

# A Proposed Tool for Lean Healthcare Performance Improvement (LHPI)

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## Abstract

In current competitive business and modern work, organizational culture and Lean Healthcare (LH) is important to improve organizational performance in healthcare industry. Healthcare industry itself is moving forward toward preparing a cost and time efficient, morale, quality, and safety healthcare providers. Thus, the aim of this study is to develop a lean healthcare tool that incorporate lean healthcare practices, quality improvement effort and performance measure in Malaysian healthcare industry. This finding is to provide a lower cost of material, improve supply chain process, better service quality for customer, and Just in Time (JIT) services deliveries. This study also expect to eliminate healthcare waste and defects in many aspects of the healthcare operation, strengthening relationships with vendors, producing high quality products, and ultimately serve customers better than competitors. The development through lean healthcare tool will be conduct in Malaysia healthcare industry and will also be adopt to analyze the data gather from systems validation process. Further, the findings of the study are expects to provide a practical guideline for healthcare practitioner to enhance performance improvement and to provide tested lean healthcare system, quality improvement effort and performance improvement systems in healthcare industries through a tool. Development of lean healthcare tool will be test in this research. Hence, this research might be important to Malaysian Healthcare industry in improving performance improvement. As such, it is expected to benefit both researchers, practitioners, consultant and academic player.

**Keywords:** Lean healthcare practice, Lean healthcare tool, Quality improvement, Malaysian Healthcare industry.

## Introduction

Healthcare costs are increasing rapidly and the cost of providing care is going up, but the payers do not always want to increase reimbursements. Patient injuries and deaths due to preventable errors occur far too often throughout the world. Healthcare industry was concerned with a

quality and efficiency to deliver a good service to their customers. This is because the healthcare industry needs to deal with various problems such as increase demand for service, demographics, waiting time concern, rising cost of service delivery, government funding constraints, quality concerns, lack of quality personnel, and productivity (Villeneuve, 2011). According to National Strategic Mission Thrusts (2014), one of the objectives is productivity and innovation through K-economy. Healthcare industry has opportunities to lower their total cost of operations by implementing sound and stable processes and technologies. Lean and other continuous improvement methodologies have become premier strategies for responding to healthcare challenges and these methods provide pragmatic, sustained benefits when applied to healthcare that positively impact patient and employee satisfaction. In response to rising costs, payers (the government or private players) often propose cutting reimbursements in an attempt to control costs, in doing so; they are changing the price paid, but not the underlying costs in the system. Cutting prices without corresponding cost reductions will hurt hospital margins, which can slow future investment for hospital's financial future (Graban, 2009).

While there are differences in the healthcare systems across different countries, there are some universal problems that concern patients: preventable errors that lead to injury and death. Instead of focusing solely on the problem of patient access to care, lean also gives us tools for improving the delivery of care. It is imperative that we examine and understand the details of how healthcare is delivered, implementing processes that support safe, efficient, and high-quality care. Lean provides the best way to accomplish this.

Lean is toolset, a management system, and a philosophy that can change the way clinics are organized and managed. Main principle of lean is to reduce waste, reduce costs, and improve quality and timely delivery of products and services. Modeled by the Toyota Production System (TPS), although health care differs from manufacturing, hence it makes it more vital as life is something irreplaceable. In any healthcare service centre, (e.g.: clinics and hospitals), the stakes are high, any small mistakes or failure can cause fatalities. As it is a matter of life and death. Besides, lean healthcare is a tool for quality improvement which has been used by many organizations. It is suitable for service industry because lean improves the speed of delivery, quality and flexibility (Snyder and McDermott, 2009). Other than that, lean healthcare systems are used by healthcare organization to reduce waste and medical error (Jimmerson et al., 2005) and give added value for the customer. Reductions in errors can give high benefits in terms of time, cost, patient welfare, staff motivation, and productivity. Thus, lean healthcare systems are an important practice that can be implemented in Malaysian healthcare industry in order to increase the lean healthcare systems. Therefore the lean healthcare initiative should be integrated and interdependently linking all aspects of human, technical, process, culture, and result so that it becomes an effective and systematic strategic business system.

Today, the development and the number of quality initiative programs have increased over the years. In relation, many healthcare companies decided to move from the existing

quality initiatives to the lean healthcare initiative as a business strategy to improve the smoothness of business operations and organizational performance. The development of this lean has spread to various industries, which has started by Toyota Company in the healthcare sector to other sectors such as healthcare, education, banking, public and public organization. Healthcare industry itself is moving forward toward preparing lower cost of material, cheaper price, JIT deliveries, and elimination of waste and defects in many aspects of the activity or operation, and strengthening relationships with vendors, and ultimately producing high quality products and customers services better than competitors.

