Abstract 015-0611

Outcome of Lean in Swedish health care – rationalization or increased patient value?

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POMS 21st Annual Conference

Vancouver, Canada

May 7 to May 10, 2010

Abstract

Lean is a philosophy, which has gained popularity in a variety of fields and industries. One of these is health care. Fundamental in Lean is the focus on creating value for the customers. To do that, organizations must strive to continuously eliminate all non-value creating activities and free time for innovation of activities that increase customer value. As a result of an increasing popularity of Lean in Swedish health care, there is an ongoing debate about its effects. The purpose of this paper is to elaborate on the drivers for implementing Lean in Swedish health care and to explore to what extent the outcome is activities and efforts aimed at increasing the value for the patients. The research indicates that the majority of reported results from Lean projects found in literature as well as studied Lean projects focus mainly on productivity and rationalization, and only secondary on value creation for the patients.

Keywords: Implementation, efficiency, effectiveness, innovation, culture

Introduction

Lean is a concept for improving quality by minimizing waste and increase customer value, which has gained popularity in a variety of fields and industries. One of these is health care. In Sweden, as in many other countries, the health care sector is facing the challenge of an increasing demand with limited resources that do not grow equally to the needs. The cost for health care in Sweden is estimated to grow from 9,1% of BNP in 2005 to 22% in less than 40 years (OECD Health Data 2007). A number of factors are driving the cost: the population is growing and people live longer; new treatment methods increase cost for medicines and, overhead expenses are increasing. Patients and relatives are also better educated and have access to much knowledge, giving them both ability and expectations to be more involved in

the process. The conclusion is that the health care sector is facing higher and new demands on their services. It has become necessary to rethink the system of working. Practitioners as well as researchers advocate that Lean is a solution and report successful implementation results from a variety of hospitals and clinics in various countries (e.g. Chalice 2007, Dickson et al, 2009, Eaton 2008, Graban et al. 2009, Hadfield and Holmes 2008, Joosten et al, 2009, Kollberg et al 2007, Lewis 2001, Zidel 2006). As a result of an increasing popularity of Lean in Swedish health care, it is interesting to study its effects.

Fundamental in Lean is the focus on creating value for the customers (e.g. Hines et al, 2004, Hines et al, 2008, Womack and Jones, 2005). To do that, organizations must strive to continuously eliminate waste and free time for innovation of activities that increase customer value. However, in reported studies and in Lean literature there is a tendency to focus on efficiency and productivity and only to a limited extent on the value adding activities. Hence, the purpose of this paper is to elaborate on the drivers for implementing Lean in Swedish health care and to explore to what extent the outcome is activities and efforts aimed at increasing the value for the patients or merely improving internal efficiency. The research indicates little evidence of sustainable and continuous improvements or organizational change. Organizational change is key for driving the change of providing care for the patients that is needed to meet the new and increasing demand.

This study looks at literature on Lean and Lean Healthcare and case study evidence of Lean implementations with the purpose to gain insights and understanding of Lean implementations in Swedish health care. Hence, this study provides not a complete literature review, but selected examples of Lean in health care from tutorial and investigating/reporting literature. Neither does the study give a comprehensive review of all Lean implementations in

Swedish health care. Gaps that need to be further developed have been identified through evidence put forward in public presentations, statements from initiators, project descriptions and internal evaluations of projects.

In the following sections we shortly present the origin and development of Lean, briefly reflecting on the cornerstones of the concept, as well as the application of Lean in general. Lean in health care is then examined in literature followed by empirical examples of Lean projects and implementation efforts in Swedish health care. A discussion is then provided focusing the role and involvement of patient value, service, long- and short-term benefits and perspectives, effectiveness and innovation in Lean Healthcare. The discussion ends up in research propositions focusing areas of Lean Healthcare that needs further investigation and conceptualization. Finally, conclusions are provided together with a short reflection on the limitations of the paper.

