

## RESEARCH ARTICLE

# THE ROLE OF LEAN SIX SIGMA IN BOOSTING COMPETITIVE ADVANTAGE IN THE GOVERNANCE OF HEALTHCARE ORGANIZATIONS: A CONCEPTUAL FRAMEWORK

Suzan Al-Najjar\* and Suzari Abdul Rahim

Graduate College of Business, Universiti Sains Malaysia, Penang, Malaysia

**ABSTRACT** - This study aims to present a conceptual framework that brings together reward and recognition, and customer focus (organizational factors), which can help organizations achieve a competitive advantage (CA) through applying Lean Six Sigma (LSS) in healthcare. A critical review of the models of reward and recognition, and customer focus, LSS, and CA measures was performed to create the conceptual framework. A synthesis of the existing literature provides the basis for the development of the conceptual framework of the LSS measures. The independent variables are reward and recognition, and customer focus. The mediator variable in this framework is LSS, and CA is employed as the dependent variable. The framework offers a systematic method of evaluating the determinants of LSS in healthcare. Accordingly, the newly developed conceptual framework identifies and describes the direct associations between organizational factors and CA in the healthcare (HC) sector and the indirect associations through LSS. This study is important for professionals working in HC seeking to achieve CA in hospitals. Additionally, this study is valuable to researchers and academics working in the LSS field as it explores the importance of LSS implementation in hospitals. In addition, limited studies have been conducted to explore the status of LSS implementation in HC and this study is expected to provide theoretical contributions to the LSS approach in healthcare.

**ARTICLE HISTORY**

Received : 15-6-2023  
Revised : 8-9-2023  
Accepted : 14-9-2023  
Published : 30-6-2024

**KEYWORDS**

LSS  
*Competitive advantage*  
*Reward & recognition*  
*Customer focus*

## INTRODUCTION

The healthcare (HC) sector is the world's largest and fastest-growing industry, as the number of competitors is rapidly increasing. As a result, it has become more challenging to control service cost, quality, productivity, and patient satisfaction among emerging sector (Hundal et al., 2021). Likewise, the HC industry is hoping to improve medical services, which poses a significant barrier to enjoying medical tourism's competitive advantage as a prominent force among emerging markets and developing countries (Bhat et al., 2019). Furthermore, the HC sector faces a number of challenges, as patients demand excellent-quality services at affordable prices. These challenges include long waiting times, low productivity, inefficiency, demoralized staff, and low patient satisfaction (Noronha et al., 2021), inflation and intense competition, patients demanding superior medical care at an affordable price, patient safety, and medication error costs. Any error is likely to significantly affect the patient's quality of life (Limpanyalert, 2018). To overcome these challenges, HC organizations should improve the quality of patient care, patient safety and service quality while reducing operational and financial costs. Thus, improving the quality of medical care services has become a primary concern for patients and care givers (Bhat et al., 2020). To provide quality service to patients, quality-improvements tools have become increasingly essential in hospitals for the purpose of satisfying, motivating, and retaining patients. Consequently, HC providers who fail to acknowledge the importance of delivering service of a high quality and enhancing patient satisfaction might lose their patients, which is a critical challenge to which all HC organizations are exposed (Bhat et al., 2020). This situation forces HC managers to work in a context of competitive pressure, to improve their operations and deliver high-quality HC services at the lowest costs and with the most effective usage of resources. Hence, HC organizations worldwide uniformly employ quality-improvement tools to enhance HC quality performance and achieve a competitive advantage (CA) (Gonzalez-Aleu and Van Aken, 2017; Siagian et al., 2021). However, HC professionals must participate efficiently and effectively when quality-improvement methods are introduced into their regular work activities and focus more on learning new ways to provide services at lower costs and to higher standards, to satisfy patients' needs (Dobrzykowski et al., 2016; Chang et al., 2020). Today, LSS is one of the most popular and effective business strategies for enabling continuous improvement in a number of industries (services and manufacturing) to enhance performance, operational excellence, achieve the desired quality goals, and establish a sustainable CA (Antony et al., 2019). Firstly, to achieve the above-mentioned goals, HC organizations should reduce medication errors to zero, as any error would immensely affect patients' quality of life and adopting cross-industry practices such as LSS has been observed to be an effective business strategy to reduce the errors and wastages in the system, and to enhance its value. In the HC sector, LSS has been applied to improve the care services provided to patients and enhance patients' satisfaction

through quality performance and services (Bhat et al., 2020). Recently, most quality practitioners have recognized the importance of applying LSS in the HC industry. In particular, LSS can help ensure the success of HC organizations by improving a number of crucial areas, such as patient waiting time and delivery of medical test reports, in addition to eliminating superfluous medical costs (Antony et al., 2019). Moreover, the LSS methodology helps HC organizations create a culture of CI in HC, to guarantee rigorous results in a felicitous manner (Wang et al., 2019; Antony et al., 2019). Ultimately, HC organizations hope to create a sustainable CA by seeking opportunities to implement new quality approaches such as LSS because of its effective role in improving quality performance and achieving competitive advantage. However, while there have been some attempts to improve the understanding of such variables in previous studies, these studies have the limitation that LSS was not explicitly defined. Consequently, there is a need to conduct further studies to build upon the existing knowledge of the relationship between LSS and competitive advantage.

The main objective of the current paper is to create a conceptual framework for the implementation of LSS encompassing organizational factors and competitive advantage. In contrast to other research on the same topic, the current approach hopes to identify “what” dimensions of LSS practices exist in the HC sector by consulting previous studies of the dimensions of LSS practices in HC. In addition, the current study aims to identify the possible advantages of this interaction, which could justify “why” LSS should be applied in HC, to verify what results can be generated from the implementation of LSS in HC. For the purposes of answering the above-mentioned questions and achieve the research objectives, the current study is as follows.

## LITERATURE REVIEW

The HC sector began to progressively apply the LSS approach more than 20 years ago to achieve many purposes, such as a reduction in medical errors, improvement in the quality of patient care, and improvement in the levels of safety for patients and care givers. These lead to enhanced quality performance, operational excellence, and help achieve a sustainable CA (Alblooshi et al., 2020; Antony et al., 2012). Furthermore, LSS helps to minimize variation, reduce waste, eliminate unnecessary processes, and reduce waiting times between value-added activities to enhance quality which helps, accordingly, hospitals to gain a sustainable CA (Ahmed, 2019). Furthermore, focusing on satisfying patients’ needs has been an essential motivator for the implementation of various quality initiatives, such as LSS, throughout the HC industry (Zakuan, 2009; Sim et al., 2022). This has led organizations to focus more on the opinions of their patients, fulfill patients’ needs and expectations (Citybabu & Yamini, 2022; Sodikoglu & Zehir, 2010), and predict patients’ demands (Shah & Ward, 2007). Besides focusing on patients, a reward system is a motivational tool to enhance employee engagement and recognize employee efforts related to LSS implementation, making it more efficient and effective. Anthony and Banuelas (2002) mentioned that linking LSS to employees is vital for LSS, in that promotion and compensation should be connected to LSS commitment and its successful implementation.

