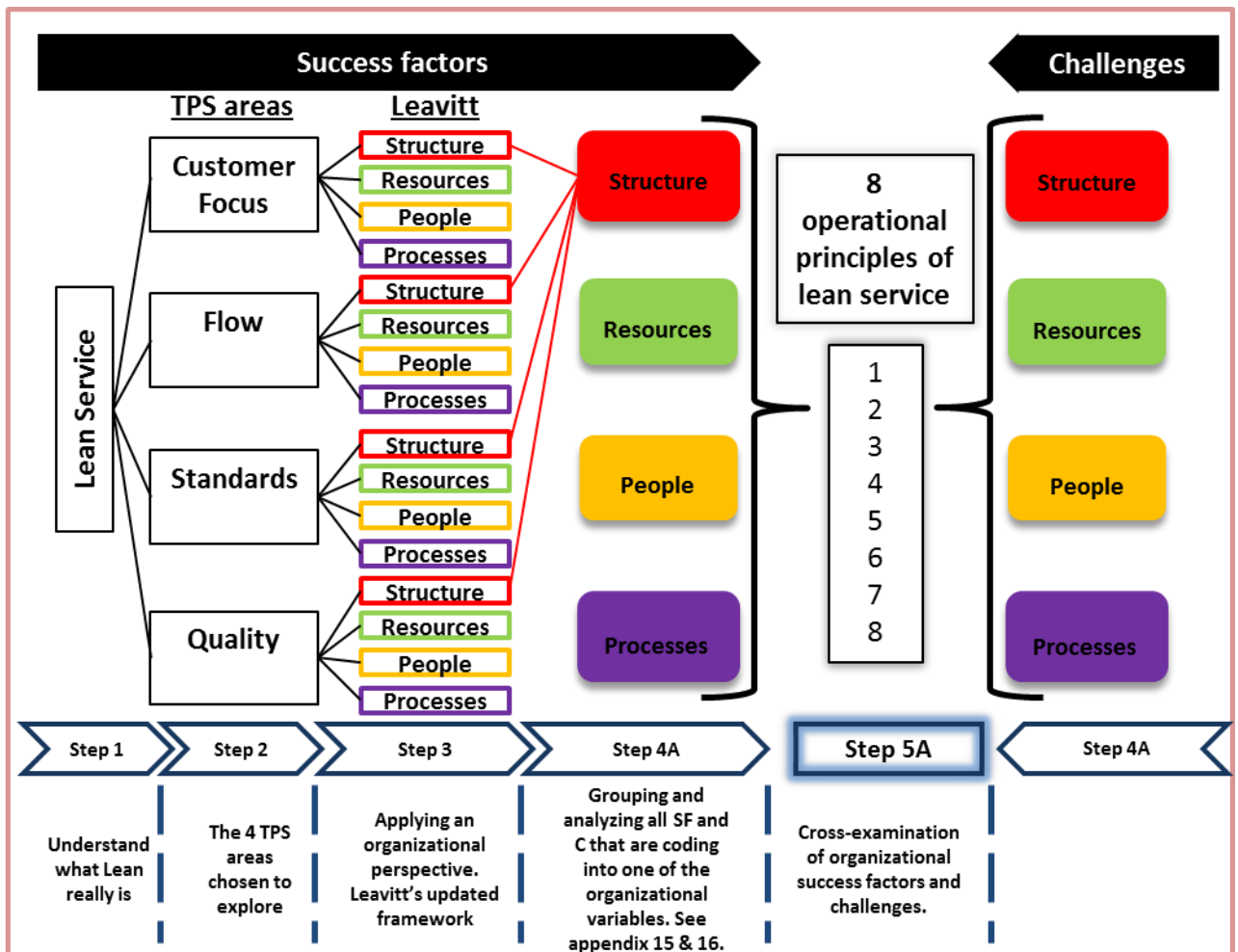


Figure 4.9– Analysis Beta. [Own model]

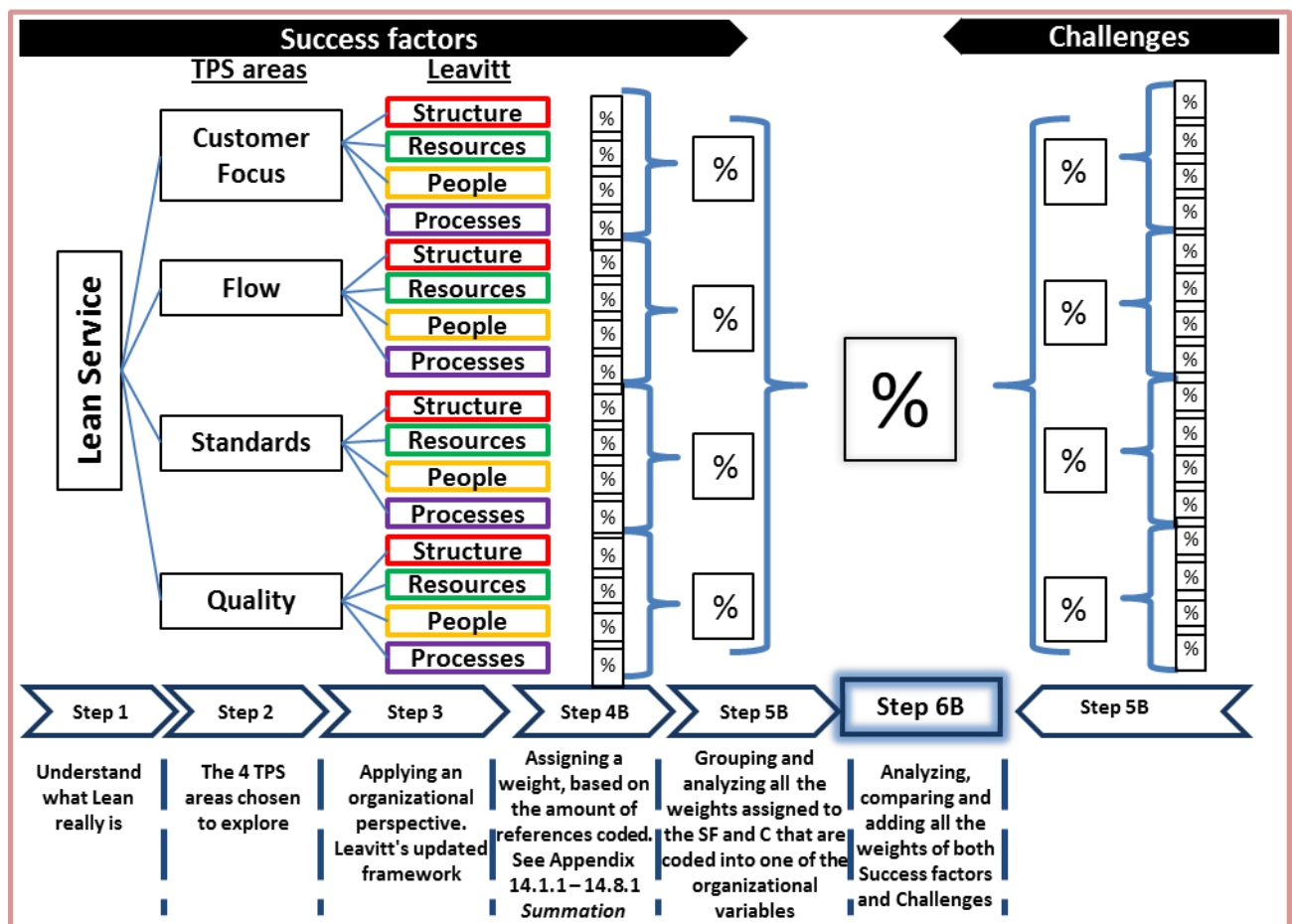


Figure 4.10– Analysis Gamma. [Own model]

#### 4.7.2 ANALYSIS ALPHA - STEP 1 – WHAT IS LEAN?

The first step is the starting point of the research project. What is Lean? Given our literature review was unable to provide an answer; we found it necessary to ask this control question. This question was analyzed after data reduction process, combined by using quotes.

#### 4.7.3 STEP 2 – TPS & THE 4 AREAS

Given our interpretation and choice to explore and examine the operational characteristics of lean service in four areas provided by the TPS framework, namely Customer Focus, Flow, Quality, and Standardization.

#### 4.7.4 STEP 3 – APPLYING AN ORGANIZATIONAL PERSPECTIVE

After the process of coding and quantifying the open answers into categories, we then proceeded by using Leavitt's updated multivariate organizational framework as mechanism to categorize the data. This framework also contains four separate variables; structure, resources, people, and

processes. Then each category is analyzed and then once again classified into Leavitt's updated multivariate framework.

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#### 4.7.4.1 CLASSIFICATION –LEAVITT'S ORGANIZATIONAL FRAMEWORK

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The success factors and challenges for the question at hand are then classified into one or several of Leavitt's variables that we saw the fit. Thereafter, each variable are also assigned a weight of importance which is based on the amount references the success factor or challenge encompassed i.e. how many respondents mentioned the given success factor or challenge. Further, if the success factor or challenge was classified into several variables, then the reference weight is divided equally between the selected variables. For full disclose of this classification process please see appendix 15 *Analysis & Classification*.

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#### 4.7.5 ANALYSIS BETA – IDENTIFYING COMMON SUCCESS FACTORS AND CHALLENGES IN LEAN SERVICE (STEP 4A – 5A)

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In order to provide an answer to *what success factors and challenges are most important in a Lean service context?* We saw two possible solutions. First approach, one can discover what success factors and challenges are important, then later ask another or same sample population to rank or value each success factor and challenge individually. The down side with approach is that it requires two surveys at two different times; on the positive side it becomes extremely accurate. Second approach, which is the method utilized in this thesis, by cross-examining each TPS area and each variable. This process is outlined in appendix 16 *Identifying patterns in Success Factors* and appendix 17 *Identifying patterns in Challenges*, which relates to step 4A in figure 4.9. We then extracted common success factor or challenges which left us a list of 43 success factors and challenges. Thereafter, by comparing success factors against challenges we in turn identify a few key operational issues that are both a success factor and a challenge, which relates to step 5A in figure 4.9.

The final step 5A's deduction is quite straight forward, it is based on two criterions, instead of sending a survey out yet again and ranking the each individual success factor and challenge. First criteria, the success factor or challenge has to be classified into more than one variable (structure, people, processes, resources) in the organizational framework. Second criteria, the item has to be mentioned both as a success factor and challenge.

We consider this method fit for our purpose, given the inherent flaws of Leavitt's multivariate system that variables constantly interact with each other and thus sometime makes it hard to distinguish causality; cause and effect. Therefore, we believe the two criterions effectively minimize the inherent flaw in order to recognize some sort of hierarchy of main success factors and challenges.

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#### 4.7.6 ANALYSIS GAMMA – LEAN SERVICE FROM AN ORGANIZATIONAL PERSPECTIVE.

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Analysis Gamma relies only on analyzing the weights assigned on the organizational framework and in an explorative fashion deriving what is important from an organizational perspective. These weights are derived from the answers of the respondents and related to frequency of their answers. This is done piece by piece and putting everything together, and adding each variable together. Finally, we add the sum of all references both from success factors and challenges, this process is depicted by figure 4.10 and supported by the data in appendix 15 *Analysis & Classification* (the bottom line for each Success Factor and Challenges for TPS area and summed up the total weights i.e. appendix 15.1.1 - 15.8.1 *Summation*)

By doing this we believe that we can supplement analysis Beta, since we are given a slightly different perspective when analyzing percentages rather than hard coded entities. These percentages can provide an indication on what key parts of an organization that drives the success factors and/or challenges when implementing lean, thus adding further clarity to *How the success factors and challenges relate to an organization*. This analysis will give a broader picture than analysis Beta, as the outcome of analysis Gamma will provide guidelines regarding what entities of an organization to focus on, rather than a concrete list of actions as the outcome of analysis Beta provides.

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#### 4.8 DATA QUALITY

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Reliability is the degree of consistency in assignment of similar words, phrases or other kinds of data to the same pattern or by different researchers – inter-rater reliability. Reliability can also mean the degree of consistency that the same researcher assigns similar observations and interpretations at different points in time. Qualitative researchers must always be aware of these issues and implement appropriate methods to cope with them (Hair et al., 2007).

Validation in qualitative research is the extent to which qualitative findings accurately represent the phenomena being examined. There are different methods for this: triangulation, extended fieldwork, participant feedback, external peer review, and pattern matching (Hair et al., 2007).

[...] the association of quantitative paradigm with qualitative research through validity and reliability have changed our understanding of the traditional meaning of reliability and validity from the qualitative researchers' perspectives. Reliability and validity are conceptualized as trustworthiness, rigor and quality in qualitative paradigm. It is also through this association that the way to achieve validity and reliability of a research get affected from the qualitative researchers' perspectives which are to eliminate bias and increase the researcher's truthfulness of a proposition about some social phenomenon (Denzin, 1978) using triangulation. Then triangulation is defined to be "a validity procedure

where researchers search for convergence among multiple and different sources of information to form themes or categories in a study. (Creswell & Miller, 2000, p. 126)

In our research the method of reliability and validity is that of peer feedback, both from a researcher's perspective from our mentor but also practitioner's view point. Also, utilizing an *investigator triangulation* (impression, coding and classification are cross-checked by both researchers) this is done to support and validate our findings (Nykiel, 2007; Downward & Mearman, 2007). We believe these methods will sustain the level of reliability and validity in order for our findings to have academic merit. However, as mentioned only the nine questions were selected for this thesis, this is to make our analysis consistent and strong, which also adds another layer of validity.

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#### 4.9 CRITIQUE

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Qualitative studies are often hard to prove the degree of reliability and validity, some might even argue impossible.

Therefore, reliability, validity and triangulation, if they are to be relevant research concepts, particularly from a qualitative point of view, have to be redefined as we have seen in order to reflect the multiple ways of establishing truth. (Golafshani, 2003, p. 597)

In other words, while quantitative methods are rightly criticized for encoding the researchers' biases in apparently objective 'numbers', the same can be said for qualitative method. An interview transcript might represent 'raw' data but the basic themes that are extracted have already been 'contaminated' by the researcher. In some ways this argument lends support to the postmodernists in their claim that all accounts are unique in that they represent the differing perspectives of different observers. (Armstrong et al., 1997, p. 602-603)

Since we use a basic analytical process inspired by grounded theory there are of course some inherent problems with this method. Grounded theory has two main problems, an un-reflected view of data processing is advocated, which brings with it a bias from pre-scientific categories of common-sense thinking; on the other hand, too much time is spent on detailed coding operations (Alvesson & Sköldberg, 2000).

One critique should also be directed in our own assessment of how we coded or classified each challenge or success factor, meaning what we said to be a structural success factors, could be argued against and classified as something else. However, our research is open and transparent, hence there is no need to circumnavigate around this issue but instead welcome other suggestions by other researchers. Instead, in the appendix 15 *Analysis & Classification* we present our assessment of the coding process.

The sample, should also be critiqued given we explicitly asked questions regarding lean service, we find it almost unrealistic that individuals possess 20 years' experience within this field, our expected average based on our supervisors recommendations "*if one has more the plus 4 years of lean service experience, they are an expert by all means.*" We believe some have overestimated their own capabilities, given lean service development in Sweden (see figure 1.2). Therefore, we would like to question our sample and we are unable to realize the Hawthorne effect of the respondents. Critique should also be directed to the entire sample method.

The questions in themselves might have been misleading at times even though the majority of the research project was spent on trying to develop well thought-out and relevant questions. Also, regarding the length the average respondent spent on answering (1h 34 min, trimmed mean) the survey questionnaire might have exhausted the respondents. For these reasons, it strengthens the fact that the nine questions chosen in this thesis, were not misunderstood as far we could tell, this cannot be said for the rest of 14 questions. One reason for this ineffective questionnaire, could be that too many opinions were accounted for when creating the survey, we were still influenced by the initial questionnaire, too long time was spent in developing the survey hence we got slightly blindsided. However, to make this point clear, the questions chosen have been rigorously analyzed; we believe they were not misunderstood and therefore have strong reliability and validity.

**Conclusion:** there are obvious faults with using qualitative approaches, but we believe such affects are minimized because we utilize a combined approach. However, the entire analysis Beta i.e. the empirical base is based on grounded theory which have inherent flaws as above mentioned. The classification process of analysis Gamma could also be argued differently. There were also issues with both the sample and the overall design of the questions, but not for the ones presented in this thesis.

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## 5 EMPIRICAL FINDINGS

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*In this chapter we outline the basis for our empirical data. This chapter provides the reader an understanding for the complexities of the process of data reduction as well as description of how to interpret our appendix. Lastly, we provide a complexity index which quantifies our data reduction process.*

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### 5.1 DATA REDUCTION – GROUNDED THEORY

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In accordance with the method, the answers to the open-ended questions for the online survey are coded into different categories; this process is described under section 4.6 *Data-Reduction*. The full list of answers can be found in appendix 14 *Empirical Data*. We believe that this appendix is one of the major theoretical contributions of this research project.

The appendix 14 *Empirical Data* only provides the frequency of issues mentioned, not a ranking. Some might view this list in regards of realizing what success factor or challenge that is the most common or single issue that is the most crucial. This list does not provide answers for such an authoritative ranking of issues, due to the inherent nature of this study and survey. We denote that the list simply represents the frequency of which one category in accordance to the data reduction, that is not the same as valuing or being asked to rank different issues, which is needed for such an authoritative list. In our survey, we asked open-ended questions, meaning the respondent might not have realized all issues at hand and thereafter unable to fairly judge what is most important. Analysis Beta, identifies the most important success factor and challenges in accordance with the method.

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### 5.2 CODING STATISTICS

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In this section we have outline the statistics behind our data reduction process, which in essence quantifies the qualitative data. Following is an explanation of the different concepts used for the data reduction:

- **Respondents**, refer to the person answering the question.
- **Categories**, first we analyzed an answer thereafter we interpret the meaning and code the answer into a category. Often one answer is coded into several different categories because the questions were open-ended and thus frequently leads to lengthy answers with multiple meanings.
- **References**, refer to the code given to an answer, i.e. if one respondent had answered a question and then his or hers answers is coded into four categories, this equates to four references. This is more relevant analyzing one category, and then one can realize how

many respondents were coded into the given category. This is almost the same as frequency in regards to statistics.

- **Categ/Resp**, this value gives an indication of how many different types of answers were provided by a respondent in one question.
- **Ref/Resp**, this value gives an indication of how many answers each respondent provided per question.

| Question | Respondents | Categories | References | Categ/Resp | Ref/Resp |
|----------|-------------|------------|------------|------------|----------|
| 1        | 62          | 17         | 104        | 0,27       | 6,12     |
| 6a       | 59          | 14         | 58         | 0,24       | 4,14     |
| 6b       | 55          | 20         | 78         | 0,36       | 3,60     |
| 7a       | 55          | 16         | 84         | 0,29       | 5,25     |
| 7b       | 59          | 27         | 115        | 0,46       | 4,26     |
| 8a       | 55          | 24         | 78         | 0,44       | 3,25     |
| 8b       | 53          | 42         | 126        | 0,79       | 3,00     |
| 9a       | 53          | 23         | 74         | 0,43       | 3,22     |
| 9b       | 53          | 36         | 85         | 0,68       | 2,36     |

Figure 5.1– Coding statistics

The figure 5.1, besides giving a descriptive view of each question's empirical coding, it also indicates how intricate and thorough the entire data reduction process was. In addition, consider that the above table only represents 9 out of the 22 questions asked.