The origin and development of Lean

Lean is seen as "one of the most influential manufacturing paradigms of recent times" (Holweg 2006). Hines et al (2004) establish that '"he application of Lean thinking has made a significant impact both in academic and industrial circles over the last decade". A problem is the arising confusion about what the Lean concept is really about (Hines et al 2004). The predominant view appears to be that it is an improvement model, a set of methods, tools and techniques for eliminating waste and increasing efficiency (Womack and Jones 2005, Hines et al 2004). Some emphasize that Lean is much more, and refers to it as a toolset, a management system, *and* a philosophy that can change how businesses are organized and managed in a way that improves the quality by minimizing waste (Graban 2009).

Even though there might be differences in the interpretation of Lean, most people recognize Toyota as the pioneer of the Lean production methods, referred to as the Toyota Production System (TPS). The term 'Lean' was first used by John Krafcik, who was a member of the MIT research team that studied Toyota in the late 80's (Holweg 2006, Graban 2009). It was later picked up by Womack et al (1990) "to contrast Toyota with the western mass production system" (Holweg 2006). The contrast refers to the holistic view of an entire management system. The TPS was merely the operations element of Toyota's total management system (Womack, et al 1990). The real power of the system emerged when it was tightly linked to the product development process, the supplier management process, the customer management process, and the policy focusing process for the whole enterprise (Holweg 2006).

Womack and Jones (1996) later developed the concept of 'Lean Thinking' including five principles reinforcing the holistic view and the customer perspective. In recent years Lean has been described as a people-thinking system, built on the cornerstones of customer value, empowerment, teamwork and perfection (Dickson, et al 2009, Holweg 2006). Furthermore, Joosten et al (2009) discuss the importance of balancing operational and socio-technical aspects in order to benefit from improvements that cannot be achieved by neither aspect alone.

Application of Lean

Lean has diffused from the manufacturing processes, to basically all business processes in a company. It has travelled from the automotive industry to manufacturing companies in general, and finally, in the last decade, into the service sectors, where it is now finding its form (Womack and Jones 1996, Hines et al 2004). Even though the Lean concept is now widely used in all business processes and in many industries, western companies have eagerly

adopted the tools and techniques to eliminate waste and reduce cost, but struggle with the mindset and organizational culture of the concept (Hines et al 2004). As an effect many Lean efforts show short term local benefits but fell short of their intended impact on the overall system's performance (Holweg and Pil 2001), and evidence are not clear on the sustainable effects (Dickson et al 2009). In practice Lean has become yet another internal improvement methodology focused on removing waste and improving internal efficiency (Nave 2002), far from the paradigm it has been called (Holweg 2006). Managers still have to figure out how to release the full potential of the Lean concept. This means to come across the challenges of changing the mindsets of people on how we work and how we manage work (Graban 2009). One of the major obstacles for cultural change is that management theory is addressed as a secondary or tertiary issue (Nave 2002), and that the human and socio-technical aspects of the high-performance work system core to the Lean manufacturing approach is neglected (Hines et al 2004, Joosten et al 2009).

Lean in health care

Hospitals in the US have been experimenting with Lean since the 1990s and the concept is also widely spread in the UK (e.g. Dickson et al 2009, Papadopoulos and Merali 2008, Proudlove 2008, Radnor and Walley 2008, Vest and Gamm 2009). It is only in recent years that Lean has become popular in Swedish hospitals, clinics and primary care units, e.g. Lund University Research Hospital, Capio S:t Göran Hospital, Sahlgrenska University Hospital, Karolinska University Hospital, Uppsala University Hospital and Landskrona Hospital. As a result of an increasing popularity of Lean in Swedish health care, there is an ongoing debate about its usefulness and effects.

Several authors report that Lean fits well in health care (e.g. Chalice 2007, Eaton 2008, Graban et al. 2009, Hadfield and Holmes 2008, Kollberg et al 2007, Lewis 2001, Zidel 2006). Although the majority of the reporting is in favor of Lean in health care, some critique and issues have been raised. Kollberg et al. (2007) point out that 'patient focus' is a concept that needs clarification, and that the patients' demands change during health care processes, which needs to be taken into consideration in the implementation. Some advocate that the positive effects that we have seen so far is merely a result of the work with process orientation and have in fact little to do with the Lean concept (Radnor and Walley 2008).

