

Sustainability through Lean Healthcare and Operational Performance in the Private Hospitals: A Proposed Framework

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ABSTRACT: *The Strategy Canvas in the Eleventh Malaysia Plan is targeted on the implementation of management strategies to improve the efficiency of organizations. This effort includes the healthcare industry as private hospitals thrive to deliver better service to Malaysia's growing population. To achieve a desired outcome, the lean management methodology will be implemented to enhance efficiency while optimizing resources by improving work processes in an organization. The implementation of change has to be executed as statistics on numbers of private hospitals has shown significant fluctuation. This indicates on the possibility that there are factors affecting the operations of private hospitals which may place their profitability in a vulnerable state. A main concern for private hospitals are on how they manage unnecessary waste in the organization. Therefore, the researcher will look closely into how lean healthcare practices and operational performance could lead to sustainability in private hospitals by taking into account the triple bottom line; that is financial, social, and environmental elements. A conceptual framework will be presented in this paper with the hope that this research will be extremely insightful for the service sector, specifically for healthcare organizations who are looking into improving their organizational performance and maintain sustainability.*

KEYWORDS– *Lean health care, operational aspects, sociotechnical aspects, operational performance, sustainability, and private hospital*

1. Introduction

The Malaysian Ministry of Health stated that sustainability issues related to increase in cost is a notion supported by healthcare provider [1]. Increase in operational cost is often a factor in the failing to sustain and improve private hospitals' services due to waste incurred [2]. As reported by the Kaiser Family Foundation [3], hospital charges, fraud, and waste are seen as the main reasons for rising healthcare costs. Therefore, it was proposed that in order to minimize expenditure and any rising costs related to healthcare, healthcare providers need to consider reducing waste which will ensure the sustainability of their organizations [4].

Wastes from healthcare institutions can be classified into the following types; clinical waste, radioactive waste,

chemical waste, pressurized containers, and general waste [5]. In addition, eight types of waste has been identified which included transportation, inventory, motion, waiting, overproduction, over processing, errors, and talent management [6]. These classifications were introduced by Taiichi Ohno at Toyota in the 1940s, where seven types of wastes were discovered within the manufacturing sector [7]. Subsequently, a research conducted by the Malaysia Productivity Corporation, or MPC [8], summarized issues and challenges that affected twelve Malaysian private healthcare providers that led to waste as depicted in Table 1.

Table 1 *Types of Wastes Occurred in Malaysian Private Healthcare Organizations*

Original wastes	Private healthcare issues
Waiting	It takes time to resolve certain issues due to requirement of having it made in official writing.
Overproduction	Tonnes of paperwork required to fulfil a request, such as certified copies of reports.
Errors	Requirements' revisions that were done without any communication and information given.
Waste of talent	The deficiency of experienced and skills among nurses. Restricted from employing foreign nurses to focus on hiring unemployed graduates.

Source: MPC [8]

Therefore, a lean approach was suggested for the healthcare sector which will support a continuous quality improvement in waste reduction, since other transformational approaches such as six sigma, total quality management (TQM), and business process re-engineering seemed to produce less desirable results in

sustainability, as proven in the United States (US) and United Kingdom (UK) healthcare systems [9]. Similarly, in the opinion that the adaptation of lean healthcare approach accompanied with sustainability will lead to continuous improvement towards perfection in the sector seems ideal especially in developing countries [10],[4]. The implementation of lean healthcare will assist organizations to eliminate waste which is perceived as one of the best practices to accelerate productivity growth [11].

1.1 Problem Statement

Limited research has been conducted on how lean healthcare enables achievement in sustainability within healthcare organizations which also include three main pillars; economic, social, and environmental. Past study has revealed there are relationship between lean healthcare and financial performance. However, unfortunately the study did not cover the social and environmental performances aspects [12]. In order to attain sustainability in healthcare performance, it is clearly stressed that economic, social and environmental performance are needed to be equally utilized as measurement in efforts to enhance the quality of service in healthcare organizations [13],[14].

Previous studies have found that lean practices also improved operational performance in the service sector with results indicating that technical aspects in lean service positively effects operational performance [15]. Looking into the healthcare sector, it is said that lean principles are capable of increasing operational performance by reducing costs and lead times, provide high quality service, increased safety, and high morale [16].