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### 5.2.1 COMPLEXITY INDEX

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Further we have created a complexity index, which should function as a gauge of how complex each question was to interpret and quantify. This complexity index was developed to show the reader both how intricate and difficult the coding process and how wide the ranges of answers were figure 5.2 outlines the ranking of each question, a lower index number the easier it was to code and understand the respondents' answers.

| Question | Complexity Index        |
|----------|-------------------------|
|          | (Categ/Resp * Ref/Resp) |
| 8b       | 2,38                    |
| 7b       | 1,95                    |
| 1        | 1,68                    |
| 9b       | 1,60                    |
| 7a       | 1,53                    |
| 6b       | 1,42                    |
| 8a       | 1,42                    |
| 9a       | 1,40                    |
| 6a       | 0,98                    |

**Figure 5.1– Complexity Index**

Figure 5.2 reveals that question 8b was the most complex question to code i.e. *Which are the main success factors in order to create a common and standardized way of working?* The easiest question was 6a i.e. *Which have been the greatest challenges to get the whole organization to continually keep attention to the external customer demands?*

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## 6 ANALYSIS

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*In this chapter, the findings from the empirical chapter will be analyzed and discussed. The analysis are separated into three distinct parts, each corresponding to one of the three proposed research questions - what is lean; identifying operational success factors and challenges in lean service; and how does the success factors and challenges relate to the organization?*

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### 6.1 ANALYSIS ALPHA - WHAT IS LEAN?

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The first question was asked in the survey as a control question, in order to provide insight to what lean really is and is extrapolated as an independent analytical step (step 1 in both analysis Beta and Gamma see figure 4.9 and 4.10). Through this analysis we can determine whether lean is just as confused in practice as our literature review reflects.

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#### 6.1.1 LEAN HAS NO UNIVERSAL DEFINITION

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We coded the answers into 17 categories and 104 different references, also these questions rank third on the complexity index, however, this still does not do this question justice. It is far more complex than the statistics depict. Nonetheless, the 17 different categories relates to the breadth of all the answers, which clearly is strong evidence that lean has no accepted definition. Although, there is a strong convergence of opinion because six categories alone make out 77% of all the references (for the full list please find appendix 14 *Empirical Data – What Is Lean?*):

- 1 An Approach
- 2 A Philosophy
- 3 A Way to Improve
- 4 A Culture
- 5 A Way of Thinking
- 6 Waste Elimination

Because these six categories effectively make out 77% of all the references, this greatly limits the breadth of the question. In addition, these different categories are very closely related and it might be hard to understand what the difference between these really is. One can argue that these categories are just slight nuances of one another. It is possible that the respondents actually meant the same thing, but used another vocabulary, which further limit the breadth of the answers. Despite this convergence among the six categories and similarity of meaning, it is still proof that lean lacks a universal definition. In turn, this is a good reflection of the perplexities and confusion of the lean literature. Thus, this control question filled its purpose of trying to understand what lean really is.

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### 6.1.2 UNDERSTANDING LEAN – SEVERAL LEVELS OF ABSTRACTION

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As previously discussed, lean has several interpretations which is clearly depicted by the large amount of categories. Besides what do the categories actually mean? In order to not neglect the true depth of the question we also analyze the individual quotes, in order to further develop the knowledge of lean. Overlooking the categories, there are three different types of answers: short, medium, and long. We believe this is a reflection of the nature of the survey and each type of answers offer new insights. The short answers are often very straight forward and no longer than one sentence. At times, it reflects a very narrow view of lean. The medium length answers are longer than one sentence but not covering the subject in depth, these answers are more descriptive than the short answers, but at times confusing. The long answers are very detailed and offer precise meaning, interestingly we see a new consensus around a new type of understanding of lean, that derives different levels of abstraction in order conceptually understand the lean concept.

It is clear that lean means more than just one thing, this is clearly illustrated before with the variety of categories, the below quote depicts this issue of ambiguity and ultimately according to this person it is an approach which involves several activities.

**Lean** = A customer-focused approach, in a resource efficient and humane way to run a business based on, among other things everyone's commitment, teamwork, long-term thinking people; learning and daily continuous improvement in maximizing the value and eliminate waste.

**Value** = It is about the customer, receiving what she wants. The highest value obtained when the "right things are done right" at the right time, i.e. when the customer requests it.

**Waste** = Things that do not give the most value and costs unnecessary money, time and / or power.

The above quote also outlines and defines waste and value as two core issues. Although, the specific type of value or waste might be different depending on company and industry and requires a deep understanding of the business in order to fully dictate what true value and waste are for the customer. Various practitioners and academics have tried to uncover and define waste (Ohno, 1988; Womack, 1996; Liker, 2004), however literature does not define value in the same descriptive form as waste, and this might be partly explained by the dynamic characteristic of value from a company-to-company view point, even more so from industry-to-industry.

We have outlined that lean has various meanings, but the longer quotes are discussing lean on different levels of abstraction. These very long and in depth quotes are limited, in the sense they

are very stratified, but none the less offer new insights. Below, two of the most interesting quotes are illustrated<sup>1</sup>:

Lean is a philosophy, a way to look at and manage the business (a system approach). To ensure customer needs and manage their corporate identity and its operations to meet customer needs. Lean is 80% about leadership and 20% about the tools. / Lean leadership leads the whole business not just the organization. By business I mean the staff and processes, responsibilities and authority (which brings out staff), incentive systems (such as encouraging process optimization rather than function optimization), etc. Leaders who set the framework, showing the way, is exemplary and / starting point. When managers change their behavior, then all other employees adapt, which in turn affects the employees' values about what is right and wrong, acceptable or unacceptable, this eventually affect the company's culture. / The second part of Lean is the elimination of waste, taking advantage of the employee's capacity, continuous effort to improve their working practices, a learning organization. / My own experience is that it has been quicker to embrace Lean tools than affect leadership. Affecting leadership and exercising Lean thinking takes much longer and has to start with top management.

Lean is a philosophy. At the highest level, it is how to describe their business intent. Simplified, the intention must be set by all stakeholders. Striving to create maximum value, all stakeholders, thereby creating a win- win basis. In ORGANIZATION X the lean philosophy is symbolized by the double wave. That CUSTOMERS and employees must win together. This viewpoint, describes how to ascribe value to all stakeholders. How the business and the customer must first learn to see people through the values of respect for the individual / The next level of abstraction are the principles which describe how the organization should relate to its development. The vision, values, and principles, combine to create a creative space where you then give developmental work to the employees. When the person doing the work, takes ownership of their process and constantly develop it by solving problems and eliminating waste. Only then will lean tools come into play. / / My own experience and what I have seen of other people growing in this philosophy, both as professionals and as people, is the human development that occurs synchronously with the development of quality for the customer and efficiency for owners. Win- win for real!

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<sup>1</sup> Words that appear in capital letters have been modified in order to protect the anonymity of the respondent

These quotes reveal the complexities of decoding the answers in the survey by mere qualitative techniques. Also, these quotes offer a multitude of concepts (even more so than the first quote), in order to answer the question– what is lean? The quotes have three things in common; firstly lean is a dynamic collaboration effort among the internal people of the organization and externally with its other stakeholders, such as customers. Second, lean involves a utilization of tools and techniques. Third, it appears to be a hierarchy between the different issues or concepts at stake i.e. both quotes agree that lean is on the highest level of hierarchy is a philosophy and the last level of abstraction involves tools. One quote directly mentions levels, the other quote separate levels with a distinction between leadership and tools or waste elimination. However, it is unclear from all quotes how many levels there exist and also any distinct order to them. From this we can generate our first hypothesis:

Hypothesis 1: Lean has several different meanings and entails a vast amount of various concepts or issues. These issues and concepts in turn have a several levels of hierarchy or abstraction.

## 6.2 ANALYSIS BETA – OPERATIONAL SUCCESS FACTORS AND CHALLENGES IN LEAN SERVICE

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Now, that we have further developed an understanding for lean in practice we will continue with analysis beta – identifying operational success factors and challenges. In the methodology we have outlined the analytical process, for orientation how the problem is broken down and analyzed please refer to the method and figure 4.9.

First and foremost, this analysis will answer the second sub research question – *What are the operational success factors and challenges when implementing lean in a service context?* by coding the respondents' answers to show a complete list of success factor and challenges for each TPS area. In turn, as our analytical process suggest it will empirically disclose most of the success factors and challenges regarding lean service.

This list is extremely comprehensive and for most probably too heavy to actually realize any benefits from it, however this is arguably the most valuable part of our research project and greatest academic contribution, please see appendix 14 *Empirical Data*. This list could actually be utilized in a different research project with deductive approach. These lists might seem rather definitive, but given that lean as previously discussed encompasses such a variety of concepts it is plausible that lean has infinite number of success factors and challenges because the data source resides in the minds of people. Hence, the need to uncover the most relevant success factors and challenges. Unquestionably, some success factors and challenges are more frequently

listed than others, as indicated by appendix *14 Empirical Data*. Also, considering these lists are too long and does not provide any simple and managerial application there is also a need to make these more comprehensible.

Therefore, in accordance to step 4A in figure 4.9 we have broken down the problem further to make the list more manageable. Figure 6.1 and 6.2 is the result of the success factors and challenges meeting our first criteria of analysis Beta i.e. the success factor or challenge is coded into more than one variable of the organizational framework. These are further separated into primary, secondary, other categories. Primary success factors or challenges are mentioned in all the variables in the organizational framework. Secondary success factors or challenges are mentioned in three out of the four the variables in the organizational framework. Other success factors or challenges are mentioned in two out of the four the variables in the organizational framework. Success factors or challenges that are mentioned in one out of the four the variables in the organizational framework, do not meet our first criteria per definition.

## 6.2.1 SUCCESS FACTORS IDENTIFIED

| SUCCESS FACTORS |      |           |         |  |
|-----------------|------|-----------|---------|--|
| Customer Focus  | Flow | Standards | Quality | STRUCTURE  |
|                 |      |           |         | <b>Primary Success Factors</b>   |
| x               | x    | x         | x       | One success factor is to actively involve top management   |
| x               | x    | x         | x       | One success factor is to work with the customer  |
|                 |      |           |         | <b>Secondary Success Factors</b>   |
| x               | x    | x         |         | One success factor is clear communication  |
|                 | x    | x         | x       | One success factor is to comply with standards   |
|                 |      |           |         | <b>Other Success Factors</b>   |
|                 | x    |           | x       | One success factor is to involve everybody concerned   |
| x               | x    |           |         | One success factor is to work cross-functional   |
|                 |      |           |         | <b>RESOURCES</b>   |
|                 |      |           |         | <b>Primary Success Factors</b>   |
| x               | x    | x         | x       | One success factor is to visualize; customer needs, flows, standards, and processes                        |
| x               | x    | x         | x       | One success factor is to continuously measure and monitor; customer needs, flows, standards, and processes |
| x               | x    | x         | x       | One success factor is to educate the organization  |
|                 |      |           |         | <b>Secondary Success Factors</b>   |
|                 | x    | x         | x       | One success factor is to make time for working with the flow, standards and quality                        |
| x               | x    | x         |         | One success factor is to hold a value stream analysis  |
|                 |      |           |         | <b>Other Success Factors</b>   |
|                 |      |           |         | -  |
|                 |      |           |         | <b>PEOPLE</b>  |
|                 |      |           |         | <b>Primary Success Factors</b>   |
| x               | x    | x         | x       | One success factor is to have a deep understanding of lean   |
|                 |      |           |         | <b>Secondary Success Factors</b>   |
|                 | x    | x         | x       | One success factor is to involve everybody concerned   |
|                 | x    | x         | x       | One success factor is to create an environment in which we dare to be open                                 |
| x               |      | x         | x       | One success factor is to have high endurance at work   |
|                 |      |           |         | <b>Other Success Factors</b>   |
|                 | x    |           | x       | One success factor is to give responsibility to employees  |
| x               |      |           | x       | One success factor is to highlight success stories   |
|                 |      |           |         | <b>PROCESSES</b>   |
|                 |      |           |         | <b>Primary Success Factors</b>   |
| x               | x    | x         | x       | One success factor is to work with the customer  |
|                 |      |           |         | <b>Secondary Success Factors</b>   |
| x               | x    | x         |         | One success factor is to conduct value stream analysis   |
| x               | x    |           | x       | One success factor is clear communication  |
| x               | x    | x         |         | One success factor is working with focus, one thing at a time  |
|                 | x    | x         | x       | One success factor is to eliminate problems at the root cause  |
|                 |      |           |         | <b>Other Success Factors</b>   |
| x               |      |           | x       | One success factor is to perform daily control   |

Figure 6.1– Success factors identified

## 6.2.2 CHALLENGES IDENTIFIED

| CHALLENGES     |      |           |         |   |
|----------------|------|-----------|---------|---|
| Customer Focus | Flow | Standards | Quality | STRUCTURE   |
|                |      |           |         | <b>Primary Challenges</b>                                       |
|                |      |           |         | -   |
|                |      |           |         | <b>Secondary Challenges</b>                                     |
|                | Y    | Y         | Y       | One challenge is the size of the organization                   |
| Y              | Y    |           | Y       | One challenge is the difficulty to involve top management       |
| Y              |      | Y         | Y       | One challenge is to be able to work cross-functional            |
| Y              |      |           | Y       | One challenge see the big picture                               |
|                |      |           |         | <b>Other Challenges</b>   |
| Y              |      |           | Y       | One challenge is to clarify the client's needs                  |
|                | Y    | Y         |         | One challenge is developing a daily control systems             |
|                |      |           |         | <b>RESOURCES</b>  |
|                |      |           |         | <b>Primary Challenges</b>                                       |
| Y              | Y    | Y         | Y       | One challenge is finding resources, especially time             |
|                |      |           |         | <b>Secondary Challenges</b>                                     |
| Y              | Y    |           | Y       | One challenge is to find relevant metrics                       |
|                |      |           |         | <b>Other Challenges</b>   |
| Y              |      |           | Y       | One challenge is to get the organization to see the big picture |
|                |      |           |         | <b>PEOPLE</b>   |
|                |      |           |         | <b>Primary Challenges</b>                                       |
| Y              | Y    | Y         | Y       | One challenge is to create understanding                        |
|                |      |           |         | <b>Secondary Challenges</b>                                     |
|                | Y    | Y         | Y       | One challenge is to create a permissive and learning culture    |
| Y              | Y    |           | Y       | One challenge is to engage everybody                            |
|                |      |           |         | <b>Other Challenges</b>   |
|                |      | Y         | Y       | One challenge is leadership                                     |
| Y              |      |           | Y       | One challenge is to get the organization to see the big picture |
|                |      |           |         | <b>PROCESSES</b>  |
|                |      |           |         | <b>Primary Challenges</b>                                       |
|                |      |           |         | -   |
|                |      |           |         | <b>Secondary Challenges</b>                                     |
|                |      |           |         | -   |
|                |      |           |         | <b>Other Challenges</b>   |
| Y              |      |           | Y       | One challenge is to stay focused                                |
| Y              |      |           | Y       | One challenge is to get the organization to see the big picture |

Figure 6.2– Challenges identified

Figure 6.1 and 6.2 serves as an effective list of frequently encountered success factors and challenges, if we view all the answers from a holistic organizational perspective. These figures might not be comprehensive but it is great start (given this is an exploratory research project) of issues for managers to prepare and be aware of. However, it is still 43 issues listed in total counting both these tables combined, which is too many for a manager to efficiently keep track of. Therefore, we still see a need to further condense the list of success factors and challenges. This is done in accordance with step 5A in analysis Beta (see figure 4.8), which involves cross-examining both figures 6.1 and 6.2 against one another to derive common success factors and challenges, which is our second criteria in analysis Beta i.e. the success factor and challenge has to be mentioned in both tables.

### 6.2.3 PROPOSING EIGHT OPERATIONAL LEAN SERVICE PRINCIPLES

| SUCCESS FACTORS / CHALLENGES |      |           |         |  |
|------------------------------|------|-----------|---------|--|
| Customer Focus               | Flow | Standards | Quality | STRUCTURE  |
|                              |      |           |         | <b>Common Factors</b>  |
| x/y                          | x/y  | x/        | x/y     | One success factor is to actively involve top management /<br>One challenge is the difficulty to involve top management                                      |
| x/y                          | x/   | /y        | /y      | One success factor is to work cross-functional /<br>One challenge is to be able to work cross-functional   |
|                              |      |           |         | <b>RESOURCES</b>   |
|                              |      |           |         | <b>Common Factors</b>  |
| x/y                          | x/y  | x/y       | x/y     | One success factor is to continuously measure and monitor;<br>customer needs, flows, standards, and processes /<br>One challenge is to find relevant metrics |
|                              |      |           |         | <b>PEOPLE</b>  |
|                              |      |           |         | <b>Common Factors</b>  |
| x/y                          | x/y  | x/y       | x/y     | One success factor is to have a deep understanding of lean /<br>One challenge is to create understanding   |
| /y                           | x/y  | x/        | x/y     | One success factor is to involve everybody concerned /<br>One challenge is to engage everybody   |
|                              | x/y  | x/y       | x/y     | One success factor is to create an environment in which we dare to<br>be open / One challenge is to create a<br>permissive and learning culture              |
|                              | x/   | /y        | x/y     | One success factor is to give responsibility to employees /<br>One challenge is leadership   |
|                              |      |           |         | <b>PROCESSES</b>   |
|                              |      |           |         | <b>Common Factors</b>  |
| x/y                          | x/   | x/        | /y      | One success factor is working with focus, one thing at a time /<br>One challenge is to stay focused  |

Figure 6.3– Eight operational lean service principles

This analysis indicates that eight items or concepts are both a success factor and a challenge, thus it fulfills the second criteria in analysis one. We have also offered a ranking which is based on if the concept is mentioned as an answer for any of the questions asked in the survey and not based on the amount of references e.g. if the concept is given a 8/8 that means the item is mentioned as an answer in all the questions asked or if the concept is given an 5/8 it is mentioned in five of the eight questions (figure 6.3 indicates what question it is mentioned as an answer):

- 1 Create a deep understanding for Lean. (8/8)
- 2 Continuously measure and monitor customer needs, flows, standards, and processes, with relevant metrics. (8/8)
- 3 Active top management. (7/8)
- 4 Engage everybody concerned. (6/8)
- 5 Create a permissive/learning culture. (6/8)
- 6 Work cross-functional. (5/8)
- 7 Always stay focused and work with one thing at a time. (5/8)
- 8 Give everybody responsibility. (4/8)

This list is both short and understandable and offers profound managerial impact. This leads us to develop our second hypothesis, which we propose eight operational principles of lean service:

Hypothesis 2: Lean service in essence, from an organizational perspective, is mainly about eight fundamental concepts; 1) *Create a deep understanding for Lean*, 2) *Continuously measure and monitor customer needs, flows, standards, and processes with relevant metrics*, 3) *involve and have an Active top management*, 4) *Engage everybody concerned*, 5) *Create a permissive/learning culture*, 6) *make the entire organization Work cross-functional*, 7) *Ensure that each individual Always stay focused and work with one thing at a time*, 8) *Give everybody responsibility* in order to create ownership for their respective tasks.