Graban (2009) advocates Lean hospitals for improving quality, patient safety and employee satisfaction. The book sets of with a discussion of Lean in general and with special focus on Lean hospitals. The philosophy is mentioned and Graban argues that it is by the concrete Lean tools and methods that the cultural change emerges. However, no methods or evaluations are presented where the philosophy has got sustainable effects on the hospitals or clinics mentioned as examples. Furthermore, while the patient is mentioned and argued for, especially in the beginning of the book, the methods and tools presented focus very much on improving internal processes, e.g. reducing time and waste by standardization and rationalization.

With a similar outline Zidel (2006) presents a guidance book on how to implement Lean principles in health care organizations. The book focus on a number of methods and provides several examples of how these methods have provided significant changes in lead-time, reduction of unnecessary administrative work etc. While the book takes a starting point in value adding, there are very little emphasis on methods and tools for understanding the customers' and what they value. One subchapter (two pages) emphasizes the strategic

dimension of knowing the direction of your improvement efforts, i.e. adding value to your patients. The rest of the book focuses very much on improving the efficiency of existing processes and procedures.

Chalice (2007) presents 46 steps for improving health care organizations based on Lean production methods. The book focuses the US health care system. Only the first two steps include the customer, i.e. identifying customer value from the patients' perspective and mapping the patient value stream. The following 44 steps present various methods and perspectives on how to reduce waste, decrease lead-times, how to make managers Lean managers, how to implement the Lean methods, how to focus on both cost and quality simultaneously, and so on. The perspective is solely on the existing organization and improvement of existing operations from a health care provider perspective.

Lewis (2001) takes a broad approach to Lean and presents how it not only can affect the health care giving processes but also other parts like purchasing, technology development and human resource management. The book is similar to many others in both the internal focus and the practical focus on how to work with Lean methods.

In their study of eight Lean projects in the Scottish public sector (health care and other sectors), Radnor and Walley (2008) find major benefits to win just from greater acceptance of a process perspective. They conclude that Lean may not be an appropriate first step for improvements because the basic conditions are not in place, i.e. process view, understanding capacity and demand, linking improvement activities to strategy and a culture of structured problem solving. However, they emphasize that if embedding enabling conditions Lean may allow organizations "not only to meet the challenges set by government to improve

productivity but also to deliver a high-quality service meeting customer requirements". The eight projects had various drivers for change towards a Lean approach: change of leadership, struggle with performance indicators, introduction of a new technology, Government agendas, recommendations, changing policy environment, threat of competition, demand for increased efficiency and service expansion with limited resources. None of the drivers were concerned with customer/patient value and satisfaction. The outcome of the projects were significant measurable benefits to productivity in the form of speed and quality by reducing flow time, number of steps in a process, time to first appointment, diagnostic wait, but no reporting on evidence of increased customer values.

Dickson et al (2009) studied Emergency Departments at two teaching and two community hospitals in the US to see if process improvement efforts using Lean principles improved care quality. Similar patient care metrics was used to follow development of performance in all four departments. Metrics were defined and measured during a pre-Lean year, i.e. the baseline for comparison and they were measured in the years after full implementation (post-Lean years). All projects had positive effect on fighting the crowds. Three of the four Emergency Departments showed process and patient satisfaction improvements despite higher volumes. Improvements in internal efficiency were clear: throughput times were improved; the lengths of stay were shortened and efficiency in laboratory turnaround times increased. Patient satisfaction seemed to be the most resistant to change. Initially it was even reduced in of the departments, but this may be an effect of the increasing number of patients that met a physician and hence was given the opportunity to fill in a customer satisfaction survey. Observations support the view that when Lean is applied according to the TPS principles and is owned by the frontline workers who actually perform the work it can produce care metric improvements.