Social aspects of lean service too proved to have a positive relationship on operational performance [15]. Sociotechnical in the context of teamwork [17] and leadership [18],[19] are capable in improving operational performance. On top of that, dimensions of operational performance have been addressed by a myriad of scholars based on purpose of study specifically in the healthcare sector yet still fragmentary. [20]. Indeed, it has been anticipated that operational performance dimensions should emphasis on multiple dimension rather than separate dimensions [21]. The findings have exposed studies on relationships between lean healthcare practices (operational aspects and sociotechnical aspects) with operational performances limited specifically to private hospitals.

This study, therefore attempts to investigate the relationship between lean healthcare practices, operational performance and sustainability in private hospitals.

1.2 Research Objectives

RO1: To examine the relationship between operational aspects and sustainability in private hospitals.

RO2: To examine the relationship between sociotechnical aspects and sustainability in private hospitals.

RO3: To examine the relationship between operational aspects on operational performance in private hospitals.

RO4: To examine the relationship between sociotechnical aspects on operational performance in private hospitals.

RO5: To examine the relationship between operational performance and sustainability.

RO6: To examine the mediating effect of operational performance on operational aspects and sociotechnical with sustainability.

1.3 Conceptual model

A conceptual framework has been proposed to explicate the relationship between variables in this study [22]. This framework was developed based on the literature review and two independent variables were identified; one mediating variable and one dependent variable. Figure 1, illustrates the theoretical relationship of sustainability, operational performance, operational aspects and sociotechnical aspects for this study. The independent variables are operational aspects and sociotechnical aspects; operational performance is quantified as mediating, while sustainability as the dependent variable. Thus, understanding lean as a whole is crucial to ensure identification of appropriate tools or practices by the organization for application to enable fulfilment of customer's satisfaction.

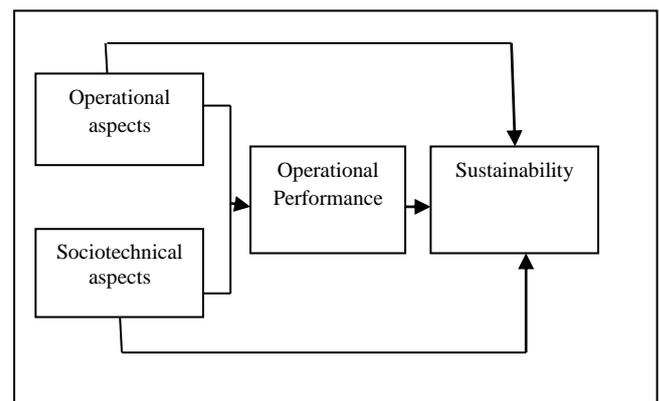


Figure 1
Conceptual Framework of the Study

1.4 Scope of study

This study specifically investigates the influences of lean healthcare practices, namely the operational aspects and sociotechnical aspects as well as operational performance which effect sustainability within the financial, social and environmental contexts. The participating respondents in this research will include licensed private hospitals in Malaysia listed under the Department of Medical Practice, Ministry of Health Malaysia (MOH).

2. Literature Review

2.1 Operational Aspects and Sustainability

The implementation of lean and sustainability performance in the manufacturing context is interconnected [23]. For instance, it has found that the involvement of workers and cross-functional executive positively associated with the strategic alignment of lean manufacturing bundles; (Just In Time (JIT), Total Quality Management (TQM), Total Preventive Maintenance (TPM), and Human Resource Management (HRM)) and sustainability (social and environmental) [24]. Meanwhile, research on economics sustainability has resulted significant influence on lean manufacturing to improve firm performance [25]

Conversely, to witness those relationships interlinked in the healthcare setting seems to be ambiguous except in the context of exploring on the level of awareness [10], the integration of lean TQM model [26], typology of lean implementation [7], the evidence of lean system [27] and developing strategies and leaders [28]. However, a prior study indicated that kaizen blitz as one of the operational aspects in lean with having positive impact on the sustainable performance in the healthcare industry [13]. In contrast, insignificant relationship was found between technical aspects of lean service and financial performance but not in the context of social and environmental performance [15].

Lean 5S also provides a powerful process tool to convince various types of organizations to achieve sustainability [26]. Consequently, it has revealed lean tools in healthcare such as 5S, continuous improvement, waste elimination, 5 why's, VSM and types of waste properly managed led to a sustainable organization [10]. Thus, it can be confirmed that there is a dearth in research to observe the direct relationship between operational aspects and sustainability.