### Theoretical Perspective of the Study

Contingency theory offers a theoretical lens through which to explain how an organization can customize quality practices and, subsequently, present performance variation (Zhang et al., 2000). Likewise, empirical literature analyzing internal determinants of competitive advantage tends to be oriented toward the resource-based view (RBV) approach and maintains that a hospital’s competitive advantage is determined by corporate administration. On the other hand, organizational factors (rewards system and patient focus) are justified by contingency theory, which states that companies should be aware of both external and internal environmental factors in order to develop and prosper (Beleska-Spasova, 2014). Furthermore, Ferdousi et al. (2019) recently confirmed that RBV theory and contingency theory effectively explain the association between CA and organizational factors. Consequently, building upon previous discussions, this study will contribute theoretical and empirical insights into the available literature by creating an integral model that builds upon contingency theory and the RBV of hospitals. The theoretical framework includes two organizational factors—reward and recognition, and patient focus—to determine their effect on CA directly and indirectly through LSS. This analysis focuses on the importance of studying these factors’ mediating effects, during attempts to prosper and compete in a competitive market, within the context of the literature on HC.

### LSS in HC services

The current study defines the LSS approach through key six determinants: Six Sigma, Lean system, Continuous quality improvements, Value-added activities, Teamwork, and Patient safety (Zu et al., 2008; Shah & Ward, 2007; Kaltenbrunner et al., 2017; D’Andreamatteo et al., 2015; Malmbrandt & Åhlström, 2013; Ahmed et al., 2018).

#### Six Sigma

Desai et al. (2015) defined SS as a “methodology having a statistical base focusing on removing all causes of variations or defects in the product or core business processes”. Furthermore, Yadav et al. (2020) added that SS is a methodology which is particularly focused on the bottom line and process improvement projects. The SS methodology includes numerous strong statistical tools, in addition to analytical techniques, to determine the effectiveness of the quality-improvement process in HC organizations, such as failure mode and effect analysis, the Kano model (according to its founder professor, Noriaki Kano), critical-to-quality metrics, process Sigma measurements, defect measures, and old quality measures such as process capability, statistical processes, control charts, check sheets, histograms, Pareto charts, and root cause–effect. Moreover, SS includes effective approaches for process improvement such as DMAIC (Design-

Measure-Analyze-Develop-Control) and DMADV (Design-Measure-Analyse-Develop-Verify), which are applicable to different management instruments and techniques, in addition to the Design for Six Sigma (DFSS) approach, which primarily focuses on continuously improving projects in HC organizations (Zu et al., 2008).

### **Lean System**

The lean system has its roots in the Toyota Production System, which was later characterized as “lean” as it requires fewer resources to produce numerous products with the least waste possible. The lean approach focuses on identifying value from the consumer’s perspective by excluding, from processes, activities that do not serve consumers’ demands (Womack & Jones, 2003). Thereafter, deploying lean tools became favored by HC leaders due to their potential to combine cost reductions with patients’ HC requirements and meet these requirements through reducing costs and prices, increasing the effectiveness and efficiency of the delivery of medical services, and identifying waste areas to eliminate any step that does not provide value to patients (Ahmed et al., 2018). Furthermore, lean initiatives improve HC in various ways by applying different tools and initiatives such as the *5S practices*: sort, set, shine, standardize, and sustain (Yusaf et al., 2013). These practices are essential to organizing spaces so work can be performed efficiently, effectively, and safely. In the same vein, *the Kaizen* method is a lean initiative which refers to all types of activities that continuously improve all functions and processes and involve all kinds of employees, from top management to non-managerial levels, to work together proactively to achieve regular and incremental improvements in processes. Poka-Yoke is another lean initiative which is focused on mistake-proofing, by designing a method or mechanism in a process to perform error detection, to achieve zero defects through avoiding (Yoke) mistakes (Poka) (Ahmed et al., 2018). Similarly, Just In Time (JIT) is a prominent and effective tool in the HC industry due to its effectiveness at eliminating waste and reducing the waiting time in processes, in addition to improving employee motivation, which impacts the service quality in HC organizations (Cerfolio & Ferrari, 2019). In addition to previous discussions, value stream mapping (VSM) is a simple activity which maps all the product- and service-related steps involved in a company’s processes. The process might include Finance and Accounting, Human Resources, Customer Service and Production. The core idea is to map the flow of material starting from acquiring raw material from suppliers to providing finished goods to customers. Finally, process mapping can also help caregivers eliminate irrelevant elements in processes by adapting numerous tools, such as flow charts and process maps, in order to further examine quality-improvement processes in healthcare (Williams et al., 2017).

### **Patient Safety**

Simsekler et al. (2018) described patient safety as a climacteric matter in HC, which forces HC systems to prioritize building systems to provide high-quality services. Indeed, patient safety is critical in HC as it severely impacts patients’ lives. However, according to Kurutkan et al. (2015), system-related medical errors cost HC organizations significantly in terms of human and financial costs. Furthermore, Simsekler et al. (2019) added that HC organizations should also focus on preventing the occurrence of medical mistakes, learning from previous errors, and consequently building a strong culture of safety which serves HC providers and patients. Hence, enhancing patient safety requires the adoption of proper quality-improvement tools. However, HC processes should be adequately designed and defined and contribute to lower waiting times without patient delays (Gurses & Carayon, 2007). Thus, it is crucial, in HC, to employ proper quality-improvement tools which help HC providers and managers prevent adverse events by reducing errors. According to El-Jardali et al. (2014), it is essential that HC organizations incorporate patient safety into their corporate culture, thus proactively enhancing awareness of patient safety through focusing on the need to reduce medication errors. Indeed, the LSS approach has been applied in HC to reduce medical mistakes, improve the quality of services provided to patients, and improve patient safety (Ahmed et al., 2018).

### **Continuous Quality Improvement (CQI)**

CQI is an ongoing effort, a systematic and formal approach, to enhancing all elements of an organization—whether related to processes, tools, products, or services—and to evaluate and improve performance. However, the most important point is that these improvements should be frequent, consistent, and continuous, whether they are big or small. CQI is the process of collecting data about a particular practice or service to benchmark performance, track and validate indicators that affect outcomes, and recognize problems in processes and management. Therefore, as mentioned by Sollecito and Johnson (2011), CQI is a process improvement approach which adopts an overall-systems perspective, which considers an organization’s strategic objectives and contributes to a culture of quality. The most widely used tool for such improvement is Plan–Do–Check–Act (PDCA) (also known as the Deming cycle), which establishes four steps to solve problems related to business process improvements. PDCA is a cycle used by firms engaged in continuous improvement to train their employees in problem-solving.