### 6.3 ANALYSIS GAMMA - LEAN SERVICE FROM AN ORGANIZATIONAL PERSPECTIVE

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Now, that we have identified the operational success factors and challenges, as well as identified the most important issues. We will continue with analysis gamma – understanding how these operational success factors and challenges relate to the organization. In the methodology we have outlined the analytical process, which encompasses analysis gamma, for orientation how the problem is broken down and analyzed please refer to the method and figure 4.10.

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### 6.3.1 QUANTIFYING EACH TPS AREA INDIVIDUALLY AND QUANTITATIVE ASSESSING A LEAN SERVICE ORGANIZATION

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We use an organizational approach in order to uncover the success factors and challenges, therefore, naturally there is a need to deeper understand the organizational framework and how these variables interact with the questions relating to the TPS areas. In other words, because we use an organizational perspective, we must in turn decipher the success factors and challenges relating to the framework. This is done because it relates to the third research question - *How does the success factors and challenges relate to an organization?* As well as strengthen our previous analysis and to provide further guidance of how to apply the eight operational principles. Thus the focus of this analysis is really to understand how these operational success factors and challenges relate to the organization as this analysis puts focus on what parts of an organization that is most related to success factor and/or challenges according to the respondents. This analysis represents step 4B-6B in figure 4.10. It is easy to jump to the assumption that there is a direct correlation between the eight operational principles and the areas which they relate to in the research framework. We do not regard such an assumption as false, but the results of this thesis cannot be used to verify or reject the assumption.

We will in the following sections only comment on the findings on each TPS variable as the figures speaks for themselves. We will however include some comments on the total figures as these numbers make a broad enough foundation to uncover trends and patterns.

### 6.3.1.1 SUCCESS FACTORS

| Success Factors                     |              |              |               |              |            |          |
|-------------------------------------|--------------|--------------|---------------|--------------|------------|----------|
|                                     | Structure    | Resources    | People        | Processes    | Total      | Std. Dev |
| <b>Customer Focus<sub>SF</sub></b>  | <b>23.33</b> | <b>16</b>    | <b>26.33</b>  | <b>12.33</b> | <b>78</b>  |          |
|                                     | 30%          | 21%          | 34%           | 16%          |            | 8%       |
| <b>Flow<sub>SF</sub></b>            | <b>27.25</b> | <b>27.75</b> | <b>41.75</b>  | <b>18.25</b> | <b>115</b> |          |
|                                     | 24%          | 24%          | 36%           | 16%          |            | 8%       |
| <b>Standardization<sub>SF</sub></b> | <b>28.5</b>  | <b>22</b>    | <b>35</b>     | <b>20.5</b>  | <b>106</b> |          |
|                                     | 27%          | 21%          | 33%           | 19%          |            | 6%       |
| <b>Quality<sub>SF</sub></b>         | <b>16.5</b>  | <b>22</b>    | <b>33</b>     | <b>13.5</b>  | <b>85</b>  |          |
|                                     | 19%          | 26%          | 39%           | 16%          |            | 10%      |
| <b>Total<sub>SF</sub></b>           | <b>95.58</b> | <b>87.75</b> | <b>136.08</b> | <b>64.58</b> | <b>384</b> |          |
|                                     | 25%          | 23%          | 35%           | 17%          |            | 8%       |

**Figure 6.4– Success factors aggregated**

It is clear that people is the most important success factor any organization is trying to operate in a lean fashion, the variable received 35% of all the references. It was the number one variable in all the questions.

The second most important success factor is structure at 25%, closely followed by Resources at 23%. However, remember that the four variables interact with each other, meaning that better structures might facilitate better communication and thus lessen the importance of people. On the other hand, good people might also compensate for weak structures.

It is also very shocking that processes at 17% ranks as the least most important success factor, even though lean is often regarded as a processes improvement measure, which also might be the explanations for why it also ranks so low.

### 6.3.1.2 CHALLENGES

| Challenges                   |              |              |               |              |       |          |
|------------------------------|--------------|--------------|---------------|--------------|-------|----------|
|                              | Structure    | Resources    | People        | Processes    | Total | Std. Dev |
| Customer Focus <sub>c</sub>  | 18.5<br>32%  | 5.5<br>9%    | 26<br>45%     | 8<br>14%     | 58    | 16%      |
| Flow <sub>c</sub>            | 45<br>54%    | 10<br>12%    | 16<br>19%     | 13<br>15%    | 84    | 19%      |
| Standardization <sub>c</sub> | 15.66<br>20% | 6.66<br>9%   | 48.66<br>62%  | 7<br>9%      | 78    | 25%      |
| Quality <sub>c</sub>         | 9.25<br>13%  | 10.75<br>15% | 44.75<br>60%  | 9.25<br>13%  | 74    | 24%      |
| Total <sub>c</sub>           | 88.41<br>30% | 32.91<br>11% | 135.41<br>46% | 37.25<br>13% | 294   | 17%      |

Figure 6.5– Challenges aggregated

It is clear that that people at 46% are the biggest challenge for any organization trying to implement or operating in a Lean fashion. In three of the four questions people is ranked the highest, with an enormous 60% and 62% in Standardization and Quality.

The second biggest challenge is structure at 30%. It is interesting to note that structure dominates when flow is created with 35% margin down to the next biggest challenge. This might resound in the current company structure at the respondents. If there is a functional structure with a bias towards resource efficiency, then obviously, there is a big challenge to reorganize the structure of the company in order to be flow oriented.

The gap is fairly large between number one variable, People and number two variable, Structure. The gap is also almost equally as big down to number three ranked variable i.e. Processes at 13%. Resources at 11% ranks as the least relevant challenge.

### 6.3.1.3 SUCCESS FACTORS VERSUS CHALLENGES

| Success Factors versus Challenges |              |              |               |              |            |          |
|-----------------------------------|--------------|--------------|---------------|--------------|------------|----------|
|                                   | Structure    | Resources    | People        | Processes    | Total      | Std. Dev |
| <b>Total<sub>SF</sub></b>         | <b>95.58</b> | <b>87.75</b> | <b>136.08</b> | <b>64.58</b> | <b>384</b> |          |
|                                   | 25%          | 23%          | 35%           | 17%          |            | 8%       |
| <b>Total<sub>C</sub></b>          | <b>88.41</b> | <b>32.91</b> | <b>135.41</b> | <b>37.25</b> | <b>294</b> |          |
|                                   | 30%          | 11%          | 46%           | 13%          |            | 17%      |

**Figure 6.6– Success factors versus Challenges**

There is a clear correlation between each variable for both success factor and challenge, however, these do not completely accurately match i.e. the correlation is not one-to-one. This is in itself very interesting because one could expect success factors and challenges to be “mirror images” of each other, but they are not.

Although People are viewed as the biggest success factor, it is also clearly the biggest challenge. This indicates that one cannot stress enough the importance of people in a lean service organization.

The Structure ranks second in total for both success factors and challenges, although it is assigned more weight as a challenge. This indicates that Structure is also crucial for a lean service organization.

As for Resources and Processes, they are given more weight as success factor then they are as a challenge. Also, they have switched their ranking, while Resources is ranked as the third success factor, it is ranked as the fourth challenge. Same goes for Processes, while it is ranked as the fourth success factor, it is ranked as the third challenge.

There is a much higher standard deviation for challenges than success factors, we believe this is because it is easier to attest challenges of one’s operations than success factors. This indicates that it is harder to realize success factor than it is to identify challenges. Why is this important? Lean, as mentioned, is an interrelated concept that incorporates dimensions of an organization, one aspect of the organization is culture. Culture is a dimension often overlooked is even though

it is essential part of an organization. In order to establish a culture an organization need to know its own values and identify or at least share values and norms (Schein, 1984). Making ones beliefs explicit and knowing what your strengths (success factors) and weaknesses (challenges) are and express these as artifacts could ultimately define an organization (Schein, 1984). Thus, if an organization is unable to exemplify its strengths, its culture is not as fully developed as it could be. It is also human to assign more weight to negative aspects than to epitomize ones strengths (Baumeister et al., 2001). Due to uneven distribution of challenges in the organization framework, compared to success factors (see figure 6.6), we can build our third hypothesis.

Hypothesis 3: It is easier to point out the challenges than success factors, which in turn indicates that is hard to pinpoint ones' organizational identity.

This hypothesis further entails the importance of communicating success stories within the organization, which have been identified success factor in this thesis.

#### 6.3.1.4 SUCCESS FACTORS AND CHALLENGES

| Success Factors & Challenges |               |               |               |               |            |          |
|------------------------------|---------------|---------------|---------------|---------------|------------|----------|
|                              | Structure     | Resources     | People        | Processes     | Total      | Std. Dev |
| <b>Total<sub>SF</sub></b>    | <b>95.58</b>  | <b>87.75</b>  | <b>136.08</b> | <b>64.58</b>  | <b>384</b> |          |
| <b>Total<sub>C</sub></b>     | <b>88.41</b>  | <b>32.91</b>  | <b>135.41</b> | <b>37.25</b>  | <b>294</b> |          |
| <b>Total<sub>SF+C</sub></b>  | <b>183.99</b> | <b>120.66</b> | <b>271.49</b> | <b>101.83</b> | <b>678</b> |          |
|                              | 27%           | 18%           | 40%           | 15%           |            | 11%      |

**Figure 6.7– Success factors and Challenges**

When adding both success factors and challenges together, it becomes clear that People at 40%, are by far the most important organizational variable in regards to implementing lean service. This might not be very surprising when reflecting upon it, as all companies are built around and upon their people. Depending on what service archetype (Silvestro et al., 1992) the particular company operates in, this might become even more so important. Maister (1997) discuss that in a professional service firm, the product itself are the people and their knowledge and skills, hence they are indispensable and the professional service firm should always strive to develop the human capital of the firm i.e. their knowledge and skills. However, as we have shown in the

literature review, the people in the lean service literature are an issue greatly underdeveloped. Here we offer a new paradigm of lean service, people effectively incorporates 40% of a lean service organization. *"People are what makes or breaks this company"* (Respondent X).

Structure ranks as second at 27%, this might be intuitively understood because it facilitates the foundation of the interaction between the people, which is the most important variable. Resources at 18% ranks as the third most important variable. Processes at 15% is ranked as the least important variable, which is unexpected because lean is often viewed as a processes improving method or tool (White & Chaiken, 2008).

It is quite interesting to see that the results are relatively clear. One might expect these results to be quite mixed as there seem to be a gap or confusion regarding lean in the academic literature. The different variables or dimensions of Leavitt's model interact strongly with each other, but this analysis clearly depicts that people are the most important variable in total, and also in almost all individual questions.

Hypothesis 4: People are the most important factor in regards to lean service from an organizational perspective.

We also conducted a simple word analysis, by using *NVivo*. We found that, of all the words used over five characters long and of relevance, any form of understanding and words relating to understanding, such as knowledge was by far the most used word. 1.9 percent of all the words used were related to understanding. On second place, words relating to management, at 1.1 percent. Although we place no significant weight to this analysis, instead it functions as a method of triangulation to support and secure that our grounded theory analysis is beset on the right discourse.

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## 7 SYNTHESIS

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*The aim of this chapter is to provide a more holistic perspective of the results and answers the main research question. Also, relate the findings of this thesis back to current theory.*

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### 7.1 HOW TO IMPLEMENT LEAN IN SERVICE CONTEXT?

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The answer to this question lies within synthesizing all three analyses Alpha, Beta and Gamma together. In order to successfully implement lean in service context, the organization needs to be extremely people centric and more often than not solve focus on the people. At the same time constantly apply the eight operational principles of lean service.

- 1 Create a deep understanding for Lean
- 2 Continuously measure and monitor customer needs, flows, standards, and processes, with relevant metrics
- 3 Active top management
- 4 Engage everybody concerned
- 5 Create a permissive/learning culture
- 6 Work cross-functional
- 7 Always stay focused and work with one thing at a time
- 8 Give everybody responsibility

*Create a deep understanding for Lean* – everybody needs to understand the lean concept and what it means to the organization in order to effectively communicate with each other. This mutual understanding is the basis in order to proceed with the implementation. Analysis Alpha revealed that lean is understood differently from person to person and hard to define. Hence there is a great need to really understand the concept itself, but more importantly also find a unifying convergence of relating to the concept within the organization. Otherwise, communication breaks down immediately simply because people are not talking about the same thing i.e. they are not comparing or discussing apples-to-apples.

*Continuously measure and monitor customer needs, flows, standards, and processes, with relevant metrics* – without measuring and monitoring the work the evaluation process and trying to continuously improve becomes ineffective. Also, this principle reveals what to measure and monitor, but not how.

*Active top management* – It is most important that top management is active, not just involved but fully active throughout the implementation, preferably even involved in some day-to-day activities.

*Engage everybody concerned* – lean involves everybody in the entire organization, not just certain people, therefore it is utmost important to secure that everybody participates and even more important contribute.

*Create a permissive/learning culture* – in order to contribute, the culture of the organization should be permissive, which is an essential part of learning. If ideas are not openly shared then it is extremely hard to leverage the inherent knowledge within the organization.

*Work cross-functional* – this builds on the notion of knowledge leverage. Working cross-functional enables people to share and incorporate ideas that otherwise would not have been thought of and thus solve the customers' needs in a better manner.

*Always stay focused and work with one thing at a time* – doing one thing at a time is essential in order to do right the first time, which in turn has many benefits.

*Give everybody responsibility* – this is not same as engaging everybody, although they are probably correlated. Everyone should be responsible and accountable for a certain or several tasks which in turn improves the quality of the work.

The results in this thesis indicate that people are by far the most important factor from an organizational standpoint, hence the need to further adapt principles that naturally appeal and enhance to the interaction of people. We use the term “people” in the same context as we use it in Leavitt's organizational framework.

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## 7.2 RELATING TO THEORY

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In accordance with an abductive approach and grounded theory analysis, the findings of this thesis must relate back to current theory. Choosing what theory to relate back to is challenging because of the subject, lean service remains somewhat undeveloped. As we aim to investigate how to implement lean in service context this is difficult. Therefore we choose to relate our findings to the lean production principles. .

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### 7.2.1 LEAN PRODUCTION VERSUS LEAN SERVICE

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In this section we then employ Karlsson's (1992) lean production principles framework because Åhlström (2004) utilized the same framework when translating these lean production principles to service. The difference in this thesis is that we develop and propose eight lean service principles and relate these principles to lean production. Thus it is a different approach, while Åhlström utilizes deduction and this thesis has an inductive (abductive to be correct) stance.

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### 7.2.2 KARLSSON

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The Lean Production Principles are fundamentally developed from Womack and colleagues' previous work *The Machine that Changed the World* (1990), and since these principles are somewhat established and accept by the academic world, although no universal principles exist (Doolen & Hacker 2005, Pettersen 2009). We find Karlsson's (1992, cited in Åhlström 2004) framework for lean production principles to be particularly relevant because Åhlström (2004) utilizes this framework to investigate and translating the lean production principles to a service context.

Åhlström(2004) acknowledges Weick's three dimension of characterization of social theories. This might also be the reason why the previous frameworks have failed to appeal to the nature of our research. Womack and Jones are too simple and Liker is to general and complex. Karlsson's (1992) framework is particularly useful for our purpose because it has been used already to relate lean production to lean service in Åhlström's study in (2004). Now, this thesis effectively does the opposite of what Åhlström did with the fundamental difference being the research approach. While Åhlström (2004) relates the principles of lean production to several service cases, this thesis have an abductive approach.

First, we explore certain operational characteristics of lean service developed from the TPS. Then we uncover success factors and challenges in regards to lean service and further develop eight operational principles and relate the findings back to the principles of lean production.

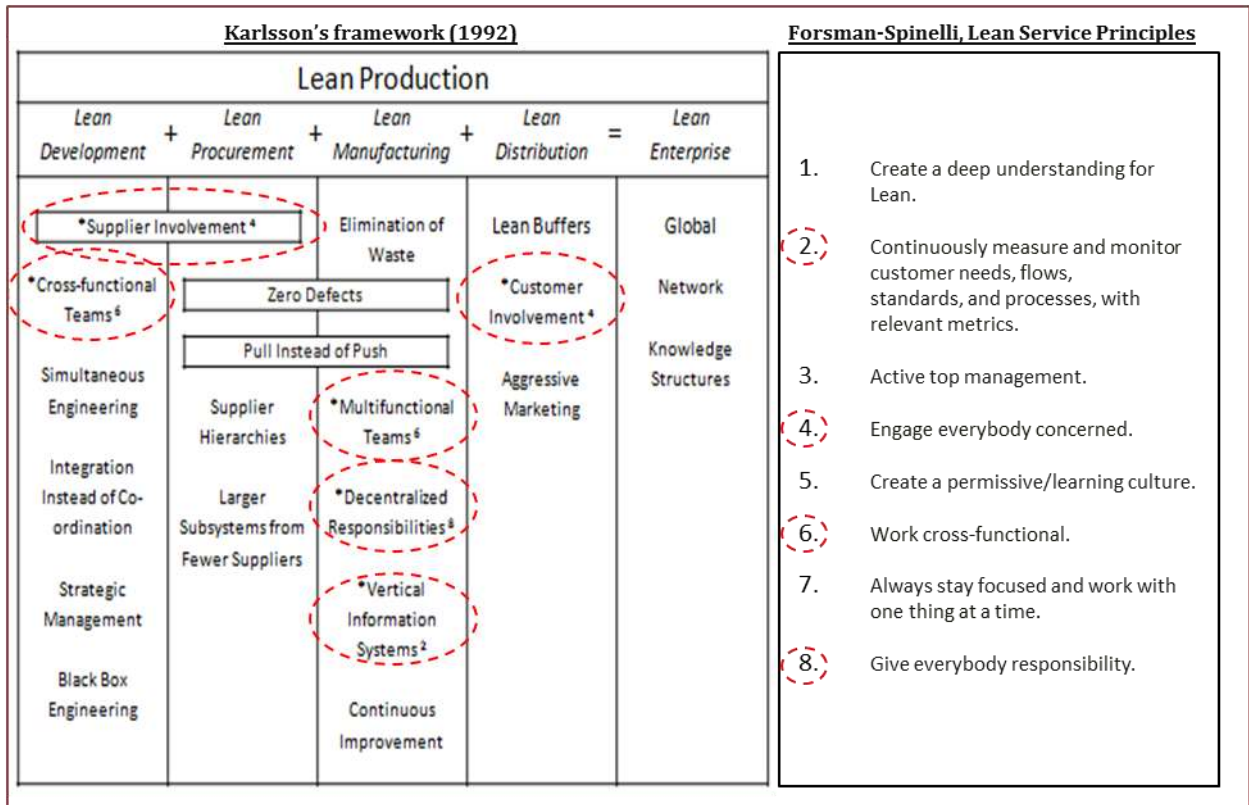


Figure 7.1– Comparison between Karlsson 1992 (Åhlström 2004. p. 548) and [Own model]

Effectively we can directly translate four of our proposed principles into the Karlsson's framework (1992), which is indicated in figure 6.3 with a "\*". This leaves out four of our proposed operational principles *Create a deep understanding for Lean*, *Active top management*, *Create a permissive/learning culture*, and *Always stay focused and work with one thing at a time*. These four operational lean service principles are clearly not in focus in the lean production framework. This can partly be explained by the fact when Åhlström (2004) utilizes the framework he makes a clear distinction between **principle** and **activity**, something our operational lean service principles do not take into account. The eight operational lean service principles are very activity oriented. Thus, Åhlström's (2004) distinction is effective because it allows to classify the seventh principle into an activity i.e. *Always stay focused and work with one thing at a time*. Also, one can argue that our first principle, *Create a deep understanding for Lean*, is the goal of what is referred to as *Lean Development* in Karlsson framework and that the associated principles of *Lean Development* are the mean to reach the goal.