2.2 Sociotechnical Aspects and Sustainability

Sociotechnical in lean practices is of utmost importance since previous studies were found less concerned in highlighting human factors to support operational or technical aspects in the healthcare sector [29]. A study has been presented that leadership, top management involvement and commitment were the main criteria to attain environmental sustainability in the public healthcare organization [30]. Unfortunately, the research did not focus on social and economic of sustainability. However, previous empirical research has found positive impact between social bundle in lean service and financial performance [15]. On top of that, another findings discovered that the achievement of sustainability can be derived from the implementation of lean in the aspect of training, providing good reward and effective communication [31].

Inverse result exhibited had showed that implementation of lean was not a contributor of sustainability in the Swedish psychiatry healthcare based on sociotechnical

analysis [32]. Sustainability was measured in the context of role clarity, goal clarity, learning and participation which revealed that the socio-technical of lean was not sustainable in the psychiatry division [32]. While, in addition, past study had established strong leadership and effective communication as an important element to achieve sustainability [7].

From the review, it was therefore confirmed that there is lack of evidence on sustainability and lean healthcare in the sociotechnical aspect as seen from previous studies. Furthermore, the usage of sociotechnical terms is varied with different theories. Therefore, it is important to investigate the relationship between sociotechnical aspects and sustainability in the Malaysian context.

2.3 Operational Aspects and Operational Performance

Operational performance has been viewed as the crucial element to witness significant relationship between managerial level and operations [33]. Moreover, fewer studies have proven that lean healthcare practices in the operational aspects have direct influence to operational performance. Previous studies have shown, adapting lean helped to reduce operational failures and staffing issues in the healthcare organization which has led to cost reduction [34],[35],[36],[37]. Cost reduction has also been affected in an average length of stay (ALOS) [38], while other study has looked at length of stay (LOS) as positively associated with patient satisfaction [39].

In consistent with the study of certain studies, positive effect was found between lean bundles and technical bundle of lean service towards operational performance in the private hospital and service sector respectively [15],[40]. Meanwhile, practicing lean principles has managed to reduce hospital costs and indirectly improved operational performance [35]. Furthermore, it has been suggested that application of lean management in the healthcare sector as aim to lessen any waste [4].

From the review, it has shown that the relationship between operational aspects and operational performance remain unclear and need to be further examine.

2.4 Sociotechnical Aspects and Operational Performance

Under the Sociotechnical Theory (STS) the focus and attraction is not solely on lean literature, but in a broader perspective moving ahead on the literature of operations management [15]. In other words, this view of STS is to have a better understanding in explaining the impact of performance and modern improvement system to better explain the sociotechnical aspects and operational performance link [15].

Frequent studies placed focus on the operational aspects without putting an attention on sociotechnical aspects [17]. In particular, there is a scarcity of literature on the notion of sociotechnical aspects and operational performance studies. For instance, in the service sector, it has discovered positive relationship between social

bundles in the aspect of motivational factors and operational performance but not in the aspect of human factors [15]. Another study has been directed and it has shown teamwork as one of the sociotechnical aspects which contributed in reducing hours for patient discharge [17]. Besides, effective teamwork is reflected in good communication and leadership between staff and top management.

The element of leadership in the sociotechnical aspect seems to be noteworthy for the organization and is able to improve operational performance as well [18],[19].

2.5 Operational Performance and Sustainability

Alluding to the extension of Stakeholder Theory, sustainability has gained attention from various companies including the healthcare sector. Attaining sustainability in organizations are a challenge due to strains in meeting the hopes of the whole stakeholders [41]. The model of Toyota Production system (TPS) has highlighted that the main goal is to eradicate waste that comprises quality, cost, lead time and seeing high morale [42] which it undoubtedly focused on operational performance of the healthcare sector. Hence, underneath this theory and model, it is beneficial to enlighten the relationship between operational performance and sustainability.

As far as the researcher's is concern, only few studies have been conducted to explain these variables with results showing ambiguity. For example, it has found operational performance in the healthcare sector contributed to financial performance [4]. Moreover, several companies from different business setting have tremendously shown cost reduction in the organization such as Baxter International [43] and Clorox Company [44] which led to financial performance, but unfortunately not in the non-financial performance. Meanwhile, other studies conducted by preceding studies have substantiated that operational performance contributed to sustainability of financial performance and environmental performance respectively in the manufacturing sector [44],[46].