### **Value-added Activities (VAA)**

The core target of LSS is to evaluate decisions regarding future with the aim of creating more value for individuals and societies, which is what all organizational levels are striving for (Alblooshi et al., 2020). From an HC perspective, VAA can be defined as all actions taken to increase the benefits of a patient’s service. Moreover, Womack and Jones (2003) defined VAA in service organizations as how service providers deliver the exact needed and customized product or service in the least time, from when the customers demand the product to the delivery time. In addition, this product should be provided at an affordable price by reducing all types of waste. Waste can be defined as any activities that do not add any value to the services or goods from the customers’ or patients’ perspective. Indeed, waste might include

product defects, unnecessary logistics, or waiting time. Furthermore, service providers should focus on patients by clearly defining their needs, eliminating costs, enhancing the efficiency of the delivery of medical services, and identifying waste areas to eliminate anything that does not add value for patients (Hagan, 2011). Therefore, as mentioned by Joosten et al. (2009), the time required to deliver a service can be categorized as either VA time or non-VA time. VA time focuses on reducing the patient waiting time for services and how providers can manage time appropriately throughout the delivery process. In contrast, non-VA time is a type of waste, which negatively impacts customer satisfaction, retention, engagement, and loyalty.

### **Teamwork**

Teamwork concerns collaboration between a group of people who share complementary skills and aim to achieve specific objectives in an effective and efficient way (Tjosvold & Tjosvold, 2015). From a quality perspective, developing teamwork in HC ensures high quality and safety. Moreover, Leong and Teh (2012) identified many features of effective teamwork, such as increasing value, trust, and respect among members, in order to solve organizational issues. According to Daft (1998), establishing proper and effective teamwork can solve problems of quality. El-Jardali et al. (2014) concluded that in order to develop effective teamwork in an HC organization, cooperation between the departments of hospitals is required to deliver care services to patients. The successful implementation of LSS projects requires many factors, such as collaboration and cooperation between departments, specific expertise, creating new and creative solutions, and developing innovative ideas. Everyone benefits from the success of LSS projects and, therefore, all team members should be involved and collaborate. LSS requires an organizational culture that supports teamwork, flexibility, and risk-taking, which are the exact requirements for innovation. Ultimately, Linderman et al. (2006) concluded that if teams follow the Define–Measure–Analyze–Improve–Control (DMAIC) approach and are committed to performing each step, challenging objectives can be achieved. Hence, the performance of the project can be improved.

### **Competitive Advantages (CA)**

CA has been defined by many scholars from a variety of perspectives. For example, Barney (1991) described CA as a reflection of an organization's unique resources which differentiate it from its competitors. Later, Freiling et al. (2008) mentioned that organizations with valuable, rare, superior, and complementary resources and capabilities may use these to distinguish themselves from their competitors and, accordingly, achieve CA. Moreover, Sila (2007) added that the successful implementation of TQM enhances the quality of a product, eliminates different types of costs, contributes to the timely delivery of products, and eliminates time wasting, therefore, helping in the gaining of CA. Moreover, Kaur et al. (2019) described CA as playing a pivotal role in enhancing an organization's reputation in competitive markets, making it unique and more successful at accumulating new resources by utilizing available resources. More recently, Ariga et al. (2022) emphasized that a CA is the difference between an organization and its competitors which adds value to customers. An organization's own unique value distinguishes it from other companies in the same sector. These values include a lower cost structure or highly specialized expertise.

In addition to the above definitions of CA, many scholars have evaluated the relationship between quality management and competitive advantage. For example, organizations seek to gain CA to achieve long-term success based on the differences between competitors in quality strategy, costs, flexibility, and innovation (Anning-Dorson, 2018; Knight et al., 2020). Furthermore, Flynn et al. (1994) highlighted that quality management is difficult to imitate as quality-management activities continuously enhance the performance of organizations. However, previous studies concluded that quality management can be a source of CA within the context of the resource-based view (RBV) of organizations (Yunis et al., 2013). RBV theory addresses the proper usage of organizational resources to achieve sustainable CA (Lestari et al., 2020). Of equal importance, according to Cho and Linderman (2020), within the context of RBV, innovation can help achieve CA through appropriate investment in human, technical, and financial resources, thus enabling organizations to develop creative ideas and turn them into tangible innovations. Furthermore, RBV focuses on the role of quality management which combines complementary management practices related to enhancing the performance of a business through enhancing revenue, reputation, productivity, and, consequently, CA (Deming, 1982). Likewise, service firms, in general, and HC organizations, in particular, are very much concerned with gaining a sustainable CA, as the HC industry has shifted away from its traditional business models. Indeed, increasing competition has made HC organizations more market-oriented and helped them to face the radical redesign of their processes and strategies to achieve favorable economic results. To be specific, HC organizations are facing increasing pressure to enhance patient care with the least usage of resources and ensure the maximum utilization of resources in an effective and efficient way (Wang et al., 2019). Moreover, Bharadwaj et al. (1993) created a contingency model of sustainable CA for service organizations, which leads to improved performance and patient satisfaction, in which the core sources of CA are illustrated along with barriers to the imitation of service-companies' characteristics. In addition, Sekhon and Kennington (2001) concluded that sustainable CA in HC organizations must be derived from superior service quality. Thus, there are five essential factors required to garner the sustainable CA of HC organizations, based on Epetimehin (2011): "creativity and innovation in pricing, promotion, distribution, and technological innovation".

### **Conceptual Framework and Research Hypotheses**

Based on the literature review, the current study proposes a theoretical framework to be tested empirically. The proposed framework is extracted from the available literature addressing the hospital context. The current study

contributes to the existing literature in extending the knowledge of HC circumstances. The research framework of the present study is based on the RBV and contingency theory. The RBV posits that a company's performance depends on the optimal acquisition and proper utilization of a company's unique resources (Barney, 2001). Moreover, the RBV states that such resources enable organizations to practice specific behaviour that could lead to enhancing their performance quality. Runyan et al. (2007) mentioned that the medical staff who implement business strategies using their valuable resources constitute the foundation of CA. Figure 1 depicts a model which focuses on two independent variables (reward and recognition, and customer focus), one mediator variable (LSS), and includes the dependent variable competitive advantage. Hence, the current research developed a conceptual framework and hypotheses based on previous studies (Zu et al., 2008; Kaltenbrunner et al., 2017; D'Andre Matteo et al., 2015; Ferdousi et al., 2019; Ahmed et al., 2018). Figure 1 depicts the conceptual framework of the study, which includes seven hypotheses. These hypotheses, and the relationships between the research variables, will be examined in the subsequent sections of this paper.