## **2. Literature Review**

### **2.1 Lean practice in Healthcare**

Originating from the Toyota Motor Corporation, lean (also referred to as the Toyota Production System, TPS) is considered to be a radical alternative to the traditional method of mass production and batching principles for optimal efficiency, quality, speed and cost (Holweg, 2007). However lean is increasingly prevalent in healthcare, there is little evidence of a full implementation of lean to the level achieved by Toyota (Spear, 2005). Lean initiative have extensively applied around the world, as companies seek to attain and sustain a competitive advantage. One of the main principles in implementing the lean initiative is to eliminate any waste that adds to the cost of the product and service (Womack and Jones, 1996; Ohno, 1998). Waste has been classified into seven categories which are also known as seven deadly wastes. These seven deadly wastes includes overproduction, waiting, transportation, over processing, inventory, motion and defects (Womack and Jones, 1996). In addition, Li et al. (2005) suggest that through waste elimination, the continual implementation of lean has the advantage in increasing the speed of production process, improving the quality of service and customer satisfaction. Besides, Lean is being implemented tangible benefits have been reported such as reduction of processing or waiting time, increase in quality through a reduction of errors, a reduction in costs (Silvester et al., 2004), alongside intangibles such as increased employee motivation and satisfaction, and increased customer satisfaction (Radnor and Boaden, 2008).

Lean has been embraced across public services, including healthcare, central government and local government organizations (Radnor, 2010). The application of Lean principles in healthcare, particularly hospitals, should remove duplicate processes and unnecessary procedures such as: recording patient details in multiple places; excessive waiting for staff; and uncoordinated, variable discharge processes resulting in a longer length of stay (NHSIII, 2007). In short, Lean seeks to reconfigure organizational processes to reduce waste and enhance productivity based upon the application of specialist analytical tools and techniques coupled with creating a culture of continuous improvement (Womack and Jones, 1996). In addition, lean healthcare in healthcare industry positively benefits for patient, clinicians, and stakeholders (Villeneuve, 2011) in addition detecting waste and eliminating waste (Vlachos and Bogdanovic, 2012). Waste determine as a main principle in implementing lean. Thus, waste has been categorized into seven types which are mistakes, over production, over processing steps,

employee movement, transportation, waiting time, and services which do not meet customer need.

Waste in healthcare unit occur such as delays between the expected time and the actual time for a visit, operation, over capacity, preparation time needed consists of operational, visit, medical device time and procedures to manage referrals (Kollberg et al., 2007). According to Habidin et al. (2012), healthcare industries have moved forward to focus on efficiency especially on preparing lower cost material, cheaper price, Just in Time (JIT) deliveries and elimination of waste, and defects in many aspects of the activity operation. In relation to that, lean healthcare systems are the most suitable tool to be implemented. This is because lean healthcare systems can become great potential and sustainable tools to reduce costs, improve quality, Lean healthcare has emerged as one of the most impactful approaches to help increase an organization's competitiveness through improvements in process efficiency and a reduction in operational waste. Hagg et al. (2007) stated that lean healthcare is an effective tool for identifying and eliminating waste from process. The benefit and goal of applying lean in healthcare is to best approach to reduce waste, as well as reducing wait times and unnecessary travel, while building quality, speed, and flexibility into the organization. Therefore, lean healthcare has been chosen as one of a strategy to overcome the issues. A service organization with global demands of service quality has paid attention to lean philosophies, principles, tools, and technique.

Meanwhile a study by Boyer (1996) states that investment in infrastructure such as quality leadership, group problem solving, training, and worker empowerment is an important stepping stone toward the success of lean initiatives implementation. This supports the study done by Papadopoulou and Ozbayrak (2005) who found that management commitment, communication, workforce empowerment and ownership improvement through a methodical lean education system and encouragement, and development of lean culture are essential for sustaining change toward lean. Another study by Achanga et al. (2006) also suggested that success of lean implementation depends on four critical factors: leadership and management; finance; skills and expertise; and supportive organizational culture of the organization. In line with these factors, some researchers (Sakakibara et al., 1993; Flynn et al., 1995, Swink et al., 2005; Narasimhan et al., 2006; Shah and Ward, 2007) opined that there is a need for a set of practices and a comprehensive implementation tool to contribute to the success of revolution in lean initiatives.

Shazali et al. (2013) and Khaidir et al., (2014) stipulate that Malaysia is in circumstance to provide the quality of healthcare in this country. Lean healthcare is a tool for quality improvement which has been used by many organizations (Habidin et al., 2015; Habidin et al., 2014). Originally, lean healthcare is designed as a management tool for creating a continuous improvement, improving activities and process through eliminating waste. In addition, lean healthcare also can be described with a various name such as lean production, lean manufacturing, total production system and found in the healthcare industry as a lean service,

lean hospital and lean healthcare. All of them are known as a multi-dimensional strategy for management practice including just-in-time, quality systems, work teams and supplier management in an integrated system (Shah and Ward, 2003). Hence, the development of Lean Healthcare Performance Improvement (LHPI) Tool for Malaysian Healthcare Industry can be measured in order to improve the performance for Malaysian healthcare industry.