Main driver for Lean implementations according to Joosten et al (2009) is the need of improving operational efficiency due to incidents and quality problems. They report similar results from Lean implementations as many others, i.e. reduced waste in inventory and reduced waiting time for patients, although they too report the "lack of high quality evidence supporting Lean premises". They advocate more and higher quality research on socio-technical dynamics in Lean organizations, especially in health care, due to the fact that most Lean implementation efforts are aimed at improving operational efficiency and only secondly take into account the socio-technical efforts of their inventions.

One of few studies with a critical approach to Lean implementations is a study of Lean/TPS implementations in US health care (Vest and Gamm 2009). Included in their study were nine reference articles, which met the authors' selection criteria (for more details we refer to the article). The reviewed studies concluded that the implementations were successful in improving a variety of health care related processes. However, the authors are critical to the methodologies used and claim that the methodological limitations might undermine the validity of the results. Furthermore they argue that none of the results were particularly generalizable and points out the frequent absence of any attention to changes in organizational culture or substantial evidence of lasting effects from the efforts. Hence, Vest et al emphasize the need for improvements in research methodologies and expansion of timeframes to create real understanding of what works and what does not work in Lean implementations.

Proudlove et al (2008) conclude that the Lean tools and techniques get too much focus at the expense of implementation. Their review of a project evaluation of Lean implementations in the UK National Health Service reveal that the difficulties in identifying customers and

processes in a health care setting and the use of clear and appropriate terminology are of particular significance.

Empirical insights

The Lean concept is well recognized and widely used among many actors in the Swedish health care sector, i.e. public and private care providers, regional hospitals, local hospitals and in primary care units. Lund University Research Hospital (USIL) is recognized as the pioneer of Lean Healthcare in Sweden. Encouraged by the initial positive results, the concept is adopted not only by clinics throughout the hospital in Lund, but also by many other hospitals, clinics and primary care units in Sweden. A selection of implementation initiatives is presented below.

Lund University Research Hospital

Lund University Research Hospital (USIL) is one of the pioneers of Lean implementation in Sweden. The concept was launched in 2007 as a strategic improvement method, strongly supported by hospital management and driven by a strategic staff function. Drivers for change are both the external pressure on efficiency and quality and an internal ambition to provide better and more dignified care for the patients (Anhede and Lord 2009). Hospital management was driven by the vision of changing the structure of mass production, a silo focused organization built around areas of expertise, to a patient oriented workflow. To fulfill this vision, hospital management emphasizes the need of a cultural change built on a new leadership and empowerment (Lord 2007). Cultural change is expected to come through the bottom-up approach where all employees go through training programs and are involved in the improvement efforts.

The list of reported benefits is long, e.g. reduced evaluation time, increased number of reception hours with less physicians, increased accessibility by more telephone hours, reduction of waiting time by half for patients with fractures, reduction of overtime work by 50%, faster recovery for some cancer patients by providing examination, x-ray and surgery in the same day, dramatically improvements of evaluation of patients with eating disorders. So far, hospital management is satisfied with the results and will be using Lean methods and philosophy for further improvements. No well documented academic studies or research reports have been found on the Lean projects and initiatives at the hospital.

Capio S:t Göran Hospital, Stockholm

Capio S:t Göran Hospital is a private company providing public health care. Due to reorganization in 2004 among hospitals in the Stockholm area the patient flow at Capio S:t Göran almost doubled, which put pressure on productivity improvements. Hospital management initiated a change project with focus on customer value-adding activities and waste reduction. The improvement efforts were driven by the employees supported by management and was based on many of the Lean principles and tools, although the Lean concept was not known at the time. 80 % of the patients flow through the emergency department, and hence this is where the project started. Results show a reduction in time to treat patients with 30-40 % and the total lead-time has been reduced with 40 % (Läkartidningen 2008). Due to a change to individual planning for each patient and no classical rounds, the flow of patients in and out of the ward has been leveled out during the day, which has had a positive effect on the working environment (Pettersson 2007). Benefits come from the introduction of process orientation. The Lean implementations have had a clear focus on internal processes. There is no evidence of patients being involved in the work, or of documented results of increased patient value. Patient value is mentioned only as an effect of the improvements of internal efficiency, but is not raised as a primary driver.