In turn, this is further proof that the lean production principles are relevant for lean service. Notice the choice of words, relevant for lean service, because we believe this is not proof that they are transferable, although as previous academic suggest there is a need to slightly modify the lean production principles, due to the inherent difference between services and production (Åhlström, 2004). The purpose of this study is not to investigate if the lean production principles

are transferable to service, this thesis have in fact done the opposite – abductively developed lean service principles and then compared these current lean production, thus the use of the word relevant instead of transferable.

However, it is clear that people, are even more in focus in a lean service setting than lean production, not to say that people are not in focus in lean production they clearly are a big vocal point, but they are even more so in regards to lean service. This is further evident when taking our hypothesis number four into account - People are the most important factor in regards to lean service from an organizational perspective. Our insight suggests there is a need to further develop and add more principles to the lean production framework in order to successfully apply these principles in a service context i.e. lean service. This is probably partly because the inherent variability due to human interaction in a service setting. It could also be explained by the phenomena developed in hypothesis 3, that it is easier to pinpoint challenges than success factors. Another, reasonable explanation could be the issue of inventory, since services do not incur storage costs, this over focus on people and the culture might as well be the closest thing services can relate to storage costs. Culture needs maintenance and service organizations need a lot of it, but hopefully this preservation is not perceived as carrying cost. There are all sorts of plausible explanations, which is out of scope for this thesis.

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### 7.3 SUMMARY OF SYNTHESIS

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In order to successfully implement lean service, it is undoubtedly clear that the people should be in focus. Then operate in a pattern according to the proposed eight lean service principles. This is a concise answer to how to implement lean in a service context.

Also, we compare the eight proposed lean service principles to the principles of lean production by utilizing Karlsson's framework (1992), which is the same Åhlström (2004) used to translate the principles of lean production to service. The difference between this thesis and Åhlström's article (2004) is that of approach, this thesis develops and proposes new lean service principles.

We found that the proposed lean service principles roughly translate to the lean production principles. With the exception for two lean service principles, we explain this discrepancy as our lean service principles do not account for the difference between principle and activity, which Karlsson's framework does. The word principle is this case, as relating to the eight proposed lean service principles, is used in the intent of a guide and guiding lean service implementation work. These proposed principles are derived from the highest level abstraction or the common denominator from the list operational success factors and challenges of lean service. Therefore, by default these principles are very operational or activity oriented.

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## 8 CONCLUSIONS

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*The final chapter will outline the main conclusions of this thesis. Further, this will also express limitations, implications for future research, and reflections with the study.*

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### 8.1 FINDINGS

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The main purpose of this thesis was to explore and identify how to implement lean in a service context. This was decided after an extensive pre-study, as it became evident that the research project was failing its original intent. In turn, this thesis investigated three sub questions in order to provide an answer the main research question. These sub questions generated four separate hypotheses.

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#### 8.1.1 WHAT IS LEAN?

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We have illustrated that lean literature is confusing to say the least and that the lean service literature is still in its infancy as some academics attest to (Åhlström, 2004), unlike lean production. The perplexities in the literature are great challenges in regards to consensus of the lean concept. This thesis have depicted that these challenges also exist and are reflected in practice. However, we have identified that lean has several meanings and that the emerging understanding of the lean concept as that it exist in several abstract levels. The lack of understanding in regards to lean and also lean service is a paradox. How can one understand lean service without truly grasping what lean is?

Hypothesis 1: Lean has several different meanings and entails a vast amount of various concepts or issues. These issues and concepts in turn have a several levels of hierarchy or abstraction.

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#### 8.1.2 IMPLEMENTING LEAN SERVICE

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To answers the main research question we drew conclusions from all the analysis, Alpha, Beta and Gamma together. Given the above conundrum i.e. not really know what lean really is, it directed our research to explore operational characteristics of lean service i.e. success factors and challenges, which in turn are derived from the TPS framework. This exploration was driven through quantitative data questionnaire with open-ended questions. This resulted in a lengthy list of success factors and challenges, ultimately these lists provide the basis to answer the

research question. However, given the length of these answers they provide no immediate meaning, but rather these lists are a solid base for future research.

Further, the lists of success factors and challenges are very extensive and simply knowing the success factors and challenges are rather pointless unless they are put into context. Therefore, in order to make sense of the overwhelming data we applied an organizational framework. The framework both shortens the list and provided a foundation to realize effective managerial impact. We chose Leavitt's organizational framework, but updated it slightly, which encompasses four organizational variables; structure, resources, people, and processes.

In turn, this organizational framework provided the basis to uncover eight operational principles of lean service, these were not mentioned the most frequently in the survey, but through a series of deductive logic we interpreted these as the most central issues in regards to the lean service concept.

Hypothesis 2: Lean service in essence, from an organizational perspective, is mainly about eight fundamental concepts; 1) *Create a deep understanding for Lean*, 2) *Continuously measure and monitor customer needs, flows, standards, and processes with relevant metrics*, 3) *involve and have an Active top management*, 4) *Engage everybody concerned*, 5) *Create a permissive/learning culture*, 6) *make the entire organization Work cross-functional*, 7) *Ensure that each individual Always stay focused and work with one thing at a time*, 8) *Give everybody responsibility in order to create ownership for their respective tasks*.

These eight operational principles in lean service have in turn been compared to the Lean Production Principles developed by Karlsson (1992), and we found that there is a big overlap. However, *Create a deep understanding for Lean*, *Active top management*, *Create a permissive/learning culture*, and *Always stay focused and work with one thing at a time*. These four operational lean service principles are not in focus in the lean production framework. Further, after acknowledging the distinction of principle and activity we propose to add two more principles in a lean service setting; *Active top management*, and *Create a permissive/learning culture*, which creates a clear focus on people in a service setting.

In order to understand how the identified success factors and challenges relate to the organization when implementing lean service we analyzed Leavitt's organizational framework. This analysis will in turn help managers to understand and effectively implement lean in a service context. In addition, this analysis will add validity and strengthen the previous analysis by actually understanding the framework better.

We found that people are by far the most important organizational factor; this is very surprising considering that lean is often regarded as a process improvement method (White & Chaiken, 2008). We can now uncover two major flaws with this common perception. The first flaw is related to the word method, as previously shown, the lean concept in practice is regarded as many different things not just a method, but also a philosophic and value oriented concept with affiliated methods and tools. This thesis have identified that the lean concept have different levels of abstraction in order to fully understand the complexities of the concept. The second flaw relates to the word processes, our organizational perspective of analysis in regards to the success factors and challenges clearly depict that lean service is mostly related to people and not processes. This is further sustained when relating to the developed operational principles of lean service, which also attest to the importance of people. It is also very interesting that it is easier to point out challenges than success factors, this finding could have ramifications in turn of corporate culture and identity.

Hypothesis 3: It is easier to point out the challenges than success factors, which in turn indicates that it is hard to pinpoint one's organizational identity.

Hypothesis 4: People are the most important factor in regards to lean service from an organizational perspective.

Lastly, we would like to introduce a new way to relate to lean. Lean is not a process improvement method, instead:

*Lean should be considered as a human resource system with a focus on people rather than on the process. Lean encompasses a variety of interrelated concepts and issues. These concepts act together in concert and in a systemic nature across the entire organization on many different abstraction levels.*

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## 8.2 LIMITATIONS

The survey was aimed at lean in the context of a service setting, meaning that the result should only be evaluated towards lean service and not lean production. On the other hand, considering that most of the lean production principles are relevant in lean service, it would be interesting to uncover and direct a similar study towards lean production. People are a central aspect in lean production, but since we have not found any previous study that is conducted in a similar

fashion, it is quite possible that such a study would also highlight and truly recognize the people in the lean production system. So far the value of the people in lean production has been discounted in comparison to the findings in this study, thus it is important to be clear that this study is limited to lean service.

The survey sample was directed towards lean experts, thus the findings reflect their opinion. They perceive people and making people understand as the biggest success factor and challenge. Considering they are experts and already knowledgeable on the subject, it is plausible that this perception might be unfair and not an accurate reflection of reality. If the survey was directed to another sample group, it is quite possible another organizational factor or dimension will be more important. However, this is also difficult to judge because of the inherent dynamic of the organizational framework and these the factors constantly interact with each other.

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### 8.3 IMPLICATIONS FOR FUTURE RESEARCH

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This thesis has contributed regarding the contemporary application of TPS in a service context by identifying success factors and challenges, which can be found in appendix *15 Empirical Data*. We believe this appendix is the biggest academic contribution from this thesis, since we have found no previous study that in an exploratory fashion aim to identify the success factors and challenges in regards to lean service implementation. However, we question if a definitive list can be expressed in reality, hence there is still a need to further develop these lists of success factors and challenges. Then it would also be useful to rank or evaluate each separate success factor and challenge by developing a new survey in order to uncover the most common success factor and challenge, which is a different approach from this study. Such a study should be driven by a deductive approach and quantitative method. This study utilized a variety mixed methods, an abductive approach (more geared towards induction) and qualitative survey, then through an organizational perspective and deductive logic we identified the most common success factors and challenges. Lastly, we assessed the organizational framework strictly through quantitative techniques. Comparing the results of this thesis with a new study designed with a deductive approach and quantitative method assessing the success factors and challenges alone would further develop the theory and our understanding of lean service.

It would also to be interesting to direct this survey to another target population e.g. managers, CEO's, CFO's, line-workers, in order to relate the perceptions of lean experts to another corporate level within an organization.

This thesis also propose eight operational principles for implementing lean in a service context, further research and practical experimenting in an organizational situation is needed in order

attest the claim and validity of these principles, especially those four that we could not completely extrapolate from the lean production principles.

Moreover, we believe any of the four hypotheses we presented in the analysis would provide a solid foundation and interesting topics for future research.

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#### 8.4 REFLECTIONS

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Service production inherently deals with people and variability occurs mainly because of the dynamic customer interaction (Silvestro et al., 1992), therefore it might not be surprising that people dominate all factors in the organizational framework. However, it is extremely surprising that people dominate so clearly and especially considering that lean is sometimes regarded a process improvement method (White & Chaiken, 2008). In practice, this knowledge has major impact for managers because ultimately the people of the organization should guide and lead everything and anything an organization does. In order to improve, the focal point should always be derived from developing the people within the organization. To illustrate this point and how deep it reaches in the organization from a managerial perspective we would like to use Jim Collins (2001) bus analogy. Imagine your company as a bus, and then it all comes down to getting the right people on the bus and getting the wrong people off the bus. Once the right people are on the bus, then the people will figure out of how to operate and where to steer the bus and decide the path of the journey. This is done only after a consensus of understanding is reached of how to operate and steer the bus i.e. understanding what lean really means for oneself and the organization.

In essence, if an organization or the bus would like to pursue a lean service oriented strategy i.e. becoming more customer oriented, standardizing, raising quality, and establishing flow through the entire organization. The starting point should stem from the people by securing interaction and making everybody communicating more effectively and efficiently will ultimately will result in operations that are very lean. Hence, there is a need to reach consensus on what lean is and what it means to the organization, this understanding again ultimately resides within the minds of the people in order to determine how the bus should operate, steer, and its destination.

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## 10 APPENDIX

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## 11 ABBREVIATIONS

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**Ref.** – References, i.e. the frequency of the respondents answers coded into the category  
**% of Ref.** – Percent of References  
**#Resp.** – Number of Respondents  
**Catg.** - Categories  
**Strctr** - Structure  
**Rsrc** - Resources  
**Ppl** - People  
**Prcss** – Processes  
**Cust.** – Customer Focus  
**Stdrs** – Standardization  
**Qlty** – Quality  
**Class** - Classification

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## 12 SURVEY QUESTIONS IN SWEDISH

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1 - Vad är lean för Dig? I denna fråga är det således Din personliga syn och förståelse som är viktig. Vad har lean kommit att bli för just Dig, givet Din praktiska erfarenhet?

6A - Vilka har varit de största utmaningarna kring att få hela organisationen att kontinuerligt hålla uppmärksamheten på de externa kundbehoven?

6B - Vilka är de största framgångsfaktorerna för att få en hel organisation att fokusera på de externa kundbehoven?

7 A - Vilka har varit de största utmaningarna kring att skapa ett effektivt helhetsflöde i den organisation där Du arbetar idag?

7 B - Vilka är de största framgångsfaktorerna för att skapa ett effektivt flöde?

8 A - Vilka har varit de största utmaningarna kring att skapa väl fungerande standarder och intern "best practice" i den organisation där Du arbetar idag?

8 B - Vilka är de största framgångsfaktorerna för att kunna skapa ett gemensamt och standardiserat arbetssätt?

9 A - Vilka har varit de största utmaningarna kring att skapa en kvalitetsorienterad kultur där alla tar helhetsansvar och problem direkt lyfts upp till ytan?

9 B - Vilka har varit de största framgångsfaktorerna kring att skapa en kvalitetsorienterad kultur där alla tar helhetsansvar och problem direkt lyfts upp till ytan?

### 13 SURVEY QUESTIONS TRANSLATED TO ENGLISH

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1 - What is Lean for You? In this question, it is your personal view and understanding that is important. What is Lean has become for you, given your practical experience?

6A – Which have been the greatest challenges to get the whole organization to continually keep attention to the external customer demands?

6B – Which are the main success factors to get a whole organization to focus on the external customer demands?

7A – Which have been the greatest challenge s in order to create an effective end-to-end flow in the organization where you work today?

7B – Which are the main success factor to create an effective flow?

8A – Which have been the greatest challenges concerning the creation of functioning standards and internal best practice in the organization where you work today?

8B – Which are the main success factors in order to create a common and standardized way of working?

9A - Which have been the greatest challenges concerning the creation of a quality-oriented culture where everyone takes ownership of the entire flow and problems are immediately identified?

9B - Which are the main success factors concerning the creation of a quality-oriented culture where everyone takes ownership of the entire flow and problems are immediately identified?

## 14 APPENDIX – EMPIRICAL DATA

### 14.1 EMPIRICAL DATA – WHAT IS LEAN?

| 1 What is Lean?                     | Ref.       | % of Ref.   | #Resp.    | Catg.     |
|-------------------------------------|------------|-------------|-----------|-----------|
| An Approach                         | 23         | 22%         |           |           |
| A Philosophy                        | 21         | 20%         |           |           |
| A Way to Improve                    | 14         | 13%         |           |           |
| A Culture                           | 8          | 8%          |           |           |
| A Way of Thinking                   | 8          | 8%          |           |           |
| Waste elimination                   | 6          | 6%          |           |           |
| A Way of Working                    | 3          | 3%          |           |           |
| It's about Seeing and Understanding | 3          | 3%          |           |           |
| A Way of life                       | 3          | 3%          |           |           |
| A Toolbox                           | 3          | 3%          |           |           |
| A Holistic perspective              | 2          | 2%          |           |           |
| A Quality and Monitoring systems    | 2          | 2%          |           |           |
| A Method                            | 2          | 2%          |           |           |
| A Strategy                          | 2          | 2%          |           |           |
| It's Values                         | 2          | 2%          |           |           |
| A Production Systems                | 1          | 1%          |           |           |
| An Activity System                  | 1          | 1%          |           |           |
|                                     | <b>104</b> | <b>100%</b> | <b>62</b> | <b>17</b> |

## 14.2 EMPIRICAL DATA - SUCCESS FACTORS WITH CUSTOMER FOCUS

| 6B Success Factors with Customer Focus  | Ref.      | % of Ref.   | #Resp.    | Catg.     |
|---|-----------|-------------|-----------|-----------|
| A success factor is to continuously measure if customer value is created                          | 8         | 10%         |           |           |
| A success factor is that top management is actively involved                                      | 7         | 9%          |           |           |
| A success factor is to collaborate with customers to determine their needs                        | 7         | 9%          |           |           |
| A success factor is to communicate external feedback internally                                   | 6         | 8%          |           |           |
| A success factor is to define the concept of internal customer                                    | 6         | 8%          |           |           |
| A success factor is to highlight success stories  | 6         | 8%          |           |           |
| A success factor is that senior management communicates the importance of customer focus.         | 6         | 8%          |           |           |
| A success factor is to internally understand why the customer is important                        | 5         | 6%          |           |           |
| A success factor is to conduct value stream analysis  | 4         | 5%          |           |           |
| A success factor is that there is an understanding of the symbiosis between consumer and producer | 4         | 5%          |           |           |
| A success factor is that all the focus is on the external customer                                | 4         | 5%          |           |           |
| A success factor is to visualize the customers' needs to the organization                         | 3         | 4%          |           |           |
| A success factor is to perform daily management   | 3         | 4%          |           |           |
| A success factor is to create internal transparency and openness                                  | 2         | 3%          |           |           |
| A success factor is to educate to recognize the importance of customer focus                      | 2         | 3%          |           |           |
| A success factor is to connect customer focus with internal incentives                            | 1         | 1%          |           |           |
| A success factor is to work in cross-functional process teams                                     | 1         | 1%          |           |           |
| A success factor is to reflect after projects   | 1         | 1%          |           |           |
| A success factor is to be patience and take long term decisions                                   | 1         | 1%          |           |           |
| A success factor is to focus on the value creating processes                                      | 1         | 1%          |           |           |
|   | <b>78</b> | <b>100%</b> | <b>55</b> | <b>20</b> |