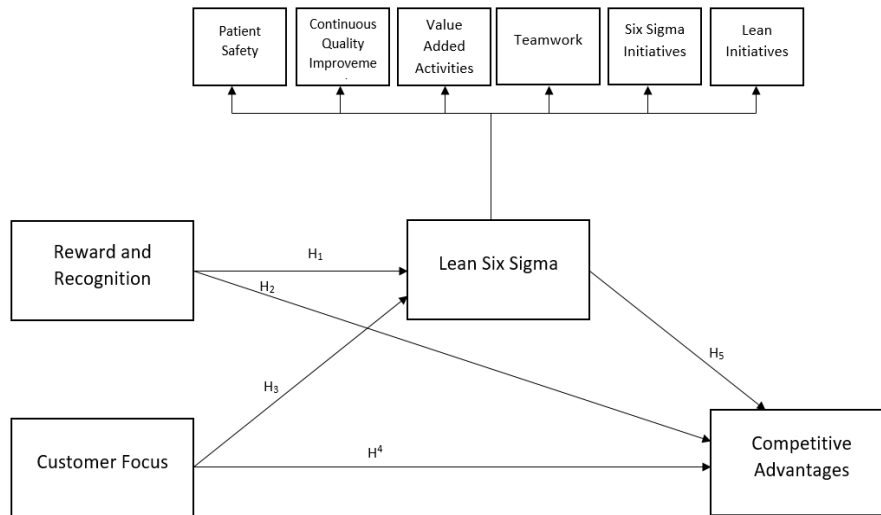


Figure 1. Sample conceptual framework

Based on the framework, the present study develops five hypotheses to measure five direct relationships. The first two hypotheses measure the direct relationship between reward and recognition with LSS (H1), and reward and recognition with CA (H2). The third hypothesis measures the direct relationship between patient focus and LSS (H3), the fourth hypothesis measures the direct relationship between patient focus and CA (H4), and the fifth hypothesis concerns the direct association between LSS and CA. Moreover, the present study also includes two indirect hypotheses to measure the indirect relationships between variables. The hypotheses measure the indirect relationship between reward and recognition (H6) with patient focus (H7), and CA through LSS. The following subsections describe the associations between the variables utilized by this study.

## The Relationships Between Customer Focus and Reward and Recognition with LSS

### Customer Focus

Building close and strong relationships with consumers is crucial to identifying customer requirements and obtaining feedback which can be utilized to enhance the quality of products and services. In the early 2000s, Zhang et al. (2000) concluded that companies should focus on customers because of their effectiveness in applying any quality-improvement tools such as LSS. Furthermore, Rahman and Bullock (2005) added that CF improves quality, delivery, performance, and productivity. Moreover, Khan (2003) found a significant relation between CF and product quality improvements through eliminating both internal and external failure costs. Likewise, Arumugam et al. (2008) revealed the significant relationship between CF and quality-improvement tools. Moreover, CF is one of the critical factors that impacts the effectiveness of LSS application, which is a customer-oriented approach that affects all organizational levels to achieve customer satisfaction (Anthony & Banuelas, 2002). Thus, previous studies suggest a significant relationship between CF and LSS. Indeed, Anthony and Banuelas (2002) included relating LSS with consumers as a significant factor identified from previous studies. Bhat and Sharma (2021) included customer focus as one of the three key areas that are critical to the success of LSS. Schwartz (2008) offered an example of the implementation of LSS by focusing on fulfilling consumer needs to improve units companywide. Moreover, Desai et al. (2015) conducted a study in Indian industries and rated "linking LSS to customers" as the second most crucial factor for success. Habidin and Yusof (2013) mentioned that LSS should be linked to patients to identify their needs and wants, and implement projects that can enhance their satisfaction. This study is interested in the HC industry because the quality of provided care services and the daily interactions between both medical and non-medical staff and patients determine whether patients live or die. Hence, HC organizations must satisfy patients' needs and exceed their expectations. Finally, as mentioned by Chakrabarty and Tan (2007), CF is among the most effective factors for guaranteeing the success of LSS programs by helping HC companies to develop and build long-term relationships that meet patient needs. Therefore, the first hypothesis is:

*H1: CF has a significant influence on LSS*

### **Reward and Recognition**

According to Zhang et al. (2000), quality-improvement initiatives should be linked with reward systems to help improve quality. A rewards and recognition system enable leaders to be aware of the quality-improvement efforts of employees and provide rewards accordingly. Thus, in line with Brown and Lam (2008), who maintain that a benefits system that is aligned to quality and customer satisfaction facilitates organizational quality initiatives, developing a rewards system may facilitate the application of quality-improvement tools. Specifically, a rewards system should be connected to quality performance because of its effective role in motivating and enhancing employee commitment to quality-improvement tools (Das et al., 2000). Additionally, there is a strong association between quality-improvement tools' implementation and the provision of financial incentives such as upgrading insurance, increment increase, special increment increases, bonuses, promotions, and non-financial incentives such as employee appreciation (Zhang et al., 2000). In particular, to improve the performance and morale of employees in healthcare, a rewards system is a vital motivational tool. Moreover, for Jeyaraman and Teo (2010), an effective rewards system is one of the major factors that can affect the successful implementation of an LSS program, as it motivates and encourages the involvement of employees in cultivating an LSS culture. This rewards system should be aligned with LSS targets and objectives (Hendricks & Kelbaugh, 1998). Indeed, Vaishnavi and Suresh (2020) mentioned that having a good rewards system helps employees to adapt to LSS and assimilate it into the working environment and determines the nature of improvements undertaken. Moreover, to increase the commitment to LSS implementation, companies should celebrate the successes of LSS in addition to having an appropriate rewarding system to incentivize employees who successfully implemented LSS objectives. Likewise, Vaishnavi and Suresh (2020) mentioned that training and development opportunities, succession planning, fair promotions, and financial and non-financial incentives are examples of reward systems in healthcare which can impact the success of LSS. Hence, a satisfactory reward system connected to an appropriate evaluation system is crucial to evaluating the progress of LSS implementation. Therefore, companies should provide employees with fair incentives connected to their efforts towards LSS and, thus, appropriate communication across the HC units is required to achieve better performance (Shah & Ward, 2007). However, only a few studies have been conducted in HC organizations. Therefore, the second hypothesis is:

*H2: Reward and recognition has a positive influence on LSS*

### **The Relationships between Customer Focus with Reward and Recognition, and Competitive advantage**

#### **Customer Focus (CF)**

Customers are the key concern of any business; thus, companies should effectively respond to changes in customers' needs and requirements to keep customers satisfied (Yusuf et al., 2007). Moreover, Al-Gasawneh et al. (2022) mentioned that CF is particularly important because of its effective role in enhancing brand image, loyalty, and reputation, which may result in increasing sales and profit margins compared with rivals, which can be a source of CA. Consequently, CF is a precious capability which is hard to imitate, and leads to a fast response to changing consumer demand and changes in quality standards. This, in turn, may lead to total productivity in addition to an increase in net income (Bhatt & Emdad, 2010). Indeed, many marketing scholars suggest a significant relationship among CF and CA. For instance, Gunawan (2022) concluded that CF has a strong relationship with overall quality results. Similarly, Douglas and Judge (2001) argued that CF is positively related to perceived organizational performance compared with rivals. In addition, Bhatt and Emdad (2010) showed that there is a significant effect of CF on CA in US manufacturing and service companies. Finally, the main reason for the existence of any organization is produce products and provide services which can fulfil customers' needs, which leads to satisfied, retained, and loyal customers, resulting in a competitive advantage. Therefore, the current study hypothesizes that:

*H3: CF has a positive influence on CA*

### **Reward and Recognition**

According to HR scholars, reward and recognition is crucial in HR strategies as it can motivate employees to develop their abilities, efforts, and performance. A reward system is a form of payment provided to staff for their employees' performance (Madhani, 2022; Silaban & Syah, 2018). Organizations should make significant efforts to satisfy their employees by implementing practices such as meeting their financial and non-financial targets and creating a positive working environment. Furthermore, hiring and retaining qualified employees who have required skills is a key to success in today's competitive markets. Moreover, employees are considered, nowadays, the most important asset in organizations as they are responsible for achieving organizational goals if utilized appropriately. Consequently, employees are a precious, rare, inimitable, non-substitutable resource, thus, a source of CA. Furthermore, Aswathappa (2013) mentioned that reward systems may affect staff living standards and productivity, which results in satisfied employees. Moreover, to improve the performance of employees, organizations should relate objectives with rewards and coaching to performance and aspects of career growth, ultimately creating an integrated process which combines performance management with appraisal. However, organizations nowadays aim to hire the most qualified candidates and getting the best out of staff equals to the performance of employees that is interpreted to organizational performance, thus gaining CA. Furthermore, according to Peters (1992), a dynamic and changeable competitive environment requires companies to

assess and implement services, quality standards, and innovation. A number of empirical studies have been conducted to investigate the effect of reward systems on CA. For example, Handel (2008) agreed that a direct compensation system such as cash commissions, insurance, bonuses, and stock options enhance employee motivation, which leads to satisfied employees. Four years later, Frye (2012) added that a proper rewards system can attract and retain talented employees, which leads to properly achieving organizational goals and gaining a CA. Similarly, Okpara (2004) stated that employee satisfaction is crucial in all parts of organizations, and that they should accommodate promotion, benefit system, supervisors and supervisee support, and evaluation systems. Based on previous discussions, human-resources benefits systems in organizations may enhance the satisfaction, loyalty, engagement, and retention of employees, therefore leading to enhanced organizational performance. Thus, the successful alignment of HR strategies such as reward and recognition may result in an organization's success. In short, satisfied employees may help organizations to gain a CA, as the better the performance of an organization, the more likely it is that a company will achieve a sustainable CA. Therefore, the current study hypothesizes the following:

*H4: Reward and recognition has a positive effective on CA.*

#### **The Relationship between LSS and Competitive advantage**

Currently, all hospitals are competing fiercely to meet quality standards, enhance patient satisfaction and enhance patient retention. Therefore, there is an essential need to introduce new continuous-improvement approaches such as LSS in hospitals. The LSS approach enables caregivers to contribute to a CA by meeting patients' requirements with enhanced effectiveness and efficiency (Sony, 2020). Applying LSS in service organizations leads to efficient and effective processes through both the efforts of employees and utilization of resources to enhance quality performance, leading to the competitive positioning of the HC organization (Laureani & Antony, 2017). Furthermore, by applying LSS in HC organizations, pursuant activities will be coordinated across all divisions to create value for patients and achieve a sustainable CA. Therefore, to achieve a sustainable CA which is hard to imitate, there is a need for an LSS framework to coordinate and synchronize these activities in a strategic manner (Hitt et al., 2016). Thus, imitation by rivals will be difficult. Additionally, effective implementation of the LSS approach links organizational strategy with organizational resources and capabilities, which consequently results in achieving a sustainable CA. Indeed, many scholars have examined the association between LSS and CA and concluded that LSS is a business strategy that reduces waste and minimizes the variation in operational resources and capabilities, which improves quality performance, enhances service quality, and improves patient satisfaction. These, in turn, help organizations acquire the best strategic resources and then optimally use these resources to create CA accordingly (Madhani, 2020). Hence, based on previous discussions, it is believed that the LSS approach has a significant effect on HC competitive advantage. Therefore, the current study hypothesizes the following:

*H5: LSS has a positive influence on CA.*

#### **The Role of LSS as a Mediator in the Relationships between Reward & Recognition and Customer Focus, and Competitive Advantage**

Previous studies have investigated the direct relation between reward systems and patient focus, with CA. Hence, this study aims to contribute to the literature in this area by investigating the role of LSS in this relationship. The mediation relationship between LSS and CA was first established by Hamilton and Chervany (1981) and recently confirmed in a study conducted by Ferdousi et al. (2019), in which it was concluded that the association between organizational factors and CA is indirect through improvements in the administrative processes. Thus, a proper quality procedure is needed to improve the efficiency and effectiveness of organizational operations and quality performance, specifically LSS. LSS is one of the operational-excellence methodologies being applied in the healthcare sector to enhance healthcare quality performance, productivity, profitability, growth, patient safety, and timely service to patients, implement cost reductions, and achieve CA, accordingly, within budgetary constraints (Bhat et al., 2020; Antony et al., 2018; Ahmed et al., 2018; Gijo et al., 2014). In contrast, McDermott et al. (2022) mentioned that a lack of structured quality improvement and clear strategies have prevented healthcare organizations from taking advantage of opportunities and even created additional challenges. One of these challenges is achieving CA, as healthcare organizations nowadays are aiming to develop a sustainable competitive advantage (Bhat & Sharma, 2021). Thus, healthcare leaders and quality practitioners believe that reinforcing the healthcare system and continuously improving the existing quality practices constitute the best solution to addressing the current opportunities and widespread challenges, such as gaining a sustainable competitive advantage (Hundal et al., 2021; Tortorella et al., 2022; Ferdousi et al., 2019).