## **2.2 Quality improvement efforts on performance improvement system for Malaysian healthcare industry**

Healthcare system is faced with challenges and opportunities from a rapidly changing operating environment, including increasing expectations on the quality of healthcare. Nevertheless, in competitive business and modern work, organizational culture and Lean Healthcare (LH) is important factor in order to improve organizational performance in healthcare industry. With rising pressure on healthcare providers to reduce costs and improve quality, an increasing number of organizations are looking to “Lean” tools and techniques as a breakthrough solution for performance improvement. To ensure the successful implementation of lean healthcare initiatives in enhancing organizational performance, performance measurement as a whole should be designed in line with current business needs, quality initiatives program, capacity and development of new technology, increased global competition, and civilizing work towards continuous improvement. Thus, both the financial and non-financial performance are definitely required by the organization because the current business era requires not only quality initiatives as a business strategy but also as a business system that emphasizes aspects of financial, quality processes, customer satisfaction and innovation.

In order to ensure the success of lean healthcare, the healthcare performance should be design and measures. It is because; a majority of research on the lean scope is based on the relationship between implementation of lean and performance (Shah and Ward, 2003). Performance can be described with various words such as business performance, organizational performance, firm performance, innovation performance, quality performance, and customer satisfaction (Khaidir et al., 2013). It also can be measured as the financial aspect and non-financial aspect or both. Therefore, healthcare performance is afforded in achieving an excellent improvement in performance by evaluating the operation step by step, creates new solutions to improve operations, increase efficiency, and reduce expenses.

Other than financial factors, customer and internal business process performance become the priority in measuring the performance in healthcare industry (Habidin, 2017; Norazlan et al., 2014; Roslan et al., 2014; Ali et al., 2013; Jamaludin et al., 2013). Thus, the performance assessment of various financial and non-financial factors from the perspective of LH is required in the healthcare industry to help forming strategic decisions on either the short or long term agendas. Therefore, to ensure the implementation of the lean operation to be applied in healthcare industries, it should be strategic, effective and not complex. Therefore, this study also focuses on the extent of performance improvement systems as a mechanism to assist the implementation lean healthcare tool. On the contrary, there is a significant gap in the

implementation of performance improvement systems measures, which is almost all, confined to literacy of Total Quality Management (TQM) initiative (Arawati, 2005; Pinho, 2008), and up to now, limited studies in the lean healthcare initiatives link the healthcare performance.

### **3. Purpose of the study**

The aim of this study is to investigate the structural relationship analysis the lean healthcare practices, quality improvement effort, and performance improvement measurement (see figure 1). However, the most important of this study to develop LHPI tool for Malaysian healthcare industry using Analytical Hierarchy Process and Excel based system. A set of assessment measurement and LHPI tool is expected to be suitable to their characteristics and improve their competitiveness, business performance, and achievement of business excellence operation in Malaysian healthcare industry.

#### **3.1 Research Questions**

1. Does the measurement items of lean healthcare practices, quality improvement efforts on performance improvement system for Malaysian healthcare industry?
2. How to develop and validate LHPI tool for Malaysian healthcare industry?
3. How to develop a software-based tool by using PHP and MySQL LHPI tool for Malaysian healthcare industry?

#### **3.2 Objective (s) of the Research**

1. To verify the measurement items of lean healthcare practices, quality improvement efforts on performance improvement system for Malaysian healthcare industry.
2. To evaluate for develop and validate LHPI tool for Malaysian healthcare industry.
3. To evaluate a software-based tool was develop by using PHP and MySQL LHPI tool for Malaysian healthcare industry.

### **4. Methodology**

The aims of this study are develop and validate LHPI tool for healthcare industry to improving hospital services and performance. Researcher proposes to conduct this research within 36 months. Researchers also suggest healthcare industry in Malaysia (133 Malaysian government hospital) as the sample of this study. As for research method, a survey will be employed to see the cause and effect through analysis. Researchers propose to use validate case study as it is relatively considered as the most economical among methods available for data collection especially in term of cost, time saving, and approach. Moreover, by using validation case study methods, it can clarify the question for survey respondents, and able to perform efficient data collection by recording their responses. The following section describes the method that will be employed in this research. Author proposes three phase of research activities. The first phase is the critical literature review. In the second phase, the research activities focus on data collection. The input data will be analyzing using SPSS and AHP software (Choice). Next, discussions and implications of the results will be presented and a suggestion for improvement

will also be discussed. Finally, the author provided conclusion and recommendations for alternative process structure based on research finding

## **5. Conclusion**

In the present day, to concentrate on quality improvement effort and performance improvement measure issues of values as far as lean healthcare practices is concerned. The philosophical aspect of looking at values should be complemented with more field research. The issue of lean healthcare valued could be addressed in the most practical way possible.

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