### 14.3 EMPIRICAL DATA - CHALLENGES WITH CUSTOMER FOCUS

| 6A Challenges with Customer Focus  | Ref.      | % of Ref.   | #Resp.    | Catg.     |
|--|-----------|-------------|-----------|-----------|
| A challenge is to get the facts on what the customer wants.                                    | 10        | 17%         |           |           |
| A challenge is to understand who the end customer  | 10        | 17%         |           |           |
| A challenge is to focus on the customer throughout the organization.                           | 10        | 17%         |           |           |
| A challenge is to get all internal functions to work towards the end customer                  | 6         | 10%         |           |           |
| A challenge is to clarify the client's needs for the entire organization                       | 4         | 7%          |           |           |
| A challenge is that <i>customer focus</i> is a new concept                                     | 4         | 7%          |           |           |
| A challenge is to understand customer needs at an aggregate level rather than individual level | 3         | 5%          |           |           |
| A challenge is to create customer focus in a function-oriented organization                    | 2         | 3%          |           |           |
| A challenge is to involve top management   | 2         | 3%          |           |           |
| A challenge is to find metrics for measuring customer needs                                    | 2         | 3%          |           |           |
| A challenge is to maintain motivation throughout the change process                            | 2         | 3%          |           |           |
| A challenge is to find time to work on customer focus  | 1         | 2%          |           |           |
| A challenge is to understand that it is the client that determines the pace of work            | 1         | 2%          |           |           |
| A challenge is to focus on the correct priorities  | 1         | 2%          |           |           |
|  | <b>58</b> | <b>100%</b> | <b>59</b> | <b>14</b> |

#### 14.4 EMPIRICAL DATA - SUCCESS FACTORS WITH FLOW

| 7B Success Factors with Flow   |            |             |           |           |
|--|------------|-------------|-----------|-----------|
|  | Ref.       | % of Ref.   | #Resp.    | Catg.     |
| A success factor is to involve all affected by the flow                  | 13         | 11%         |           |           |
| A success factor is to see the big picture                               | 13         | 11%         |           |           |
| A success factor is to understand customer needs                         | 12         | 10%         |           |           |
| A success factor is to conduct value stream analysis                     | 9          | 8%          |           |           |
| A success factor is a deep understanding of lean                         | 8          | 7%          |           |           |
| A success factor is to visualize the flow                                | 7          | 6%          |           |           |
| A success factor is to continuously measure and monitor the flow         | 6          | 5%          |           |           |
| A success factor is to educate staff so they can see the flow            | 6          | 5%          |           |           |
| A success factor is that the organizational structure follows the flow   | 5          | 4%          |           |           |
| A success factor is to give responsibilities to employees                | 5          | 4%          |           |           |
| A success factor is to understand one owns role in the flow              | 5          | 4%          |           |           |
| A success factor is to work cross-functional                             | 4          | 3%          |           |           |
| A success factor is to actively involve senior management                | 3          | 3%          |           |           |
| A success factor is to identify transition points                        | 3          | 3%          |           |           |
| A success factor is to involve the customer                              | 2          | 2%          |           |           |
| A success factor is to create an environment in which we dare to be open | 2          | 2%          |           |           |
| A success factor is to focus at one process at a time                    | 2          | 2%          |           |           |
| A success factor is to give feedback on performed tasks                  | 1          | 1%          |           |           |
| A success factor is to have effective information systems                | 1          | 1%          |           |           |
| A success factor is to connect flow to internal incentives               | 1          | 1%          |           |           |
| A success factor is to work closely with colleagues                      | 1          | 1%          |           |           |
| A success factor is to follow a standard                                 | 1          | 1%          |           |           |
| A success factor is to devote time to work with the flow                 | 1          | 1%          |           |           |
| A success factor is to benchmark against other organizations             | 1          | 1%          |           |           |
| A success factor is to find and eliminate waste                          | 1          | 1%          |           |           |
| A success factor is to strive for "one-piece-flow"                       | 1          | 1%          |           |           |
| A success factor is to level out production                              | 1          | 1%          |           |           |
|  | <b>115</b> | <b>100%</b> | <b>59</b> | <b>27</b> |

## 14.5 EMPIRICAL DATA - CHALLENGES WITH FLOW

| 7A Challenges with Flow   | Ref.      | % of Ref.   | #Resp.    | Catg.     |
|---|-----------|-------------|-----------|-----------|
| A challenge is to see the whole flow throughout the entire organization                   | 27        | 32%         |           |           |
| A challenge is that the current organizational structure impede the flow                  | 11        | 13%         |           |           |
| A challenge is that the current corporate culture prevent the flow                        | 10        | 12%         |           |           |
| A challenge is to create a flow of many different processes                               | 8         | 10%         |           |           |
| A challenge is to create flow if you lack knowledge about lean                            | 5         | 6%          |           |           |
| A challenge is to find relevant metrics to measure the flow.                              | 4         | 5%          |           |           |
| A challenge is to find time to work with flow   | 4         | 5%          |           |           |
| A challenge is to synchronize the flow  | 3         | 4%          |           |           |
| A challenge is to create flow with unclear processes                                      | 3         | 4%          |           |           |
| A challenge is to involve top management  | 2         | 2%          |           |           |
| A challenge is to create flow if you are short of resources                               | 2         | 2%          |           |           |
| A challenge is to create flow if you do not have a single person responsible for the flow | 1         | 1%          |           |           |
| A challenge is to create flow with a long distribution chain                              | 1         | 1%          |           |           |
| A challenge is to create flow without a standardized working space                        | 1         | 1%          |           |           |
| A challenge is to create flow without motivated employees                                 | 1         | 1%          |           |           |
| A challenge is to create flow without daily control                                       | 1         | 1%          |           |           |
|   | <b>84</b> | <b>100%</b> | <b>55</b> | <b>16</b> |

## 14.6 EMPIRICAL DATA - SUCCESS FACTORS WITH STANDARDIZATION

| 8B Success Factors with Standardization  | Ref.       | % of Ref.   | #Resp.    | Catg.     |
|--|------------|-------------|-----------|-----------|
| A success factor is to make all concerned involved in the creation of standards              | 15         | 14%         |           |           |
| A success factor is that everyone in the organization understands the value of standards     | 14         | 13%         |           |           |
| A success factor is to have well-defined standards   | 8          | 8%          |           |           |
| A success factor is to educate employees about the standards                                 | 7          | 7%          |           |           |
| A success factor is to monitor and measure standards.  | 6          | 6%          |           |           |
| A success factor is to ensure that standards compliance                                      | 4          | 4%          |           |           |
| A success factor is to visualize standards   | 4          | 4%          |           |           |
| A success factor is to communicate the right things that create inspiration                  | 4          | 4%          |           |           |
| A success factor is to have top management support and commitment                            | 3          | 3%          |           |           |
| A success factor is to record deviations   | 3          | 3%          |           |           |
| A success factor is to have common goals   | 3          | 3%          |           |           |
| A success factor is to begin to standardize the simple things                                | 3          | 3%          |           |           |
| A success factor is finding the right level of standardization                               | 3          | 3%          |           |           |
| A success factor is to learn from others   | 2          | 2%          |           |           |
| A success factor is that the standards is continuously improved                              | 2          | 2%          |           |           |
| A success factor is to add more resources to work on standards                               | 2          | 2%          |           |           |
| A success factor is to devote time to work with standards                                    | 2          | 2%          |           |           |
| A success factor is to be persistent in working with standards                               | 2          | 2%          |           |           |
| A success factor is to dare to start working with standards to later understand the benefits | 2          | 2%          |           |           |
| A success factor is that employees rotate work tasks   | 1          | 1%          |           |           |
| A success factor is to have a structure around how decisions are made about standards        | 1          | 1%          |           |           |
| A success factor is to use supportive lean coaches   | 1          | 1%          |           |           |
| A success factor is not to standardize at all  | 1          | 1%          |           |           |
| A success factor is to have a structure for how standards should be distributed              | 1          | 1%          |           |           |
| A success factor is that senior management requires the organization to work with standards  | 1          | 1%          |           |           |
| A success factor is to be depart from the customer's needs when creating standards           | 1          | 1%          |           |           |
| A success factor is to depart from a value stream mapping                                    | 1          | 1%          |           |           |
| A success factor is to unite around a vision of who the customer is                          | 1          | 1%          |           |           |
| A success factor is that all dare to identify waste  | 1          | 1%          |           |           |
| A success factor is to have a deep knowledge of lean   | 1          | 1%          |           |           |
| A success factor is to have an understanding of what should be standardized                  | 1          | 1%          |           |           |
| A success factor is to create realistic expectations from the beginning                      | 1          | 1%          |           |           |
| A success factor is to eliminate the root cause of variation in work methods                 | 1          | 1%          |           |           |
| A success factor is to internally benchmark  | 1          | 1%          |           |           |
| A success factor is to map the current situation in order to later improve                   | 1          | 1%          |           |           |
| A success factor is to first standardize what the employees feel are most important          | 1          | 1%          |           |           |
|  | <b>106</b> | <b>100%</b> | <b>53</b> | <b>36</b> |

## 14.7 EMPIRICAL DATA - CHALLENGES WITH STANDARDIZATION

| 8A Challenges with Standardization  | Ref.      | % of Ref.   | #Resp.    | Catg.     |
|---|-----------|-------------|-----------|-----------|
| A challenge is getting employees to understand the value of standards                       | 24        | 31%         |           |           |
| A challenge is the negative culture that exist among employees regarding the standards      | 14        | 18%         |           |           |
| A challenge is getting employees to comply with new standards                               | 8         | 10%         |           |           |
| A challenge is to find the right level of standardization                                   | 6         | 8%          |           |           |
| A challenge is the lack of leadership   | 4         | 5%          |           |           |
| A challenge is to that all flows in the organization does not look the same                 | 2         | 3%          |           |           |
| A challenge is to know what should be standardized  | 2         | 3%          |           |           |
| A challenge is that people are different  | 2         | 3%          |           |           |
| A challenge is to create standards without a capable cross-functional network               | 1         | 1%          |           |           |
| A challenge is to knowing how to signal the need for a new standard                         | 1         | 1%          |           |           |
| A challenge is to create standards that lead to consistent quality in all processes         | 1         | 1%          |           |           |
| A challenge is to old standards live on in the form of previously developed systems         | 1         | 1%          |           |           |
| A challenge is the size of the organization   | 1         | 1%          |           |           |
| A challenge is to create a simple control system for how to design standards                | 1         | 1%          |           |           |
| A challenge is to find the time to work on standards  | 1         | 1%          |           |           |
| A challenge is to restrain from measuring everything on a new standard                      | 1         | 1%          |           |           |
| A challenge is to ensure that it gives employees the right training on standards            | 1         | 1%          |           |           |
| A challenge is to create understandable informational materials that are easy to understand | 1         | 1%          |           |           |
| A challenge is the low level of knowledge among employees how to design standards           | 1         | 1%          |           |           |
| A challenge is to develop their own culture, ex. lean-house                                 | 1         | 1%          |           |           |
| A challenge is to hurry slowly, get everyone onboard  | 1         | 1%          |           |           |
| A challenge is to complete the implementation of standards fully                            | 1         | 1%          |           |           |
| A challenge is to get employees to constantly update the standards                          | 1         | 1%          |           |           |
| A challenge is to eliminate recurring problems  | 1         | 1%          |           |           |
|   | <b>78</b> | <b>100%</b> | <b>55</b> | <b>24</b> |

## 14.8 EMPIRICAL DATA - SUCCESS FACTORS WITH QUALITY

| 9B Success Factors with Quality  | Ref.      | % of Ref.   | #Resp.    | Catg.     |
|--|-----------|-------------|-----------|-----------|
| A success factor is to get all employees to feel responsibility                                    | 8         | 9%          |           |           |
| A success factor is to have blackboard meetings  | 6         | 7%          |           |           |
| A success factor is that senior management is actively involved                                    | 5         | 6%          |           |           |
| A success factor is to use representative measure of quality                                       | 5         | 6%          |           |           |
| A success factor is to involve everyone in the process   | 4         | 5%          |           |           |
| A success factor is to visualize the process   | 4         | 5%          |           |           |
| A success factor is to never connect a problem with a person                                       | 4         | 5%          |           |           |
| A success factor is to create a permissive culture   | 4         | 5%          |           |           |
| A success factor is to eliminate problems at the root cause in order to create quality             | 4         | 5%          |           |           |
| A success factor is to get everyone to see their activities as processes with a clear end-customer | 3         | 4%          |           |           |
| A success factor is to be able to deal with all issues raised to the surface                       | 3         | 4%          |           |           |
| A success factor is to educate   | 3         | 4%          |           |           |
| A success factor is to perform daily control   | 3         | 4%          |           |           |
| A success factor is to have one standard for all improvement groups                                | 2         | 2%          |           |           |
| A success factor is to provide staff with appropriate tools  | 2         | 2%          |           |           |
| A success factor is to give staff time so that they understand the working method                  | 2         | 2%          |           |           |
| A success factor is to encourage initiatives producing higher quality                              | 2         | 2%          |           |           |
| A success factor is to understand ones role in the big picture                                     | 2         | 2%          |           |           |
| A success factor is to put the customer first  | 2         | 2%          |           |           |
| A success factor is to define the responsibilities of each role in the organization                | 1         | 1%          |           |           |
| A success factor is that as change leaders work closely with other leaders                         | 1         | 1%          |           |           |
| A success factor is to create a company policy against defects                                     | 1         | 1%          |           |           |
| A success factor is to act quickly when deviations occur   | 1         | 1%          |           |           |
| A success factor is to involve the customer to create quality                                      | 1         | 1%          |           |           |
| A success factor is a clean workplace  | 1         | 1%          |           |           |
| A success factor is that everyone understands the work   | 1         | 1%          |           |           |
| A success factor is to understand the right priorities   | 1         | 1%          |           |           |
| A success factor is to work with simple concepts   | 1         | 1%          |           |           |
| A success factor is to maintain high level of competence of lean in order to create quality        | 1         | 1%          |           |           |
| A success factor is to distribute success stories  | 1         | 1%          |           |           |
| A success factor is to create environment in which people dare to be open                          | 1         | 1%          |           |           |
| A success factor is to be long-term at work and realize that the steps are small                   | 1         | 1%          |           |           |
| A success factor is to feel comfortable in the workplace   | 1         | 1%          |           |           |
| A success factor is to have compulsory improvement meetings  | 1         | 1%          |           |           |
| A success factor is to clarify the challenges  | 1         | 1%          |           |           |
| A success factor is to be clear on what to deliver   | 1         | 1%          |           |           |
|  | <b>85</b> | <b>100%</b> | <b>53</b> | <b>36</b> |

## 14.9 EMPIRICAL DATA - CHALLENGES WITH QUALITY

| 9A Challenges with Quality  | Ref.      | % of Ref.   | #Resp.    | Catg.     |
|---|-----------|-------------|-----------|-----------|
| A challenge is to create a permissive and learning culture                                      | 22        | 30%         |           |           |
| A challenge is to get everyone to understand the work process                                   | 7         | 9%          |           |           |
| A challenge is to get the organization to see the big picture                                   | 5         | 7%          |           |           |
| A challenge is to find relevant metrics to measure quality in processes                         | 4         | 5%          |           |           |
| A challenge is to find time to work on continuous improvements                                  | 4         | 5%          |           |           |
| A challenge is to understand how the discrepancies should be reported                           | 4         | 5%          |           |           |
| A challenge is to re-attach to quality work   | 3         | 4%          |           |           |
| A challenge is to get leaders to walk the talk  | 3         | 4%          |           |           |
| A challenge is to understand what discrepancies should be reported                              | 3         | 4%          |           |           |
| A challenge is to create a good structure for deviation control                                 | 2         | 3%          |           |           |
| A challenge is to understand what is right and wrong  | 2         | 3%          |           |           |
| A challenge is to create a unified vision   | 2         | 3%          |           |           |
| A challenge is to dare to give responsibility to the employee                                   | 2         | 3%          |           |           |
| A challenge is to involve everybody   | 2         | 3%          |           |           |
| A challenge is to involve top management  | 1         | 1%          |           |           |
| A challenge is that decisions should be made on the top management level first                  | 1         | 1%          |           |           |
| A challenge is that there are long distances between decisions and activity                     | 1         | 1%          |           |           |
| A challenge is to create opportunities for improvement, if one does not work cross-functionally | 1         | 1%          |           |           |
| A challenge is that it is hard to build quality, if you do not see a clear end-customer         | 1         | 1%          |           |           |
| A challenge is to define what quality is  | 1         | 1%          |           |           |
| A challenge is to select the best improvement proposals, so one does not create more waste      | 1         | 1%          |           |           |
| A challenge is to focus on quality  | 1         | 1%          |           |           |
| A challenge is to work with quality because it has not been a focus before                      | 1         | 1%          |           |           |
|   | <b>74</b> | <b>100%</b> | <b>53</b> | <b>23</b> |

## 15 APPENDIX – ANALYSIS & CLASSIFICATION

### 15.1 ANALYSIS & CLASSIFICATION - SUCCESS FACTORS WITH CUSTOMER FOCUS

| <b>6B Success Factors with Customer Focus</b>   | <b>Strctr</b> | <b>Rsrc</b> | <b>Ppl</b>   | <b>Prcss</b> | <b>Ref.</b> |
|---|---------------|-------------|--------------|--------------|-------------|
| A success factor is to communicate external feedback internally                                   | 6             |             |              |              | 6           |
| A success factor is that top management is actively involved                                      | 7             |             |              |              | 7           |
| A success factor is to create internal transparency and openness                                  | 2             |             |              |              | 2           |
| A success factor is to connect customer focus with internal incentives                            | 1             |             |              |              | 1           |
| A success factor is to work in cross-functional process teams                                     | 1             |             |              |              | 1           |
| A success factor is to continuously measure if customer value is created                          |               | 8           |              |              | 8           |
| A success factor is to visualize the customer's needs to the organization                         |               | 3           |              |              | 3           |
| A success factor is to educate to recognize the importance of customer focus                      |               | 2           |              |              | 2           |
| A success factor is to conduct value stream analysis  |               | 2           |              | 2            | 4           |
| A success factor is to define the concept of internal customer                                    |               |             | 6            |              | 6           |
| A success factor is to highlight success stories  |               |             | 6            |              | 6           |
| A success factor is to internally understand why the customer is important                        |               |             | 5            |              | 5           |
| A success factor is that there is an understanding of the symbiosis between consumer and producer |               |             | 4            |              | 4           |
| A success factor is to reflect after projects   |               |             | 1            |              | 1           |
| A success factor is to be patience and take long term decisions                                   |               |             | 1            |              | 1           |
| A success factor is that senior management communicates the importance of customer focus.         | 3             |             |              | 3            | 6           |
| A success factor is to perform daily management   |               |             |              | 3            | 3           |
| A success factor is to focus on the value creating processes                                      |               |             |              | 1            | 1           |
| A success factor is that all the focus is on the external customer                                | 1             | 1           | 1            | 1            | 4           |
| A success factor is to collaborate with customers to determine their needs                        | 2,33          |             | 2,33         | 2,33         | 7           |
| <b>15.1.1 SUMMATION</b>   | <b>23,33</b>  | <b>16</b>   | <b>26,33</b> | <b>12,33</b> | <b>78</b>   |
|   | 30%           | 21%         | 34%          | 16%          |             |