Benefits are also reported from the hospital's laboratory. In two years, productivity increased with 21 % and the increase in margin was 20 % (Pettersson 2007). Other improvements are seen in timing in decision processes, quality and medical security and working environment. Driver for change is the increased pressure to do more for less. The new way of working has been develop to a philosophy used in all parts of the hospital.

Landskrona Hospital

Landskrona Hospital is one of the smaller hospitals in Sweden. It has no overall strategy on the implementation of Lean but instead a decentralized organization encouraging improvement initiatives to derive in the divisions. In one improvement project at the hospital the Lean concept was adopted as one of the methodologies for improvement. In the background of the project plan it can be read: "While much of the nurses' time is spent on administration, such as answering the telephone, social planning and documentation, it becomes difficult to be sensitive to patients' need for care. The nurses are divided between the administrative and the patient caring work, which is their field of expertise. The assistant nurses are left alone with the patients, while the nurses spend most of their time in the office. This creates a feeling of 'us and them'" (Göransson 2007, translated by the autjors).

In a project plan for a Lean implementation project at another part of the hospital (Patientnärmrevård, Avd 3, translated by the authors) it is stated: "It is difficult for the nurses to find time for participating in the primary care and they do not always have time to keep themselves updated about the patients' situation before the rounds". Lean is mentioned as a successful method and it is written in the project plan that; "We focus on the cornerstones: respect for people; identifying the customer's/patient's need, getting to know your processes, eliminate waste with the right people in the right places, create self-governed cells, level out the flow and cut the peaks by continuous improvements". Further down in the project plan the

patient is mentioned; “To provide the best possible care, everyone in the entire work team must do what he or she do best in close cooperation with the patient and the other team members.” The aim of the project is then stated “to reallocate the task of the nursing staff, challenge current routines, increase cooperation between different professions, and, create opportunities for the patients and relatives to participate in a professional care seen from holistic perspective where we focus on the four values accessibility, continuity, whole and safety. In a project update five months after project start it is reported that some of the key insights are that change project takes time, and that there must be someone in charge who is accessible during the process (Göransson 2008). The activities carried out during this period had focus on the nurses work situation and there are suggestions for further work on the improvement of the administrative routines and the communication among the staff. The customer or patient is not mentioned explicitly in the report.

Uppsala University Hospital

Driven by the governmental requirements on reduced waiting times for patients, Uppsala University Hospital was provided extra funds for improvement projects in 2009. In the decision it can be read that improvements projects based on Lean will be executed in order to improve patient flows (HSS 2009). An overall goal for the hospital is for middle management to work systematically with Lean and that coworkers should have understanding and awareness about Lean. Several divisions are mentioned to be included and for the neurology division it is stated that “a special project […] with the purpose to create sustainable efficiency improvement within access and operational units” (HSS 2009, translated by the authors). In an interview, the director of the hospital put forward that the Lean project “is not about cost savings but about creating a great health care culture. It will benefit both patients and coworkers” (UNT 2009). On the homepage of the neurological division it can be read: “We work with the implementation of Lean within the whole division in order to collectively

find improvement areas and improve these with the focus on our patients and their needs." (Neurodivisionen). No well documented academic studies or research reports have been found on the Lean projects and initiatives at the hospital.

Discussion

When analyzing the literature on Lean health care and the reported implementations in Swedish health care there is a clear tendency of a focus on the internal activities and processes. The productivity and efficiency aspects are central as most of the methods and tools provided are to reduce, eliminate, standardize or create smooth flows in the operations. These improvements can often be measured in quantitative terms and translated to cost-reductions or time-reductions rather easily. Since the health care sector is in an urgent need to increase efficiency to provide more care with same resources, the Lean toolbox is of course appealing for managers responsible for different clinics or departments. Vest and Gamm (2009, p.7) conclude, *"The obvious potential for cost-savings or reductions were implied by the improvements in almost all of the reported studies"*. Consequently, more radical changes and the creation of novel care giving concepts might be discharged. Neither the literature nor reported initiatives emphasizes the creation of innovations or new services/concepts. Even though the literature and empirical examples give some room to the philosophical and cultural aspects of the Lean concept, tools and techniques for process improvements get most space (Graban 2009, Lewis 2001).