In addition, quality has taken into account the measurement of operational performance, instead of efficiency and availability [47]. Hence, it is thought that quality can promote sustainability in the long term [48] and will further assist the implementation of lean in the healthcare organization [49]. Nonetheless, it can be seen that past studies were unable to examine the significant relationship between operational performance and sustainability statistically or in short, more studies need to be done in order to investigate these relationships.

3. Methodology

The target population of this study is the private healthcare organizations in Malaysia, especially hospitals. According to the latest report by the Ministry of Health, Malaysia (MOH) as at 31st December 2016, approximately about 187 licensed private hospitals still operate progressively in this country [50].

For the purpose of this study, the sample of licensed private hospital was obtained from the list of Private Medical Practice Control Branch/*Cawangan Kawalan Amalan Perubatan Swasta* (CKAPS) after securing the obligatory support from the Department of Medical Practice, MOH. Thus, probability sampling techniques need to be used as a representative sample of the target population [51].

Indeed, the findings of probability sampling will determine the specified level of confidence. Thus, this study will employ a simple random sampling technique to choose an appropriate private hospital to be the part of the sample by using research randomizer software. The application of this technique is the most basic form [51] which is least bias and offers the most generalizability [22]. Therefore, the total sample size of 118 was a minimum sample based on the Krejcie and Morgan for a population of 170 to 180 [52].

The design of the questionnaire will be prepared and validated by the Subject Matter Experts (SMEs) through content validity using Lawshe's method. This is to ensure that the item of each section is reliable, acceptable and to enable respondents understand the questions without any confusion. Due to the fact that the response rate for unit analysis of an organization is low as demonstrated in past studies [15][27], the researcher has decided to use PLS-SEM with the recommendations of sample size ranging from 30 to 100, compared to CB-SEM generally ranging from 200 to 800 [28]. Therefore, the data collection will be analyzed using SPSS version 23 and SmartPLS 3.0 for the purpose of descriptive statistics and inferential statistics respectively.

5. Discussion

To date, the Malaysia's private healthcare is endlessly evolving and yet continuously grows since the beginning of 90s. The other private facilities and services were also mushroomed massively all over the country especially in the urban area since 1980s [55]. Undoubtedly, it can be seen several accomplishment by private healthcare, such as renowned medical expertise is the best in the region and international reorganization standard has been given to the most Malaysian private hospital [56]. Another impressive effort done by MOH was the integration between public and private healthcare during the tenth Malaysia plan [1]. This initiative collaboration was to reduce the shortfalls occurs in the organization which encompasses outsourcing of medical services, the employment of private specialists, the introduction of full paying patient scheme and the approval of locum practices for MOH doctors [1]. Indeed, the challenging issues of this integration need to address wisely, especially in the context of improving health service delivery and restructuring the healthcare financing.

Despite to increase global competitiveness, the transformation of private healthcare necessarily needed to ensure the performance is sustainable, because ten percent is targeted for annual growth rate in revenue for private healthcare [57]. This was aligned with the Eleventh

Malaysia plan, as to see the level of productivity in the healthcare sector is to stay ahead of the curve. For instance, the introduction of lean practices in the private healthcare has successfully streamline the shortened waiting time among patients and increased the financial sustainability in the PDSH Kota Bharu [57]. Instead, lean practices focus to optimize efforts in managing health resource and enhance patient satisfaction. Therefore, private healthcare is presently moving forward to reframe and strengthen the engine of economic growth and moreover, as to determine long term sustainability in the future [58].

6. Conclusion

Lean was the most essential word for any organization in this present world [26]. Lean also has made the organization doing more with less, but how far lean can contribute to sustainability which this study intend to investigate on the subject of relationship of lean healthcare practices; operational aspects and sociotechnical aspects on operational performance and their impact on sustainability in private hospitals. The idea of this study was derived after identifying the fragmented and discrepancies result of past studies. Thus, it has led the researcher to conduct this study with the aims to bridge the gap strategically.

6.1 Limitations

Only a limited number of private hospitals in Malaysia are found to have implemented lean healthcare practices, especially in the operational aspects that comprises of practices such as *kanban*, VSM, and JIT, among others. These hospitals place focus on the quality aspect as their key performance index (KPI) to measure performance and excellence. The researcher may face difficulty in obtaining data as the researcher would need to interact with the managerial level who is able to comment on lean healthcare and sustainability of the organization. Lastly, respondents may require some time to return the questionnaire when dealing with the managerial level and as a consequence, low response rate could possibly achieve.

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