## 15.2 ANALYSIS & CLASSIFICATION - CHALLENGES WITH CUSTOMER FOCUS

| 6A Challenges with Customer Focus  | Strctr      | Rsrc       | Ppl       | Prcss    | Ref.      |
|--|-------------|------------|-----------|----------|-----------|
| A challenge is to clarify the client's needs for the entire organization                       | 4           |            |           |          | 4         |
| A challenge is to create customer focus in a function-oriented organization                    | 2           |            |           |          | 2         |
| A challenge is to involve top management   | 2           |            |           |          | 2         |
| A challenge is to get all internal functions to work towards the end customer                  | 3           |            | 3         |          | 6         |
| A challenge is to get the facts on what the customer wants.                                    | 5           |            |           | 5        | 10        |
| A challenge is to find metrics for measuring customer needs                                    |             | 2          |           |          | 2         |
| A challenge is to find time to work on customer focus  |             | 1          |           |          | 1         |
| A challenge is to understand who the end customer  |             |            | 10        |          | 10        |
| A challenge is that <i>customer focus</i> is a new concept                                     |             |            | 4         |          | 4         |
| A challenge is to understand customer needs at an aggregate level rather than individual level |             |            | 3         |          | 3         |
| A challenge is to maintain motivation throughout the change process                            |             |            | 2         |          | 2         |
| A challenge is to understand that it is the client that determines the pace of work            |             |            | 1         |          | 1         |
| A challenge is to focus on the correct priorities  |             |            | 0,5       | 0,5      | 1         |
| A challenge is to focus on the customer throughout the organization.                           | 2,5         | 2,5        | 2,5       | 2,5      | 10        |
|  | <b>18,5</b> | <b>5,5</b> | <b>26</b> | <b>8</b> | <b>58</b> |
| 15.2.1 SUMMATION   |             |            |           |          |           |
|  | 32%         | 9%         | 45%       | 14%      |           |

### 15.3 ANALYSIS & CLASSIFICATION - SUCCESS FACTORS WITH FLOW

| <b>7B Success Factors with Flow</b>                                      | <b>Strctr</b> | <b>Rsrc</b>  | <b>Ppl</b>   | <b>Prcss</b> | <b>Ref.</b> |
|--|---------------|--------------|--------------|--------------|-------------|
| A success factor is that the organizational structure follows the flow   | 5             |              |              |              | 5           |
| A success factor is to work cross-functional                             | 4             |              |              |              | 4           |
| A success factor is to actively involve senior management                | 3             |              |              |              | 3           |
| A success factor is to give feedback on performed tasks                  | 1             |              |              |              | 1           |
| A success factor is to have effective information systems                | 1             |              |              |              | 1           |
| A success factor is to connect flow to internal incentives               | 1             |              |              |              | 1           |
| A success factor is to work closely with colleagues                      | 1             |              |              |              | 1           |
| A success factor is to involve all affected by the flow                  | 6,5           |              | 6,5          |              | 13          |
| A success factor is to follow a standard                                 | 0,5           |              |              | 0,5          | 1           |
| A success factor is to involve the customer                              | 1             |              |              | 1            | 2           |
| A success factor is to visualize the flow                                |               | 7            |              |              | 7           |
| A success factor is to continuously measure and monitor the flow         |               | 6            |              |              | 6           |
| A success factor is to educate staff so they can see the flow            |               | 6            |              |              | 6           |
| A success factor is to devote time to work with the flow                 |               | 1            |              |              | 1           |
| A success factor is to conduct value stream analysis                     |               | 4,5          |              | 4,5          | 9           |
| A success factor is to understand customer needs                         |               |              | 12           |              | 12          |
| A success factor is to give responsibilities to employees                |               |              | 5            |              | 5           |
| A success factor is a deep understanding of lean                         |               |              | 8            |              | 8           |
| A success factor is to understand one owns role in the flow              |               |              | 5            |              | 5           |
| A success factor is to create an environment in which we dare to be open |               |              | 2            |              | 2           |
| A success factor is to focus at one process at a time                    |               |              |              | 2            | 2           |
| A success factor is to identify transition points                        |               |              |              | 3            | 3           |
| A success factor is to benchmark against other organizations             |               |              |              | 1            | 1           |
| A success factor is to find and eliminate waste                          |               |              |              | 1            | 1           |
| A success factor is to strive for "one-piece-flow"                       |               |              |              | 1            | 1           |
| A success factor is to level out production                              |               |              |              | 1            | 1           |
| A success factor is to see the big picture                               | 3,25          | 3,25         | 3,25         | 3,25         | 13          |
| <b>15.3.1 SUMMATION</b>  | <b>27,25</b>  | <b>27,75</b> | <b>41,75</b> | <b>18,25</b> | <b>115</b>  |
|  | 24%           | 24%          | 36%          | 16%          |             |

## 15.4 ANALYSIS & CLASSIFICATION - CHALLENGES WITH FLOW

| 7A Challenges with Flow   | Strctr    | Rsrc      | Ppl       | Prcss     | Ref.      |
|---|-----------|-----------|-----------|-----------|-----------|
| A challenge is to see the whole flow throughout the entire organization                   | 27        |           |           |           | 27        |
| A challenge is that the current organizational structure impede the flow                  | 11        |           |           |           | 11        |
| A challenge is to involve top management  | 2         |           |           |           | 2         |
| A challenge is to create flow if you do not have a single person responsible for the flow | 1         |           |           |           | 1         |
| A challenge is to create flow with a long distribution chain                              | 1         |           |           |           | 1         |
| A challenge is to create flow without a standardized working space                        | 1         |           |           |           | 1         |
| A challenge is to synchronize the flow  | 1,5       |           |           | 1,5       | 3         |
| A challenge is to find relevant metrics to measure the flow.                              |           | 4         |           |           | 4         |
| A challenge is to find time to work with flow   |           | 4         |           |           | 4         |
| A challenge is to create flow if you are short of resources                               |           | 2         |           |           | 2         |
| A challenge is that the current corporate culture prevent the flow                        |           |           | 10        |           | 10        |
| A challenge is to create flow if you lack knowledge about lean                            |           |           | 5         |           | 5         |
| A challenge is to create flow without motivated employees                                 |           |           | 1         |           | 1         |
| A challenge is to create a flow of many different processes                               |           |           |           | 8         | 8         |
| A challenge is to create flow with unclear processes                                      |           |           |           | 3         | 3         |
| A challenge is to create flow without daily control                                       | 0,5       |           |           | 0,5       | 1         |
| <b>15.4.1 SUMMATION</b>   | <b>45</b> | <b>10</b> | <b>16</b> | <b>13</b> | <b>84</b> |
|   | 54%       | 12%       | 19%       | 15%       |           |

## 15.5 ANALYSIS & CLASSIFICATION - SUCCESS FACTORS WITH STANDARDIZATION

| 8B Success Factors with Standardization  | Strctr      | Rsrc      | Ppl       | Prcss       | Ref.       |
|--|-------------|-----------|-----------|-------------|------------|
| A success factor is that employees rotate work tasks   | 1           |           |           |             | 1          |
| A success factor is to have a structure around how decisions are made about standards        | 1           |           |           |             | 1          |
| A success factor is to use supportive lean coaches   | 1           |           |           |             | 1          |
| A success factor is to have well-defined standards   | 8           |           |           |             | 8          |
| A success factor is not to standardize at all  | 1           |           |           |             | 1          |
| A success factor is to have a structure for how standards should be distributed              | 1           |           |           |             | 1          |
| A success factor is to have top management support and commitment                            | 1,5         |           | 1,5       |             | 3          |
| A success factor is to learn from others   | 1           |           | 1         |             | 2          |
| A success factor is to ensure that standards compliance                                      | 2           |           |           | 2           | 4          |
| A success factor is that the standards is continuously improved                              | 1           |           |           | 1           | 2          |
| A success factor is that senior management requires the organization to work with standards  | 0,5         |           |           | 0,5         | 1          |
| A success factor is to record deviations   | 1,5         |           |           | 1,5         | 3          |
| A success factor is to be depart from the customer's needs when creating standards           | 0,5         |           |           | 0,5         | 1          |
| A success factor is to educate employees about the standards                                 |             | 7         |           |             | 7          |
| A success factor is to monitor and measure standards.  |             | 6         |           |             | 6          |
| A success factor is to visualize standards   |             | 4         |           |             | 4          |
| A success factor is to add more resources to work on standards                               |             | 2         |           |             | 2          |
| A success factor is to devote time to work with standards                                    |             | 2         |           |             | 2          |
| A success factor is to depart from a value stream mapping                                    |             | 1         |           |             | 1          |
| A success factor is that everyone in the organization understands the value of standards     |             |           | 14        |             | 14         |
| A success factor is to make all concerned involved in the creation of standards              | 7,5         |           | 7,5       |             | 15         |
| A success factor is to have common goals   |             |           | 3         |             | 3          |
| A success factor is to unite around a vision of who the customer is                          |             |           | 1         |             | 1          |
| A success factor is that all dare to identify waste  |             |           | 1         |             | 1          |
| A success factor is to have a deep knowledge of lean   |             |           | 1         |             | 1          |
| A success factor is to have an understanding of what should be standardized                  |             |           | 1         |             | 1          |
| A success factor is to be persistent in working with standards                               |             |           | 2         |             | 2          |
| A success factor is to create realistic expectations from the beginning                      |             |           | 1         |             | 1          |
| A success factor is to dare to start working with standards to later understand the benefits |             |           | 1         | 1           | 2          |
| A success factor is to begin to standardize the simple things                                |             |           |           | 3           | 3          |
| A success factor is to communicate the right things that create inspiration                  |             |           |           | 4           | 4          |
| A success factor is finding the right level of standardization                               |             |           |           | 3           | 3          |
| A success factor is to eliminate the root cause of variation in work methods                 |             |           |           | 1           | 1          |
| A success factor is to internally benchmark  |             |           |           | 1           | 1          |
| A success factor is to map the current situation in order to later improve                   |             |           |           | 1           | 1          |
| A success factor is to first standardize what the employees feel are most important          |             |           |           | 1           | 1          |
|  | <b>28,5</b> | <b>22</b> | <b>35</b> | <b>20,5</b> | <b>106</b> |
| <b>15.5.1 SUMMATION</b>  |             |           |           |             |            |
|  | 27%         | 21%       | 33%       | 19%         |            |

## 15.6 ANALYSIS & CLASSIFICATION - CHALLENGES WITH STANDARDIZATION

| 8A Challenges with Standardization  | Strctr       | Rsrc        | Ppl          | Prcss    | Ref.      |
|---|--------------|-------------|--------------|----------|-----------|
| A challenge is to that all flows in the organization does not look the same                 | 2            |             |              |          | 2         |
| A challenge is to create standards without a capable cross-functional network               | 1            |             |              |          | 1         |
| A challenge is to knowing how to signal the need for a new standard                         | 1            |             |              |          | 1         |
| A challenge is to create standards that lead to consistent quality in all processes         | 1            |             |              |          | 1         |
| A challenge is to old standards live on in the form of previously developed systems         | 1            |             |              |          | 1         |
| A challenge is the size of the organization   | 1            |             |              |          | 1         |
| A challenge is to create a simple control system for how to design standards                | 1            |             |              |          | 1         |
| A challenge is to know what should be standardized  | 2            |             |              |          | 2         |
| A challenge is to find the right level of standardization                                   | 3            |             |              | 3        | 6         |
| A challenge is to find the time to work on standards  |              | 1           |              |          | 1         |
| A challenge is to restrain from measuring everything on a new standard                      |              | 1           |              |          | 1         |
| A challenge is to ensure that it gives employees the right training on standards            |              | 1           |              |          | 1         |
| A challenge is to create understandable informational materials that are easy to understand |              | 1           |              |          | 1         |
| A challenge is getting employees to understand the value of standards                       |              |             | 24           |          | 24        |
| A challenge is the negative culture that exist among employees regarding the standards      |              |             | 14           |          | 14        |
| A challenge is the lack of leadership   |              |             | 4            |          | 4         |
| A challenge is that people are different  |              |             | 2            |          | 2         |
| A challenge is the low level of knowledge among employees how to design standards           |              |             | 1            |          | 1         |
| A challenge is to develop their own culture, ex. lean-house                                 |              |             | 1            |          | 1         |
| A challenge is to hurry slowly, get everyone onboard  |              |             |              | 1        | 1         |
| A challenge is to complete the implementation of standards fully                            |              |             |              | 1        | 1         |
| A challenge is to get employees to constantly update the standards                          |              |             |              | 1        | 1         |
| A challenge is to eliminate recurring problems  |              |             |              | 1        | 1         |
| A challenge is getting employees to comply with new standards                               | 2,66         | 2,66        | 2,66         |          | 8         |
| <b>15.6.1 SUMMATION</b>   | <b>15,66</b> | <b>6,66</b> | <b>48,66</b> | <b>7</b> | <b>78</b> |
|   | 20%          | 9%          | 62%          | 9%       |           |

## 15.7 ANALYSIS & CLASSIFICATION - SUCCESS FACTORS WITH QUALITY

| 9B Success Factors with Quality   | Strctr      | Rsrc      | Ppl       | Prcss       | Ref.      |
|---|-------------|-----------|-----------|-------------|-----------|
| A success factor is to involve everyone in the process  | 2           |           | 2         |             | 4         |
| A success factor is to get everyone to see their activities as processes with a clear end-customer. | 3           |           |           |             | 3         |
| A success factor is that senior management is actively involved                                     | 5           |           |           |             | 5         |
| A success factor is to define the responsibilities of each role in the organization                 | 1           |           |           |             | 1         |
| A success factor is that as change leaders work closely with other leaders                          | 1           |           |           |             | 1         |
| A success factor is to create a company policy against defects                                      | 1           |           |           |             | 1         |
| A success factor is to act quickly when deviations occur  | 1           |           |           |             | 1         |
| A success factor is to have one standard for all improvement groups                                 | 2           |           |           |             | 2         |
| A success factor is to involve the customer to create quality                                       | 0,5         |           |           | 0,5         | 1         |
| A success factor is to use representative measure of quality  |             | 5         |           |             | 5         |
| A success factor is to be able to deal with all issues raised to the surface                        |             | 3         |           |             | 3         |
| A success factor is to educate  |             | 3         |           |             | 3         |
| A success factor is to visualize the process  |             | 4         |           |             | 4         |
| A success factor is a clean workplace   |             | 1         |           |             | 1         |
| A success factor is to provide staff with appropriate tools   |             | 2         |           |             | 2         |
| A success factor is to give staff time so that they understand the working method                   |             | 1         | 1         |             | 2         |
| A success factor is to have blackboard meetings   |             | 3         |           | 3           | 6         |
| A success factor is to get all employees to feel responsibility                                     |             |           | 8         |             | 8         |
| A success factor is to encourage initiatives producing higher quality                               |             |           | 2         |             | 2         |
| A success factor is to understand ones role in the big picture                                      |             |           | 2         |             | 2         |
| A success factor is that everyone understands the work  |             |           | 1         |             | 1         |
| A success factor is to understand the right priorities  |             |           | 1         |             | 1         |
| A success factor is to never connect a problem with a person  |             |           | 4         |             | 4         |
| A success factor is to create a permissive culture  |             |           | 4         |             | 4         |
| A success factor is to put the customer first   |             |           | 2         |             | 2         |
| A success factor is to work with simple concepts  |             |           | 1         |             | 1         |
| A success factor is to maintain high level of competence of lean in order to create quality         |             |           | 1         |             | 1         |
| A success factor is to distribute success stories   |             |           | 1         |             | 1         |
| A success factor is to create environment in which people dare to be open                           |             |           | 1         |             | 1         |
| A success factor is to be long-term at work and realize that the steps are small                    |             |           | 1         |             | 1         |
| A success factor is to feel comfortable in the workplace  |             |           | 1         |             | 1         |
| A success factor is to perform daily control  |             |           |           | 3           | 3         |
| A success factor is to eliminate problems at the root cause in order to create quality              |             |           |           | 4           | 4         |
| A success factor is to have compulsory improvement meetings   |             |           |           | 1           | 1         |
| A success factor is to clarify the challenges   |             |           |           | 1           | 1         |
| A success factor is to be clear on what to deliver  |             |           |           | 1           | 1         |
| <b>15.7.1 SUMMATION</b>   | <b>16.5</b> | <b>22</b> | <b>33</b> | <b>13.5</b> | <b>85</b> |
|   | 19%         | 26%       | 39%       | 16%         |           |

## 15.8 ANALYSIS & CLASSIFICATION - CHALLENGES WITH QUALITY

| 9A Challenges with Quality  | Strctr      | Rsrc         | Ppl          | Prcss       | Ref.      |
|---|-------------|--------------|--------------|-------------|-----------|
| A challenge is to define what quality is  | 1           |              |              |             | 1         |
| A challenge is to involve top management  | 1           |              |              |             | 1         |
| A challenge is to create a good structure for deviation control                                 | 2           |              |              |             | 2         |
| A challenge is that decisions should be made on the top management level first                  | 1           |              |              |             | 1         |
| A challenge is that there are long distances between decisions and activity                     | 1           |              |              |             | 1         |
| A challenge is to create opportunities for improvement, if one does not work cross-functionally | 1           |              |              |             | 1         |
| A challenge is that it is hard to build quality, if you do not see a clear end-customer         | 1           |              |              |             | 1         |
| A challenge is to find relevant metrics to measure quality in processes                         |             | 4            |              |             | 4         |
| A challenge is to find time to work on continuous improvements                                  |             | 4            |              |             | 4         |
| A challenge is to re-attach to quality work   |             | 1,5          |              | 1,5         | 3         |
| A challenge is to create a permissive and learning culture                                      |             |              | 22           |             | 22        |
| A challenge is to get everyone to understand the work process                                   |             |              | 7            |             | 7         |
| A challenge is to get leaders to walk the talk  |             |              | 3            |             | 3         |
| A challenge is to understand what is right and wrong  |             |              | 2            |             | 2         |
| A challenge is to create a unified vision   |             |              | 2            |             | 2         |
| A challenge is to dare to give responsibility to the employee                                   |             |              | 2            |             | 2         |
| A challenge is to involve everybody   |             |              | 2            |             | 2         |
| A challenge is to understand how the discrepancies should be reported                           |             |              | 2            | 2           | 4         |
| A challenge is to understand what discrepancies should be reported                              |             |              | 1,5          | 1,5         | 3         |
| A challenge is to select the best improvement proposals, so one does not create more waste      |             |              |              | 1           | 1         |
| A challenge is to focus on quality  |             |              |              | 1           | 1         |
| A challenge is to work with quality because it has not been a focus before                      |             |              |              | 1           | 1         |
| A challenge is to get the organization to see the big picture                                   | 1,25        | 1,25         | 1,25         | 1,25        | 5         |
| <b>15.8.1 SUMMATION</b>   | <b>9,25</b> | <b>10,75</b> | <b>44,75</b> | <b>9,25</b> | <b>74</b> |
|   | 13%         | 15%          | 60%          | 13%         |           |