Moreover, Bhat et al. (2022) mentioned that there are two fundamental strategies required for the effective deployment of LSS in healthcare organizations, namely reward systems and patient focus. The success of healthcare organizations depends upon satisfying employees and customers to achieve a sustainable CA. Companies should focus on employee performance, dedication, perception, and commitment to achieving the organizational goals. Recently, most quality practitioners have recognized the importance of applying LSS in the HC industry for its role in ensuring the success of HC organizations and achieving a competitive advantage. Thus, organizations should make substantial efforts to motivate employees to apply LSS tools through various strategies such as meeting employees' financial and non-financial requirements, creating a positive working environment to increase awareness of LSS, creating a fair compensation system, and encouraging employees to be involved in the LSS culture, thereby achieving a sustainable CA. On the other hand,

CF is a unique capacity, which is hard to imitate, which leads fast responses to changing consumer demand and quality standards (Bhatt & Emdad, 2010). CF is one of the most critical factors to enhancing the effectiveness of LSS implementation as it is a customer-oriented approach which affects all organizational levels from top to bottom to achieve customer satisfaction (Laureani & Anthony, 2012; Rahman & Bullock, 2005). Indeed, to achieve customer satisfaction, LSS should be linked directly and continuously with patients to identify their needs and wants and then implement projects that meet and exceed their expectations. This will enhance consumer satisfaction, loyalty, and brand image, and improve corporate reputation, which may result in increasing sales and an improved profit margin compared with rivals. Proper alignment between CF and the LSS approach enables caregivers to develop CA by meeting patients' requirements with enhanced effectiveness and efficiency (Sony, 2020). Thus, applying LSS in service organizations leads to efficient and effective processes through combining the efforts of employees and resources with CF, which enhances quality performance, leading to the competitive positioning of the HC organization (Laureani & Antony, 2017).

Eventually, an effective implementation of the LSS approach will link organizational strategy and organizational resources and capabilities, which will ultimately result in achieving a sustainable competitive advantage. Finally, LSS is a business strategy and methodology which improves quality performance, enhances service quality, and improves patient satisfaction by reducing waste and minimizing the variation in operational resources and capabilities, which help organizations in two ways, by acquiring the best strategic resources then optimally exploiting these resources to create competitive advantage. Given the hypothesized influence of organizational factors on LSS and LSS on CA, the purpose of this study is to investigate whether there is an indirect relationship between organizational factors and CA through LSS. Thus, the current study considers whether those specific organizational factors can facilitate organizations' LSS implementation. Hence, applying LSS properly will, subsequently, lead to enhanced CA. Therefore, the study aims to extend the quality-management literature by examining the mediating role of LSS in the relationship between two organizational factors (reward systems and customer focus) and CA. Likewise, these arguments are in-line with the theoretical perspective of contingency theory and RBV, which argue that competitive advantage requires alignment between LSS application and organizational factors. Thus, this study examines the following hypothesis, which maintains that LSS will mediate the relation between reward systems and CF, with CA:

*H6: LSS mediates the association between reward and recognition, with CA*

*H7: LSS mediates the association between CF and CA*

The current research adopted a qualitative research approach to highlight the effectiveness of the quality dimensions, in general, from the literature focusing on LSS, CA, and organizational factors. This paper further extends the implementation of LSS into the HC setting, with an understanding that a proper reward system and strong patient focus can affect the implementation of LSS in HC and, accordingly, achieving CA. The published literature on LSS was used as a source for devising a conceptual framework for LSS implementation in HC. Then, a detailed description of CA in HC is provided to establish its main contributing factors. Finally, a conceptual model was developed to explain the relationships between the collected information. The current study develops a model which focuses on two independent variables (reward system and customer focus), with LSS as a mediator, and CA, which is included as an independent variable in the HC sector to address the research objectives.

## CONCLUSION

The results will provide a gateway to the study of the relationship between specific organizational factors, LSS and CA in the HC industry. However, in order to proceed with the practical research, additional knowledge should be compiled by exploring a wider range of literature. Ultimately, this conceptual paper aimed to contribute to the available literature as a reference for researchers, as well as to significantly impact caregivers in hospitals upon full completion of the research. As there is no unified structure in the literature on applying LSS in the HC sector, this paper aims to add novelty for both academicians and healthcare practitioners. In addition, it is suggested that during the application of LSS, those in the healthcare sector should focus on the healthcare-service processes or systems and administrative processes of hospitals. Empowering and involving patients in LSS implementation is a highlight of the proposed framework. Finally, this paper suggested that the integration of HC strategies and the LSS strategy can be an important and effective success factor in achieving sustainable CA.

## CONFLICT OF INTEREST

The author(s), as noted, certify that they have NO affiliations with or involvement in any organisation or agency with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, jobs, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, expertise or beliefs) in the subject matter or materials addressed in this manuscript.

## REFERENCES

Ahmed, S. (2019). Integrating DMAIC approach of Lean Six Sigma and theory of constraints toward quality improvement in healthcare. *Reviews on Environmental Health*, 34(4), 427-434.