Furthermore, most of the literature about Lean is biased. It is either informational or tutorial with a predominance of reporting the benefits of Lean without any balanced critique about issues and pitfalls. Success stories are eagerly spread to share learnings and encourage further use, but few in depth scientific studies about the effects are presented. We have only found

one journal article and two master thesis that have studied and evaluated Lean initiatives in Sweden. Critics and skeptics are few, although some voices are raised about the concern of increased workload, more administration and increased stress due to the pressure of continuous improvements (Förenade Vårdare 2009), an opinion in direct contrast to all the success stories, but supported by Per-Ola Börnefelt (Thomasson 2008).

Project reports and other internal documents regarding Lean implementations in Swedish hospitals show that the general drivers for Lean implementations are employee turnover due to stressful working conditions and an increasing pressure on the Swedish care providers to increase efficiency. Research shows that the initial focus in Lean implementations in Swedish hospitals has been on internal efficiency. Initial benefits are achieved mainly through introducing process orientation and a structured approach to process improvements including many of the Lean tools, but there is no real evidence or discussion of cultural change.

Even though patient value and care quality is mentioned as one of the main drivers for the Lean implementation initiatives, there are little evidence about increased patient value found in the project reports and evaluations. Patient value is mentioned in secondary terms, as an assumed effect of the improvements of internal efficiency. Furthermore, we haven't found any Lean implementation project in Swedish hospitals where the patients have been involved in the improvement process.

The following discussion is structured in four sections, starting with the customer value in Lean Healthcare, which we have found is more about assuming than really knowing. This is followed by a discussion on long- vs. short-term benefits and perspectives, which is an area of Lean where theory and practice seems to be far from each other. The implications of Lean in a

production vs. service orientated organization is then discussed, and, finally a discussion on innovation is provided, something we miss in the Lean concept, especially when it comes to methods and tools for the creation of innovations and novel health care concepts. The discussion draws upon both theory and practice to identify research propositions for the further development of Lean in health care.

Customer value in Lean Healthcare – knowing vs. assuming

Fundamental in Lean thinking is the focus on creating value for the customers. To do that, organizations must strive to continually eliminate all non-value creating activities and free time for innovation of activities that increase customer value. Womack and Jones (1996) clearly state that customer value must be linked to customer requirements. A view that is emphasized by Hines et al (2004) is that "it is the customer that ultimately decides what constitutes *muda* (waste), and what does not". Customer requirements change over time and hence, understanding what customers' value is a never-ending task (Hines et al 2008). Hines et al (2004) identifies two ways of creating customer value, either by reducing internal waste or by offering additional features or services valued by the customer. Value creation cannot by default be seen as equal to cost reduction (Hines et al 2004). Reducing internal waste creates customer value only if the associated costs are reduced and hence increase the overall value proposition for the customer (Hines et al 2004).

Assumptions are often made that the customer in health care is the patient, and hence the one who should define value (Angelis 2008). Considering the complexity of health care commissioning there might be a different view of the notion of the patient as customer (Kollberg et al 2007, Proudlove 2008). The patients justify the services, but they can only agree to the care provided for them. They cannot demand specific care and they do not pay directly for the care they receive. However, Kollberg et al (2007) argues that "because the

mission of health care is to treat and cure patients, who are end-consumers in the care process /.../ the patient should define what creates value in health care".

The emergent pattern of investigated literature on Lean Healthcare and empirical examples of Lean implementations in Swedish health care is that little emphasis is put on the patients, which is in direct contrast to the expressed objectives. Since the effectiveness dimension most of the time is neglected, one can question the real drivers for implementing Lean in Swedish health care. Patient value is mentioned only in secondary terms and it seems that knowing what the customer wants, how she wants it, when she wants it and, by whom she wants it, is self evident. It is often assumed that patient value is achieved by reducing waste, decreasing employee dissatisfaction and/or cutting lead-times. Patients are very seldom mentioned as an actor in value stream mapping activities or taken into consideration in the setup of improvement projects. Furthermore the patients are very seldom involved in the evaluation of the results. A classical push-strategy mindset can be identified where the caregivers by themselves know about the needs and what the customer values.