## 16 APPENDIX – IDENTIFYING PATTERNS IN SUCCESS FACTORS

### 16.1 IDENTIFYING PATTERNS – STRUCTURAL FACTORS

| 16.1.1 STRUCTURAL SUCCESS FACTORS WITH CUSTOMER FOCUS                                     |                 |      |     |       |       |
|---|-----------------|------|-----|-------|-------|
|   | Success Factors |      |     |       |       |
| 6B Structural Success Factors with Customer Focus   | Strctr          | Rsrc | Ppl | Prcss | Class |
| A success factor is to communicate external feedback internally                           | X               |      |     |       | C     |
| A success factor is that top management is actively involved                              | X               |      |     |       | A     |
| A success factor is to create internal transparency and openness                          | X               |      |     |       |       |
| A success factor is to connect customer focus with internal incentives                    | X               |      |     |       |       |
| A success factor is to work in cross-functional process teams                             | X               |      |     |       | F     |
| A success factor is that senior management communicates the importance of customer focus. | X               |      |     | X     | C     |
| A success factor is that all the focus is on the external customer                        | X               | X    | X   | X     |       |
| A success factor is to collaborate with customers to determine their needs                | X               |      | X   | X     | B     |

| 16.1.2 STRUCTURAL SUCCESS FACTORS WITH FLOW                            |                 |      |     |       |       |
|--|-----------------|------|-----|-------|-------|
|  | Success Factors |      |     |       |       |
| 7B Structural Success Factors with Flow                                | Strctr          | Rsrc | Ppl | Prcss | Class |
| A success factor is that the organizational structure follows the flow | X               |      |     |       |       |
| A success factor is to work cross-functional                           | X               |      |     |       | F     |
| A success factor is to actively involve senior management              | X               |      |     |       | A     |
| A success factor is to give feedback on performed tasks                | X               |      |     |       | C     |
| A success factor is to have effective information systems              | X               |      |     |       | C     |
| A success factor is to connect flow to internal incentives             | X               |      |     |       |       |
| A success factor is to work closely with colleagues                    | X               |      |     |       |       |
| A success factor is to involve all affected by the flow                | X               |      | X   |       | E     |
| A success factor is to follow a standard                               | X               |      |     | X     | D     |
| A success factor is to involve the customer                            | X               |      |     | X     | B     |
| A success factor is to see the big picture                             | X               | X    | X   | X     |       |

### 16.1.3 STRUCTURAL SUCCESS FACTORS WITH STANDARDIZATION

| 8B Structural Success Factors with Standardization  | Success Factors |      |     |       | Class |
|---|-----------------|------|-----|-------|-------|
|   | Strctr          | Rsrc | Ppl | Prcss |       |
| A success factor is that employees rotate work tasks  | X               |      |     |       | D     |
| A success factor is to have a structure around how decisions are made about standards       | X               |      |     |       |       |
| A success factor is to use supportive lean coaches  | X               |      |     |       |       |
| A success factor is to have well-defined standards  | X               |      |     |       |       |
| A success factor is not to standardize at all   | X               |      |     |       | C     |
| A success factor is to have a structure for how standards should be distributed             | X               |      |     |       |       |
| A success factor is to have top management support and commitment                           | X               |      | X   |       |       |
| A success factor is to learn from others  | X               |      | X   |       |       |
| A success factor is to ensure that standards compliance                                     | X               |      |     | X     | A     |
| A success factor is that the standards is continuously improved                             | X               |      |     | X     |       |
| A success factor is that senior management requires the organization to work with standards | X               |      |     | X     |       |
| A success factor is to record deviations  | X               |      |     | X     |       |
| A success factor is to be depart from the customer's needs when creating standards          | X               |      |     | X     | B     |
| A success factor is to make all concerned involved in the creation of standards             | X               |      |     | X     |       |

### 16.1.4 STRUCTURAL SUCCESS FACTORS WITH QUALITY

| 9B Structural Success Factors with Quality  | Success Factors |      |     |       | Class |
|---|-----------------|------|-----|-------|-------|
|   | Strctr          | Rsrc | Ppl | Prcss |       |
| A success factor is to involve everyone in the process  | X               |      | X   |       | E     |
| A success factor is to get everyone to see their activities as processes with a clear end-customer. | X               |      |     |       |       |
| A success factor is that senior management is actively involved                                     | X               |      |     |       | A     |
| A success factor is to define the responsibilities of each role in the organization                 | X               |      |     |       |       |
| A success factor is that as change leaders work closely with other leaders                          | X               |      |     |       |       |
| A success factor is to create a company policy against defects                                      | X               |      |     |       |       |
| A success factor is to act quickly when deviations occur  | X               |      |     |       | D     |
| A success factor is to have one standard for all improvement groups                                 | X               |      |     |       |       |
| A success factor is to involve the customer to create quality                                       | X               |      |     | X     |       |

## 16.2 SUMMARY RESOURCE FACTORS

| Success Factors  |   |   |   |   |       |
|--|---|---|---|---|-------|
| 16.2.1 COMMON STRUCTURAL SUCCESS FACTORS                       |   |   |   |   | Class |
| Cust. Flow Stdrs Qlty  |   |   |   |   |       |
| 16.2.1.1 PRIMARY SUCCESS FACTORS                               |   |   |   |   |       |
| One success factor is that top management is actively involved | X | X | X | X | A     |
| One success factor is to work with the customer                | X | X | X | X | B     |
| 16.2.1.2 SECONDARY SUCCESS FACTORS                             |   |   |   |   |       |
| One success factor is clear communication                      | X | X | X |   | C     |
| One success factor is to comply with standards                 |   | X | X | X | D     |
| 16.2.1.3 OTHER SUCCESS FACTORS                                 |   |   |   |   |       |
| One success factor is to involve everybody concerned           |   | X |   | X | E     |
| One success factor is to work cross-functional                 | X | X |   |   | F     |

## 16.3 IDENTIFYING PATTERNS – RESOURCE FACTORS

| Success Factors  |      |     |       |   |       |
|--|------|-----|-------|---|-------|
| 16.3.1 RESOURCE SUCCESS FACTORS WITH CUSTOMER FOCUS                          |      |     |       |   | Class |
| 6B Resource Success Factors with Customer Focus                              |      |     |       |   |       |
| Strctr   | Rsrc | Ppl | Prcss |   |       |
| A success factor is to continuously measure if customer value is created     | X    |     |       |   | B     |
| A success factor is to visualize the customer's needs to the organization    | X    |     |       |   | A     |
| A success factor is to educate to recognize the importance of customer focus | X    |     |       |   | C     |
| A success factor is to conduct value stream analysis                         | X    |     | X     |   |       |
| A success factor is that all the focus is on the external customer           | X    | X   | X     | X |       |

| Success Factors  |      |     |       |   |       |
|--|------|-----|-------|---|-------|
| 16.3.2 RESOURCE SUCCESS FACTORS WITH FLOW                        |      |     |       |   | Class |
| 7B Resource Success Factors with Flow                            |      |     |       |   |       |
| Strctr   | Rsrc | Ppl | Prcss |   |       |
| A success factor is to visualize the flow                        | X    |     |       |   | A     |
| A success factor is to continuously measure and monitor the flow | X    |     |       |   | B     |
| A success factor is to educate staff so they can see the flow    | X    |     |       |   | C     |
| A success factor is to devote time to work with the flow         | X    |     |       |   | D     |
| A success factor is to conduct value stream analysis             | X    |     | X     |   |       |
| A success factor is to see the big picture                       | X    | X   | X     | X |       |

### 16.3.3 RESOURCE SUCCESS FACTORS WITH STANDARDIZATION

| 8B Resource Success Factors with Standardization               | Success Factors |      |     |       | Class |
|--|-----------------|------|-----|-------|-------|
|  | Strctr          | Rsrc | Ppl | Prcss |       |
| A success factor is to educate employees about the standards   |                 | X    |     |       | C     |
| A success factor is to monitor and measure standards.          |                 | X    |     |       | B     |
| A success factor is to visualize standards                     |                 | X    |     |       | A     |
| A success factor is to add more resources to work on standards |                 | X    |     |       |       |
| A success factor is to devote time to work with standards      |                 | X    |     |       | D     |
| A success factor is to depart from a value stream mapping      |                 | X    |     |       |       |

### 16.3.4 RESOURCE SUCCESS FACTORS WITH QUALITY

| 9B Resource Success Factors with Quality  | Success Factors |      |     |       | Class |
|---|-----------------|------|-----|-------|-------|
|   | Strctr          | Rsrc | Ppl | Prcss |       |
| A success factor is to use representative measure of quality                      |                 | X    |     |       | B     |
| A success factor is to be able to deal with all issues raised to the surface      |                 | X    |     |       |       |
| A success factor is to educate  |                 | X    |     |       | C     |
| A success factor is to visualize the process                                      |                 | X    |     |       | A     |
| A success factor is a clean workplace   |                 | X    |     |       |       |
| A success factor is to provide staff with appropriate tools                       |                 | X    |     |       |       |
| A success factor is to give staff time so that they understand the working method |                 | X    | X   |       | D     |
| A success factor is to have blackboard meetings                                   |                 | X    |     | X     |       |

## 16.4 SUMMARY RESOURCE FACTORS

| 16.4.1 COMMON RESOURCE SUCCESS FACTORS   | Success Factors |      |       |      | Class |
|--|-----------------|------|-------|------|-------|
|  | Cust.           | Flow | Stdrs | Qlty |       |
| <b>16.4.1.1 PRIMARY SUCCESS FACTORS</b>  |                 |      |       |      |       |
| One success factor is to visualize; customer needs, flows, standards, and quality                        | X               | X    | X     | X    | A     |
| One success factor is to continuously measure and monitor; customer needs, flows, standards, and quality | X               | X    | X     | X    | B     |
| One success factor is to dedicate resources to educate the organization                                  | X               | X    | X     | X    | C     |
| <b>16.4.1.2 SECONDARY SUCCESS FACTORS</b>  |                 |      |       |      |       |
| One success factor is to make time for working with the flow, standards and quality                      |                 | X    | X     | X    | D     |
| One success factor is to hold a value stream analysis  | X               | X    | X     |      | E     |
| <b>16.4.1.3 OTHER SUCCESS FACTORS</b>  |                 |      |       |      |       |
| -  |                 |      |       |      |       |

## 16.5 IDENTIFYING PATTERNS- PEOPLE FACTORS

| 16.5.1 PEOPLE SUCCESS FACTORS WITH CUSTOMER FOCUS   |        |      |     |       |       |
|---|--------|------|-----|-------|-------|
| Success Factors   |        |      |     |       |       |
| 6B People Success Factors with Customer Focus   | Strctr | Rsrc | Ppl | Prcss | Class |
| A success factor is to define the concept of internal customer                                    |        |      | X   |       | A     |
| A success factor is to internally understand why the customer is important                        |        |      | X   |       |       |
| A success factor is that there is an understanding of the symbiosis between consumer and producer |        |      | X   |       |       |
| A success factor is to highlight success stories  |        |      | X   |       | F     |
| A success factor is to reflect after projects   |        |      | X   |       | D     |
| A success factor is to be patience and take long term decisions                                   |        |      | X   |       |       |
| A success factor is that all the focus is on the external customer                                | X      | X    | X   | X     |       |
| A success factor is to collaborate with customers to determine their needs                        | X      |      | X   | X     |       |

| 16.5.2 PEOPLE SUCCESS FACTORS WITH FLOW                                  |        |      |     |       |       |
|--|--------|------|-----|-------|-------|
| Success Factors  |        |      |     |       |       |
| 7B People Success Factors with Flow                                      | Strctr | Rsrc | Ppl | Prcss | Class |
| A success factor is to involve all affected by the flow                  | X      |      | X   |       | B     |
| A success factor is to understand customer needs                         |        |      | X   |       | E     |
| A success factor is to give responsibilities to employees                |        |      | X   |       |       |
| A success factor is a deep understanding of lean                         |        |      | X   |       |       |
| A success factor is to understand one owns role in the flow              |        |      | X   |       | A     |
| A success factor is to create an environment in which we dare to be open |        |      | X   |       | C     |
| A success factor is to see the big picture                               | X      | X    | X   | X     |       |

| 16.5.3 PEOPLE SUCCESS FACTORS WITH STANDARDIZATION   |        |      |     |       |       |
|--|--------|------|-----|-------|-------|
| Success Factors  |        |      |     |       |       |
| 8B People Success Factors with Standardization   | Strctr | Rsrc | Ppl | Prcss | Class |
| A success factor is to have top management support and commitment                            | X      |      | X   |       | A     |
| A success factor is to learn from others   | X      |      | X   |       |       |
| A success factor is that everyone in the organization understands the value of standards     |        |      | X   |       |       |
| A success factor is to make all concerned involved in the creation of standards              | X      |      | X   |       | B     |
| A success factor is to have common goals   |        |      | X   |       | C     |
| A success factor is to unite around a vision of who the customer is                          |        |      | X   |       |       |
| A success factor is that all dare to identify waste  |        |      | X   |       |       |
| A success factor is to have a deep knowledge of lean   |        |      | X   |       | A     |
| A success factor is to have an understanding of what should be standardized                  |        |      | X   |       |       |
| A success factor is to be persistent in working with standards                               |        |      | X   |       |       |
| A success factor is to create realistic expectations from the beginning                      |        |      | X   |       | D     |
| A success factor is to dare to start working with standards to later understand the benefits |        |      | X   | X     |       |

#### 16.5.4 PEOPLE SUCCESS FACTORS WITH QUALITY

| 9B People Success Factors with Quality  | Success Factors |      |     |       | Class |
|---|-----------------|------|-----|-------|-------|
|   | Strctr          | Rsrc | Ppl | Prcss |       |
| A success factor is to give staff time so that they understand the working method           |                 | X    | X   |       | A     |
| A success factor is to get all employees to feel responsibility                             |                 |      | X   |       | E     |
| A success factor is to encourage initiatives producing higher quality                       |                 |      | X   |       |       |
| A success factor is to understand ones role in the big picture                              |                 |      | X   |       |       |
| A success factor is that everyone understands the work                                      |                 |      | X   |       | A     |
| A success factor is to understand the right priorities                                      |                 |      | X   |       | A     |
| A success factor is to never connect a problem with a person                                |                 |      | X   |       |       |
| A success factor is to create a permissive culture  |                 |      | X   |       |       |
| A success factor is to put the customer first   |                 |      | X   |       |       |
| A success factor is to work with simple concepts  |                 |      | X   |       |       |
| A success factor is to maintain high level of competence of lean in order to create quality |                 |      | X   |       |       |
| A success factor is to distribute success stories   |                 |      | X   |       | F     |
| A success factor is to create environment in which people dare to be open                   |                 |      | X   |       | C     |
| A success factor is to be long-term at work and realize that the steps are small            |                 |      | X   |       | D     |
| A success factor is to feel comfortable in the workplace                                    |                 |      | X   |       |       |
| A success factor is to involve everyone in the process                                      | X               |      | X   |       | B     |

#### 16.6 SUMMARY PEOPLE FACTORS

| 16.6.1 COMMON PEOPLE SUCCESS FACTORS                                       | Success Factors |      |       |      | Class |
|--|-----------------|------|-------|------|-------|
|  | Cust.           | Flow | Stdrs | Qlty |       |
| <b>16.6.1.1 PRIMARY SUCCESS FACTORS</b>                                    |                 |      |       |      |       |
| One success factor is to have a deep understanding of lean                 | x               | x    | x     | x    | A     |
| <b>16.6.1.2 SECONDARY SUCCESS FACTORS</b>                                  |                 |      |       |      |       |
| One success factor is to involve everybody concerned                       |                 | x    | x     | x    | B     |
| One success factor is to create an environment in which we dare to be open |                 | x    | x     | x    | C     |
| One success factor is to have high endurance at work                       | x               |      | x     | x    | D     |
| <b>16.6.1.3 OTHER SUCCESS FACTORS</b>                                      |                 |      |       |      |       |
| One success factor is to give responsibility to employees                  |                 | x    |       | x    | E     |
| One success factor is to highlight success stories                         | x               |      |       | x    | F     |

## 16.7 IDENTIFYING PATTERNS – PROCESS FACTORS

| 16.7.1 PROCESS SUCCESS FACTORS WITH CUSTOMER FOCUS  |                 |      |     |       |       |
|---|-----------------|------|-----|-------|-------|
|   | Success Factors |      |     |       |       |
| 6B Process Success Factors with Customer Focus  | Strctr          | Rsrc | Ppl | Prcss | Class |
| A success factor is to conduct value stream analysis                                      |                 | X    |     | X     | C     |
| A success factor is that senior management communicates the importance of customer focus. | X               |      |     | X     | B     |
| A success factor is to perform daily management   |                 |      |     | X     | F     |
| A success factor is to focus on the value creating processes                              |                 |      |     | X     | D     |
| A success factor is that all the focus is on the external customer                        | X               | X    | X   | X     |       |
| A success factor is to collaborate with customers to determine their needs                | X               |      | X   | X     | A     |

| 16.7.2 PROCESS SUCCESS FACTORS WITH FLOW                     |                 |      |     |       |       |
|--|-----------------|------|-----|-------|-------|
|  | Success Factors |      |     |       |       |
| 7B Process Success Factors with Flow                         | Strctr          | Rsrc | Ppl | Prcss | Class |
| A success factor is to follow a standard                     | X               |      |     | X     |       |
| A success factor is to involve the customer                  | X               |      |     | X     | A     |
| A success factor is to conduct value stream analysis         |                 | X    |     | X     | C     |
| A success factor is to focus at one process at a time        |                 |      |     | X     | D     |
| A success factor is to identify transition points            |                 |      |     | X     |       |
| A success factor is to benchmark against other organizations |                 |      |     | X     |       |
| A success factor is to find and eliminate waste              |                 |      |     | X     | E     |
| A success factor is to strive for "one-piece-flow"           |                 |      |     | X     |       |
| A success factor is to level out production                  |                 |      |     | X     |       |
| A success factor is to see the big picture                   | X               | X    | X   | X     |       |

| 16.7.3 PROCESS SUCCESS FACTORS WITH STANDARDIZATION  |                 |      |     |       |       |
|--|-----------------|------|-----|-------|-------|
|  | Success Factors |      |     |       |       |
| 8B Process Success Factors with Standardization  | Strctr          | Rsrc | Ppl | Prcss | Class |
| A success factor is to ensure that standards compliance                                      | X               |      |     | X     |       |
| A success factor is that the standards is continuously improved                              | X               |      |     | X     |       |
| A success factor is that senior management requires the organization to work with standards  | X               |      |     | X     |       |
| A success factor is to record deviations   | X               |      |     | X     |       |
| A success factor is to be depart from the customer's needs when creating standards           | X               |      |     | X     | A     |
| A success factor is to dare to start working with standards to later understand the benefits |                 |      | X   | X     |       |
| A success factor is to begin to standardize the simple things                                |                 |      |     | X     | D     |
| A success factor is to communicate the right things that create inspiration                  |                 |      |     | X     | B     |
| A success factor is finding the right level of standardization                               |                 |      |     | X     |       |
| A success factor is to eliminate the root cause of variation in work methods                 |                 |      |     | X     | E     |
| A success factor is to internally benchmark  |                 |      |     | X     |       |
| A success factor is to map the current situation in order to later improve                   |                 |      |     | X     | C     |
| A success factor is to first standardize what the employees feel are most important          |                 |      |     | X     |       |