- Ahmed, S., Abd Manaf, N.H. and Islam, R. (2018), Effect of Lean Six Sigma on quality performance in Malaysian hospitals. *International Journal of Health Care Quality Assurance*, vol. 31 no. 8, pp. 973-987.
- Al-Gasawneh, J. A., AlZubi, K. N., Anuar, M. M., Padlee, S. F., ul-Haque, A., & Saputra, J. (2022). Marketing Performance Sustainability in the Jordanian Hospitality Industry: The Roles of Customer Relationship Management and Service Quality. *Sustainability*, 14(2), 803.
- Alblooshi, M., Shamsuzzaman, M., Khoo, M. B. C., Rahim, A., & Haridy, S. (2020). Requirements, challenges and impacts of Lean Six Sigma applications—a narrative synthesis of qualitative research. *International Journal of Lean Six Sigma*, 12(2), 318-367.
- Aleu, F. G., & Van Aken, E. M. (2017). Continuous improvement projects: an authorship bibliometric analysis. *International Journal of Health Care Quality Assurance*. vol. 30 no. 5, pp. 467-476.
- Anning-Dorson, T. (2018). Customer involvement capability and service firm performance: The mediating role of innovation. *Journal of Business Research*, 86, 269-280.
- Anthony, J., & Banuelas, R. (2002). Critical success factor for the successful implementing of Six Sigma projects. *The TQM Magazines*, 41(2), 92-99.
- Antony, J., Forthun, S. C., Trakulsunti, Y., Farrington, T., McFarlane, J., Brennan, A., & Dempsey, M. (2019). An exploratory study into the use of Lean Six Sigma to reduce medication errors in the Norwegian public healthcare context. *Leadership in Health Services*. vol. 32 no. 4, pp. 509-524.
- Ariga, R. A., Amelia, R., Astuti, S. B., Fajar, F. A. A., Ariga, S., Ariga, H. P. S., & Pane, N. K. (2022). Implementation of Lean Six Sigma in Improving Competitive Advantage through Patient Satisfaction and Nurse Resources to Face the Covid-19 Pandemic at USU Medan Hospital. *Macedonian Journal of Medical Sciences*, 10(G), 218-222.
- Arumugam, V., Ooi, K. B., & Fong, T. C. (2008). TQM practices and quality management performance: An investigation of their relationship using data from ISO 9001: 2000 firms in Malaysia. *The TQM Journal*. vol. 20 no. 6, pp. 636-650.
- Aswathappa, J., Garg, S., Kutty, K., & Shankar, V. (2013). Neck circumference as an anthropometric measure of obesity in diabetics. *North American Journal of Medical Sciences*, 5(1), 28.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of Management*, 27(6), 643-650.
- Beleska-Spasova, E. (2014). Determinants and measures of export performance—comprehensive literature review. *Journal of Contemporary Economic and Business Issues*, 1(1), 63-74.
- Bharadwaj, S. G., Varadarajan, P. R., & Fahy, J. (1993). Sustainable competitive advantage in service industries: a conceptual model and research propositions. *Journal of Marketing*, 57(4), 83-99.
- Bhat, D. A. R., & Sharma, V. (2021). Enabling service innovation and firm performance: the role of co-creation and technological innovation in the hospitality industry. *Technology Analysis & Strategic Management*, 1-13.
- Bhat, S., Antony, J., Gijo, E. V., & Cudney, E. A. (2019). Lean Six Sigma for the healthcare sector: a multiple case study analysis from the Indian context. *International Journal of Quality & Reliability Management*. vol. 37 no. 1, pp. 90-111
- Bhat, S., Gijo, E. V., Antony, J., & Cross, J. (2022). Strategies for successful deployment and sustainment of Lean Six Sigma in healthcare sector in India: a multi-level perspective. *The TQM Journal*. 1754-2731
- Bhat, S., Gijo, E. V., Rego, A. M., & Bhat, V. S. (2020). Lean Six Sigma competitiveness for micro, small and medium enterprises (MSME): an action research in the Indian context. *The TQM Journal*. vol. 33 no. 2, 2021 pp. 379-406
- Bhatt, G., Emdad, A., Roberts, N., & Grover, V. (2010). Building and leveraging information in dynamic environments: The role of IT infrastructure flexibility as enabler of organizational responsiveness and competitive advantage. *Information & Management*, 47(7-8), 341-349.
- Brown, S. P., & Lam, S. K. (2008). A meta-analysis of relationships linking employee satisfaction to customer responses. *Journal of Retailing*, 84(3), 243-255.
- Cerfolio, R. J., & Ferrari-Light, D. (2019). Does conversion from a minimally invasive to open procedure hurt the patient, the surgeon's ego, or the healthcare system? *Journal of Thoracic Disease*, 11(3), 646.
- Chakrabarty, A., & Tan, K. C. (2007). The current state of SS application in services. *Managing Service Quality: An International Journal*, 17(2), 194-208.
- Chang, D., Xu, H., Rebaza, A., Sharma, L., & Cruz, C. S. D. (2020). Protecting health-care workers from subclinical coronavirus infection. *The Lancet Respiratory Medicine*, 8(3), e13.
- Cho, Y. S., & Linderman, K. (2020). Resource-based product and process innovation model: Theory development and empirical validation. *Sustainability*, 12(3), 913.

- Citybabu, G., & Yamini, S. (2022). The implementation of Lean Six Sigma framework in the Indian context: a review and suggestions for future research. *The TQM Journal*, vol. 34 no. 6, 2022 pp. 1823-1859
- D'Andreamatteo, A., Ianni, L., Lega, F., & Sargiacomo, M. (2015). Lean in healthcare: a comprehensive review. *Health Policy*, 119(9), 1197-1209.
- Daft, R. L., & Lengel, R. H. (1998). *Fusion leadership: Unlocking the subtle forces that change people and organizations*. Berrett-Koehler Publishers.
- Das, T. K., & Teng, B. S. (2000). A resource-based theory of strategic alliances. *Journal of Management*, 26(1), 31-61.
- Deming, J. W., & Colwell, R. R. (1982). Barophilic bacteria associated with digestive tracts of abyssal holothurians. *Applied and Environmental Microbiology*, 44(5), 1222-1230.
- Desai, D. A., Kotadiya, P., Makwana, N., & Patel, S. (2015). Curbing variations in packaging process through Six Sigma way in a large-scale food-processing industry. *Journal of Industrial Engineering International*, 11(1), 119-129.
- Dobrzykowski, D. D., McFadden, K. L., & Vonderembse, M. A. (2016). Examining pathways to safety and financial performance in hospitals: A study of lean in professional service operations. *Journal of Operations Management*, 42(1), 39-51.
- Douglas, T.J. and Judge Jr., W.Q. (2001) Total Quality Management Implementation and Competitive Advantage: The Role of Structural Control and Exploration. *The Academy of Management Journal*, 44, 158-169.
- El-Jardali, F., Sheikh, F., Garcia, N. A., Jamal, D., & Abdo, A. (2014). Patient safety culture in a large teaching hospital in Riyadh: baseline assessment, comparative analysis and opportunities for improvement. *BMC Health Services Research*, 14(1), 1-15
- Eptimehin, F. M. (2011). Achieving CA in insurance industry: the impact of marketing innovation and creativity. *Journal of Emerging Trends in Economics and Management Sciences*, 2(1), 18-21.
- Ferdousi, F., Baird, K., Munir, R., & Su, S. (2019). Mediating role of quality performance on the association between organisational factors and competitive advantage. *International Journal of Productivity and Performance Management*. vol. 68 no. 3, pp. 542-560.
- Freiling, J., Gersch, M., Goetze, C., & Sanchez, R. (2008). Fundamental issues in a competence-based theory of the firm. In A focused issue on fundamental issues in competence theory development. *Emerald Group Publishing Limited*. vol 4, 79-106.
- Frye, C. A., Paris, J. J., Walf, A. A., & Rusconi, J. C. (2012). Effects and mechanisms of 3 $\alpha$ , 5 $\alpha$ -THP on emotion, motivation, and reward functions involving pregnane xenobiotic receptor. *Frontiers in Neuroscience*, 5, 136.
- Flynn, B. B., Schroeder, R. G., & Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operations Management*, 11(4), 339-366.
- Gijo, E. V., & Antony, J. (2014). Reducing patient waiting time in outpatient department using lean six sigma methodology. *Quality and Reliability Engineering International*, 30(8), 1481-1491.
- Gonzalez-Aleu, F., Van Aken, E. M., Cross, J., & Glover, W. J. (2018). Continuous improvement project within Kaizen: critical success factors in hospitals. *The TQM Journal*, 30(4), 335-355.
- Gunawan, I. (2022). Customer Loyalty: The Effect Customer Satisfaction, Experiential Marketing and Product Quality. *KINERJA: Jurnal Manajemen Organisasi dan Industri*, 1(1), 35-50.
- Gurses, A. P., & Carayon, P. (2007). Performance obstacles of intensive care nurses. *Nursing research*, 56(3), 185-194.
- Habidin, N., & Mohd Yusof, S. R. (2013). Critical success factors of Lean Six Sigma for the Malaysian automotive industry. *International Journal of Lean Six Sigma*, 4(1), 60-82.
- Hagan, P. (2011). Waste not, want not: Leading the lean health-care journey at Seattle Children's Hospital. *Global Business and Organizational Excellence*, 30(3), 25-31.
- Hamilton, S., & Chervany, N. L. (1981). Evaluating information system effectiveness-Part I: Comparing evaluation approaches. *MIS quarterly*, 55-69.
- Handel, H. (2008). Compensation of thermal errors in vision-based measurement systems using a system identification approach. In 2008 9th International Conference on Signal Processing (pp. 1329-1333). IEEE.
- Hendricks, C.A. and Kelbaugh, R.L. (1998), Implementing Six Sigma at GE, *Quality and Participation*, vol. 21 no. 4, pp. 48-53
- Hitt, M. A., Xu, K., & Carnes, C. M. (2016). Resource based theory in operations management research. *Journal of Operations Management*, 41, 77-94.
- Hundal, G. S., Thiyagarajan, S., Alduraibi, M., Laux, C. M., Furterer, S. L., Cudney, E. A., & Antony, J. (2021). Lean Six Sigma as an organizational resilience mechanism in health care during the era of COVID-19. *International Journal of Lean Six Sigma*, 12(4), 762-783.