One may argue that due to the urgent need to tackle the huge productivity problem, it would be good enough to increase internal efficiency that *might* make patients more satisfied. This would, however, be in opposition to the Swedish Health Care Act (Hälso- och sjukvårdslagen 1982:763). In this act it is stated that health care services shall be of good medical quality and fulfill the patient's needs of treatment and safety. Services shall be accessible for everyone demanding the services and be provided on equal terms. Furthermore, services should be built on respect for the patient's right of self-determination and integrity, and should, as far as possible, be designed and provided in cooperation with the patient.

In their article on Lean Consumption (2005), Womack and Jones state that, "customers and providers must start collaborating to minimize total cost and wasted time and to create new value." They advocate that there is a need of shifting the mindset from efficiency improvements in production to providing the customer the service she wants, when and where she wants it. This leads to our first proposition.

> **Proposition 1:** *For health care providers to become successful in taking care of their patient's needs and requirements, they need to come to a real understanding of what patients' want throughout the care process. Hence, the Lean Healthcare concept needs to be expanded with methods for gaining increased understanding of real patient needs and values.*

Long- vs. short term benefits and perspectives

In the investigated literature on Lean Healthcare and empirical examples of Lean implementations in Swedish health care, the perspective of Lean is predominantly internal, i.e. on processes and works within the hospitals, clinics or other health care actors. The methods and tools focus on the health care providers and how they should act and change. For health care managers Lean provides methods and tools that systematically can reduce costs and make operations more efficient, rather quickly with measurable effects. This makes Lean a compelling and low risk tool for rationalization and survival, at least in the short-term perspective.

While some authors proclaim that it is through the methods and tools that the Lean philosophy and thinking is implemented, operational aspects and practices are dominant while issues of cultural changes or changing mindset are much less emphasized. In their critical analysis of improvement methods in health care, Vest and Gamm (2009, p.7) conclude that; *"While all of three of the examined transformations* [Six Sigma, Lean and StuderGroup's

Hardwiring Excellence] *advocate a cultural change, few of the reviewed studies examined indicators resembling organizational culture".* A consequence of the short-term benefits and internally focused improvements, which involves and empowers several employees as suggested in the Lean concept, it is that it can become a self-reinforcing system that in the strive for perfection looses the long-term perspective and the changes in the society at large. Hence, to succeed, it is also necessary to change the mindset of the people in a sector that is stuck in a functional paradigm driven by specialization and formal structures, far away from its mission to give citizens the support and help they need as patients (Nilsson, 2008). It is necessary to challenge today's values and assumptions that are used as a platform in daily work.

> **Proposition 2:** *While short-term benefits drives and encourages Lean initiatives it is the long-term changes of organizational culture that sustainable change and improvement can take place. Hence, for the Lean initiatives to become successful the starting point must be a long-term perspective based on rethinking of underlying beliefs and assumptions.*

Production vs. service orientation

Health care organizations can be regarded as mixtures of production and service as different tasks can be more or less automated and treated as production facilities (e.g. laboratories, standard surgery etc.), while others are strictly service focused (e.g. patient counseling, health care planning, etc.). Without a genuine awareness of organizational values and assumptions there might be implications of using primarily a production perspective, i.e. a production organization including service, or primarily a service perspective, i.e. a service organization including production. Taking primarily a production perspective implies assumptions of productivity, standardization, cost-efficiency, flexibility and efficient flows, and that improvement and quality can be measured in quantitative terms (Nilsson 2008). Taking

primarily a service perspective, another set of assumptions emerges; context dependent, adaptive, customer/patient focused, care taking, confidence-inspiring, and accessible, and that quality is measured in the actual meeting with each customer/patient. Reviewing literature on Lean and reported implementations in Swedish health care, there is predominance in focusing on the production perspective. It is foremost lead-times, waiting times, number of operations etc. that are set as measures for the Lean initiatives and suggested for implementation measures. This implies that there might be a difference in the outcome of Lean implementation whether your perspective is production oriented or service oriented, and hence we propose:

> **Proposition 3:** *For health care providers having primarily a production perspective, i.e. with minor direct patient contact, current Lean methods and thinking fit better than for health care providers having primarily a service perspective, i.e. with high degree of direct patient contact. Hence, the Lean Healthcare concept needs to be adapted to fit service oriented care providers.*

Innovation – the forgotten part in Lean health care

From the literature review it becomes obvious that with a focus on improving existing care giving processes, i.e. by reducing waste and standardization of work, together with the lack of methods and tools for identifying and understanding the patient/customer, more radical changes or novel ways of health care is less deemed to be found. Christensen et al. (2000 p.2) argue that health care organizations *"instead of embracing change, they are turning the thumbscrews on their old processes – laying off workers, delaying payments, merging, and adding layers of overhead workers."* The authors (ibid.) put forward the need for innovation, something Herzlinger (2006) also emphasizes, and argue that the mind-set for improvement has to change in order to be able to handle the increased need for health care services. Merely

running the today's operations more efficient, faster and with less deficiencies is not enough. Innovation has to enter the Lean agenda. Hence, the following propositions are made:

> **Proposition 4:** *While current Lean methods are contributing to increased efficiency in health care operations the development of Lean must incorporate and put forward much stronger the methods and principles for innovation.*
>
> **Proposition 5:** *To stay competitive health care providers must stop focusing on short-term operational benefits and instead focus on creating long-term innovation capability in their organizations.*

Conclusions and future research

Practitioners as well as academics recognize Lean as a useful method for increasing quality and minimizing waste in the health care sector although the reporting is often biased since most of the reports are produced by people who have been involved in the implementation or decided on the Lean projects. Several of the reports have methodological limitations that might undermine the validity of the results (Vest and Damm, 2009). Furthermore, we have not yet seen clear evidence of sustainable effects. Lean adopters report positive initial results but so far none have demonstrated that Lean can produce lasting and continuous improvements (Dickson, et al, 2009; Vest and Damm, 2009) and there are relatively little published about the dynamics and outcomes of Lean projects (Papadopoulos and Merali, 2008). The research indicates that the majority of reported results from Lean implementation projects found in literature and Lean project reports focus mainly on productivity and rationalization, and very little on cultural change and value creation for the patients.

The conclusion is that more and higher quality research about the usefulness of Lean within Swedish health care is needed. Furthermore, we have identified four areas for further

development of Lean in health care, which we have provided in five research propositions for further studies. The four areas concerns the knowledge of customer value, short- vs. long-term benefits and perspectives of Lean implementations, the implications of Lean in a production vs. service oriented organization, and finally on how the Lean concept can be used for creating long-term innovation capability in health care. While the research provides insights and suggestions for further development of the Lean concept in the health care sector, there are some limitations of the research. One limitation is that the research is built on secondary data, i.e. reports and statements from managers and project leaders involved in the implementation projects. No deeper empirical study with hospital visit including interviews and observations has been made. Another limitation concerns the scope of the literature. Only a selection of literature on Lean Healthcare and reports from Lean implementations in Swedish health care was included. Furthermore, projects were included only if they were labeled 'Lean', which excluded several improvement efforts that could have been related to the Lean approach.

Building on the propositions suggested in this paper, there are several research endeavors that need to be further explored. The development of methods and tool to extend Lean into the patients' real needs and wants do we see as a central area for both research and development. This connected to the possible innovation opportunities for health care providers might be a beneficial path to take in order to meet the economic and medical challenges of tomorrow. Furthermore, research on Lean in service industries is also needed. The dominant production perspective most often transferred into service areas needs to be rethought and developed in order to get a better fit with services situations and processes.

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