#### 16.7.4 PROCESS SUCCESS FACTORS WITH QUALITY

| 9B Process Success Factors with Quality  | Success Factors |      |     |       | Class |
|--|-----------------|------|-----|-------|-------|
|  | Strctr          | Rsrc | Ppl | Prcss |       |
| A success factor is to involve the customer to create quality                          | X               |      |     | X     | A     |
| A success factor is to have blackboard meetings  |                 | X    |     | X     |       |
| A success factor is to perform daily control   |                 |      |     | X     | F     |
| A success factor is to eliminate problems at the root cause in order to create quality |                 |      |     | X     | E     |
| A success factor is to have compulsory improvement meetings                            |                 |      |     | X     |       |
| A success factor is to clarify the challenges  |                 |      |     | X     | B     |
| A success factor is to be clear on what to deliver                                     |                 |      |     | X     | B     |

### 16.8 SUMMARY PROCESS FACTORS

| 16.8.1 COMMON PROCESS SUCCESS FACTORS                         | Success Factors |      |       |      |   |
|---|-----------------|------|-------|------|---|
|   | Cust.           | Flow | Stdrs | Qlty |   |
| <b>16.8.1.1 PRIMARY SUCCESS FACTORS</b>                       |                 |      |       |      |   |
| One success factor is to work with the customer               | x               | x    | x     | x    | A |
| One success factor is clear communication                     | x               | x    |       | x    | B |
| <b>16.8.1.2 SECONDARY SUCCESS FACTORS</b>                     |                 |      |       |      |   |
| One success factor is to conduct value stream analysis        | x               | x    | x     |      | C |
| One success factor is working with focus, one thing at a time | x               | x    | x     |      | D |
| One success factor is to eliminate problems at the root cause |                 | x    | x     | x    | E |
| <b>16.8.1.3 OTHER SUCCESS FACTORS</b>                         |                 |      |       |      |   |
| One success factor is to perform daily control                | x               |      |       | x    | F |

## 17 APPENDIX - IDENTIFYING PATTERNS IN CHALLENGES

### 17.1 IDENTIFYING PATTERNS – STRUCTURAL CHALLENGES

| 17.1.1 STRUCTURAL CHALLENGES WITH CUSTOMER FOCUS                              |        |      |     |       |       |
|---|--------|------|-----|-------|-------|
| Challenges  |        |      |     |       |       |
| 6A Structural Challenges with Customer Focus                                  | Strctr | Rsrc | Ppl | Prcss | Class |
| A challenge is to clarify the client's needs for the entire organization      | y      |      |     |       | E     |
| A challenge is to create customer focus in a function-oriented organization   | y      |      |     |       | C     |
| A challenge is to involve top management                                      | y      |      |     |       | B     |
| A challenge is to get all internal functions to work towards the end customer | y      |      | y   |       |       |
| A challenge is to get the facts on what the customer wants.                   | y      |      |     | y     |       |
| A challenge is to focus on the customer throughout the organization.          | y      | y    | y   | y     | D     |

| 17.1.2 STRUCTURAL CHALLENGES WITH FLOW  |        |      |     |       |       |
|---|--------|------|-----|-------|-------|
| Challenges  |        |      |     |       |       |
| 7A Structural Challenges with Flow  | Strctr | Rsrc | Ppl | Prcss | Class |
| A challenge is to see the whole flow throughout the entire organization                   | y      |      |     |       | D     |
| A challenge is that the current organizational structure impede the flow                  | y      |      |     |       |       |
| A challenge is to involve top management  | y      |      |     |       | B     |
| A challenge is to create flow if you do not have a single person responsible for the flow | y      |      |     |       |       |
| A challenge is to create flow with a long distribution chain                              | y      |      |     |       | A     |
| A challenge is to create flow without a standardized working space                        | y      |      |     |       |       |
| A challenge is to synchronize the flow  | y      |      |     | y     |       |
| A challenge is to create flow without daily control                                       | y      |      |     | y     | F     |

| 17.1.3 STRUCTURAL CHALLENGES WITH STANDARDIZATION                                   |        |      |     |       |       |
|---|--------|------|-----|-------|-------|
| Challenges  |        |      |     |       |       |
| 8A Structural Challenges with Standardization                                       | Strctr | Rsrc | Ppl | Prcss | Class |
| A challenge is to that all flows in the organization does not look the same         | y      |      |     |       |       |
| A challenge is to create standards without a capable cross-functional network       | y      |      |     |       | C     |
| A challenge is to knowing how to signal the need for a new standard                 | y      |      |     |       |       |
| A challenge is to create standards that lead to consistent quality in all processes | y      |      |     |       |       |
| A challenge is to old standards live on in the form of previously developed systems | y      |      |     |       |       |
| A challenge is the size of the organization   | y      |      |     |       | A     |
| A challenge is to create a simple control system for how to design standards        | y      |      |     |       | F     |
| A challenge is to know what should be standardized                                  | y      |      |     |       |       |
| A challenge is to find the right level of standardization                           | y      |      |     | y     |       |
| A challenge is getting employees to comply with new standards                       | y      | y    | y   |       |       |

| 17.1.4 STRUCTURAL CHALLENGES WITH QUALITY   |            |      |     |       |       |
|---|------------|------|-----|-------|-------|
| 9A Structural Challenges with Quality   | Challenges |      |     |       | Class |
|   | Strctr     | Rsrc | Ppl | Prcss |       |
| A challenge is to define what quality is  | y          |      |     |       | B     |
| A challenge is to involve top management  | y          |      |     |       |       |
| A challenge is to create a good structure for deviation control                                 | y          |      |     |       |       |
| A challenge is that decisions should be made on the top management level first                  | y          |      |     |       | A     |
| A challenge is that there are long distances between decisions and activity                     | y          |      |     |       |       |
| A challenge is to create opportunities for improvement, if one does not work cross-functionally | y          |      |     |       | C     |
| A challenge is that it is hard to build quality, if you do not see a clear end-customer         | y          |      |     |       | E     |
| A challenge is to get the organization to see the big picture                                   | y          | y    | y   | y     | D     |

## 17.2 SUMMARY STRUCTURAL CHALLENGES

| 17.2.1 COMMON STRUCTURAL CHALLENGES                       |            |      |       |      |       |
|---|------------|------|-------|------|-------|
|   | Challenges |      |       |      | Class |
|   | Cust.      | Flow | Stdrs | Qlty |       |
| 17.2.1.1 PRIMARY CHALLENGES                               |            |      |       |      |       |
| -   |            |      |       |      |       |
| 17.2.1.2 SECONDARY CHALLENGES                             |            |      |       |      |       |
| One challenge is the size of the organization             |            | y    | y     | y    | A     |
| One challenge is the difficulty to involve top management | y          | y    |       | y    | B     |
| One challenge is to be able to work cross-functional      | y          |      | y     | y    | C     |
| One challenge see the big picture                         | y          | y    |       | y    | D     |
| 17.2.1.3 OTHER CHALLENGES                                 |            |      |       |      |       |
| One challenge is to clarify the client's needs            | y          |      |       | y    | E     |
| One challenge is developing a daily control systems       |            | y    | y     |      | F     |

## 17.3 IDENTIFYING PATTERNS – RESOURCE CHALLENGES

| 17.3.1 RESOURCE CHALLENGES WITH CUSTOMER FOCUS                       |            |      |     |       |       |
|--|------------|------|-----|-------|-------|
| 6A Resource Challenges with Customer Focus                           | Challenges |      |     |       | Class |
|  | Strctr     | Rsrc | Ppl | Prcss |       |
| A challenge is to find metrics for measuring customer needs          |            | y    |     |       | B     |
| A challenge is to find time to work on customer focus                |            | y    |     |       | A     |
| A challenge is to focus on the customer throughout the organization. | y          | y    | y   | y     | C     |

| 17.3.2 RESOURCE CHALLENGES WITH FLOW                         |            |      |     |       |       |
|--|------------|------|-----|-------|-------|
|  | Challenges |      |     |       |       |
| 7A Resource Challenges with Flow                             | Strctr     | Rsrc | Ppl | Prcss | Class |
| A challenge is to find relevant metrics to measure the flow. |            | Y    |     |       | B     |
| A challenge is to find time to work with flow                |            | Y    |     |       | A     |
| A challenge is to create flow if you are short of resources  |            | Y    |     |       | A     |

| 17.3.3 RESOURCE CHALLENGES WITH STANDARDIZATION   |        |            |     |       |       |
|---|--------|------------|-----|-------|-------|
|   |        | Challenges |     |       |       |
| 8A Resource Challenges with Standardization   | Strctr | Rsrc       | Ppl | Prcss | Class |
| A challenge is to find the time to work on standards  |        | Y          |     |       | A     |
| A challenge is to restrain from measuring everything on a new standard                      |        | Y          |     |       |       |
| A challenge is to ensure that it gives employees the right training on standards            |        | Y          |     |       |       |
| A challenge is to create understandable informational materials that are easy to understand |        | Y          |     |       |       |
| A challenge is getting employees to comply with new standards                               | Y      | Y          | Y   |       |       |

| 17.3.4 RESOURCES CHALLENGES WITH QUALITY                                |        |            |     |       |       |
|---|--------|------------|-----|-------|-------|
|   |        | Challenges |     |       |       |
| 9A Resources Challenges with Quality                                    | Strctr | Rsrc       | Ppl | Prcss | Class |
| A challenge is to find relevant metrics to measure quality in processes |        | Y          |     |       | B     |
| A challenge is to find time to work on continuous improvements          |        | Y          |     |       | A     |
| A challenge is to re-attach to quality work                             |        | Y          |     | Y     |       |
| A challenge is to get the organization to see the big picture           | Y      | Y          | Y   | Y     | C     |

## 17.4 SUMMARY RESOURCE CHALLENGES

| Challenges  |       |      |       |      |       |
|---|-------|------|-------|------|-------|
| 17.4.1 COMMON RESOURCE CHALLENGES                               | Cust. | Flow | Stdrs | Qlty | Class |
| 17.4.1.1 PRIMARY CHALLENGES                                     |       |      |       |      |       |
| One challenge is finding resources, especially time             | y     | y    | y     | y    | A     |
| 17.4.1.2 SECONDARY CHALLENGES                                   |       |      |       |      |       |
| One challenge is to find relevant metrics                       | y     | y    |       | y    | B     |
| 17.4.1.3 OTHER CHALLENGES                                       |       |      |       |      |       |
| One challenge is to get the organization to see the big picture | y     |      |       | y    | C     |

## 17.5 IDENTIFYING PATTERNS – PEOPLE CHALLENGES

### 17.5.1 PEOPLE CHALLENGES WITH CUSTOMER FOCUS

| 6A People Challenges with Customer Focus   | Challenges |      |     |       | Class |
|--|------------|------|-----|-------|-------|
|  | Strctr     | Rsrc | Ppl | Prcss |       |
| A challenge is to get all internal functions to work towards the end customer                  | Y          |      | Y   |       | A     |
| A challenge is to understand who the end customer  |            |      | Y   |       |       |
| A challenge is that customer focus is a new concept  |            |      | Y   |       |       |
| A challenge is to understand customer needs at an aggregate level rather than individual level |            |      | Y   |       | C     |
| A challenge is to maintain motivation throughout the change process                            |            |      | Y   |       |       |
| A challenge is to understand that it is the client that determines the pace of work            |            |      | Y   |       |       |
| A challenge is to focus on the correct priorities  |            |      | Y   | Y     | E     |
| A challenge is to focus on the customer throughout the organization.                           | Y          | Y    | Y   | Y     |       |

### 17.5.2 PEOPLE CHALLENGES WITH FLOW

| 7A People Challenges with Flow                                     | Challenges |      |     |       | Class |
|--|------------|------|-----|-------|-------|
|  | Strctr     | Rsrc | Ppl | Prcss |       |
| A challenge is that the current corporate culture prevent the flow |            |      | Y   |       | B     |
| A challenge is to create flow if you lack knowledge about lean     |            |      | Y   |       | A     |
| A challenge is to create flow without motivated employees          |            |      | Y   |       | C     |

### 17.5.3 PEOPLE CHALLENGES WITH STANDARDIZATION

| 8A People Challenges with Standardization  | Challenges |      |     |       | Class |
|--|------------|------|-----|-------|-------|
|  | Strctr     | Rsrc | Ppl | Prcss |       |
| A challenge is getting employees to understand the value of standards                  |            |      | Y   |       | A     |
| A challenge is the negative culture that exist among employees regarding the standards |            |      | Y   |       | B     |
| A challenge is the lack of leadership  |            |      | Y   |       | D     |
| A challenge is that people are different   |            |      | Y   |       | B     |
| A challenge is the low level of knowledge among employees how to design standards      |            |      | Y   |       |       |
| A challenge is to develop their own culture, ex. lean-house                            |            |      | Y   |       |       |
| A challenge is getting employees to comply with new standards                          | Y          | Y    | Y   |       |       |

| 17.5.4 PEOPLE CHALLENGES WITH QUALITY                                 |            |      |     |       |       |
|---|------------|------|-----|-------|-------|
|   | Challenges |      |     |       |       |
| 9A People Challenges with Quality                                     | Strctr     | Rsrc | Ppl | Prcss | Class |
| A challenge is to create a permissive and learning culture            |            |      | Y   |       | B     |
| A challenge is to get everyone to understand the work process         |            |      | Y   |       | A     |
| A challenge is to get leaders to walk the talk                        |            |      | Y   |       | D     |
| A challenge is to understand what is right and wrong                  |            |      | Y   |       | A     |
| A challenge is to create a unified vision                             |            |      | Y   |       |       |
| A challenge is to dare to give responsibility to the employee         |            |      | Y   |       |       |
| A challenge is to involve everybody                                   |            |      | Y   |       | C     |
| A challenge is to understand how the discrepancies should be reported |            |      | Y   | Y     | A     |
| A challenge is to understand what discrepancies should be reported    |            |      | Y   | Y     | A     |
| A challenge is to get the organization to see the big picture         | Y          | Y    | Y   | Y     | E     |

## 17.6 SUMMARY PEOPLE CHALLENGES

| Challenges  |       |      |       |      |       |
|---|-------|------|-------|------|-------|
| 17.6.1 COMMON PEOPLE CHALLENGES                                 | Cust. | Flow | Stdrs | Qlty | Class |
| 17.6.1.1 PRIMARY CHALLENGES                                     |       |      |       |      |       |
| One challenge is to create understanding                        | y     | y    | y     | y    | A     |
| 17.6.1.2 SECONDARY CHALLENGES                                   |       |      |       |      |       |
| One challenge is to create a permissive and learning culture    |       | y    | y     | y    | B     |
| One challenge is to engage everybody                            | y     | y    |       | y    | C     |
| 17.6.1.3 OTHER CHALLENGES                                       |       |      |       |      |       |
| One challenge is leadership                                     |       |      | y     | y    | D     |
| One challenge is to get the organization to see the big picture | y     |      |       | y    | E     |

## 17.7 IDENTIFYING PATTERNS – PROCESS CHALLENGES

### 17.7.1 PROCESS CHALLENGES WITH CUSTOMER FOCUS

| Challenges   |        |      |     |       |       |
|--|--------|------|-----|-------|-------|
| 6A Process Challenges with Customer Focus                            | Strctr | Rsrc | Ppl | Prcss | Class |
| A challenge is to get the facts on what the customer wants.          | Y      |      |     | Y     | A     |
| A challenge is to focus on the correct priorities                    |        |      | Y   | Y     |       |
| A challenge is to focus on the customer throughout the organization. | Y      | Y    | Y   | Y     | B     |

### 17.7.2 PROCESS CHALLENGES WITH FLOW

| Challenges  |        |      |     |       |       |
|---|--------|------|-----|-------|-------|
| 7A Process Challenges with Flow                             | Strctr | Rsrc | Ppl | Prcss | Class |
| A challenge is to synchronize the flow                      | Y      |      |     | Y     |       |
| A challenge is to create a flow of many different processes |        |      |     | Y     |       |
| A challenge is to create flow with unclear processes        |        |      |     | Y     |       |
| A challenge is to create flow without daily control         | Y      |      |     | Y     |       |

### 17.7.3 PROCESS CHALLENGES WITH STANDARDIZATION

| Challenges   |        |      |     |       | Class |
|--|--------|------|-----|-------|-------|
| 8A Process Challenges with Standardization                         | Strctr | Rsrc | Ppl | Prcss |       |
| A challenge is to find the right level of standardization          | Y      |      |     | Y     |       |
| A challenge is to hurry slowly, get everyone onboard               |        |      |     | Y     |       |
| A challenge is to complete the implementation of standards fully   |        |      |     | Y     |       |
| A challenge is to get employees to constantly update the standards |        |      |     | Y     |       |
| A challenge is to eliminate recurring problems                     |        |      |     | Y     |       |

### 17.7.4 PROCESS CHALLENGES WITH QUALITY

| Challenges   |        |      |     |       | Class |
|--|--------|------|-----|-------|-------|
| 9A Process Challenges with Quality   | Strctr | Rsrc | Ppl | Prcss |       |
| A challenge is to re-attach to quality work  |        | Y    |     | Y     |       |
| A challenge is to understand how the discrepancies should be reported                      |        |      | Y   | Y     |       |
| A challenge is to understand what discrepancies should be reported                         |        |      | Y   | Y     |       |
| A challenge is to select the best improvement proposals, so one does not create more waste |        |      |     | Y     |       |
| A challenge is to focus on quality   |        |      |     | Y     |       |
| A challenge is to work with quality because it has not been a focus before                 |        |      |     | Y     |       |
| A challenge is to get the organization to see the big picture                              | Y      | Y    | Y   | Y     |       |

## 17.8 SUMMARY PROCESS CHALLENGES

| Challenges  |              |             |              |             |              |
|---|--------------|-------------|--------------|-------------|--------------|
| 17.8.1 COMMON PROCESS CHALLENGES                                |              |             |              |             |              |
|   | <i>Cust.</i> | <i>Flow</i> | <i>Stdrs</i> | <i>Qlty</i> | <i>Class</i> |
| 17.8.1.1 PRIMARY CHALLENGES                                     |              |             |              |             |              |
| -   |              |             |              |             |              |
| 17.8.1.2 SECONDARY CHALLENGES                                   |              |             |              |             |              |
| -   |              |             |              |             |              |
| 17.8.1.3 OTHER CHALLENGES                                       |              |             |              |             |              |
| One challenge is to stay focused                                | y            |             |              | y           | A            |
| One challenge is to get the organization to see the big picture | y            |             |              | y           | B            |