- Jayaraman, K. and Teo, L.K. (2010), Critical success factors for successful Lean Six Sigma implementation and its impact on company performance of electronics manufacturing service (EMS) industries: a practical guide for Lean Six Sigma implementation success model, *International Journal of Lean Six Sigma*, vol. 1 no. 3, pp. 191-215
- Joosten, T. C. M., Bongers, I. M. B., & Janssen, R. T. J. M. (2009). Application of lean thinking to health care: Issues and observations. *International Journal for Quality in Health Care*, 21(5), 341-347.
- Kaltenbrunner, M., Bengtsson, L., Mathiassen, S. E., & Engström, M. (2017). A questionnaire measuring staff perceptions of Lean adoption in healthcare: development and psychometric testing. *BMC Health Services Research*, 17(1), 1-11.
- Kaur, R., Sharma, R. K., & Goyal, S. (2019). Improving organizational performance through competitive advantage: an empirical analysis with reference to Indian IT industry. *Journal of Asia-Pacific Business*, 20(4), 281-301.
- Khan, J. H. (2003). Impact of total quality management on productivity. *The TQM magazine*, 15(6), 374-380. vol. 15 no. 6, pp. 374-380.
- Knight, E., Kumar, V., Wójcik, D., & O'Neill, P. (2020). The competitive advantage of regions: economic geography and strategic management intersections. *Regional Studies*, 54(5), 591-595.
- Kurutkan, M. N., Usta, E., Orhan, F., & Simsekler, M. C. (2015). Application of the IHI Global Trigger Tool in measuring the adverse event rate in a Turkish HC setting. *International Journal of Risk & Safety in Medicine*, 27(1), 11-21.
- Laureani, A., & Antony, J. (2012). Critical success factors for the effective implementation of Lean Sigma: Results from an empirical study and agenda for future research. *International Journal of Lean Six Sigma*, 3(4), 274-283.
- Laureani, A., & Antony, J. (2017). Leadership characteristics for lean six sigma. *Total Quality Management & Business Excellence*, 28(3-4), 405-426.
- Leong, T. W., & Teh, P. L. (2012). Critical success factors of Six Sigma in original equipment manufacturer company in Malaysia. *International Journal of Synergy and Research*, 1(1), 7-21.
- Lestari, S. D., Leon, F. M., Widyastuti, S., Brabo, N. A., & Putra, A. H. P. K. (2020). Antecedents and consequences of innovation and business strategy on performance and competitive advantage of SMEs. *The Journal of Asian Finance, Economics and Business*, 7(6), 365-378.
- Limpanyalert, P. (2018). *Patient safety in Thailand*. In Global Patient Safety (pp. 175-189). Routledge.
- Linderman, K., Schroeder, R. G., & Choo, A. S. (2006). Six Sigma: The role of goals in improvement teams. *Journal of Operations Management*, 24(6), 779-790.
- Luz Tortorella, G., Cauchick-Miguel, P. A., Li, W., Staines, J., & McFarlane, D. (2022). What does operational excellence mean in the Fourth Industrial Revolution era? *International Journal of Production Research*, 60(9), 2901-2917.
- Madhani, P. M. (2022). The “High-Road” Approach to Compensation and Benefits Practices: Enhancing Competitive Advantages. *International Journal of Applied Management Sciences and Engineering (IJAMSE)*, 9(1), 1-21.
- Malmbrandt, M., & Åhlström, P. (2013). An instrument for assessing lean service adoption. *International Journal of Operations & Production Management*. 33(9):1131–1165.
- McDermott, O., Antony, J., Sony, M., & Daly, S. (2022). Barriers and enablers for continuous improvement methodologies within the Irish pharmaceutical industry. *Processes*, 10(1), 73.
- Noronha, A., Bhat, S., Gijo, E. V., Antony, J., & Bhat, S. (2021). Application of Lean Six Sigma in conservative dentistry: an action research at an Indian dental college. *The TQM Journal*. vol. 34 no. 4, 2022 pp. 675-700.
- Okpara, J. O. (2004). Personal characteristics as predictors of job satisfaction: An exploratory study of IT managers in a developing economy. *Information Technology & People*. vol. 17 no. 3, pp. 327-338.
- Peters, B. G. (1992). Government Reorganization: A Theoretical Analysis. *International Political Science Review*, 13(2), 199–217.
- Rahman, S. U., & Bullock, P. (2005). Soft TQM, hard TQM, and organisational performance relationships: an empirical investigation. *Omega*, 33(1), 73-83.
- Runyan, C. W., Schulman, M., Dal Santo, J., Bowling, J. M., Agans, R., & Ta, M. (2007). Work-related hazards and workplace safety of US adolescents employed in the retail and service sectors. *Pediatrics*, 119(3), 526-534.
- Scwartz, S.H. (2008). *Cultural Value Orientations: Nature and Implications of National Differences*. Moscow: State University – Higher School of Economic Press.
- Sekhon, H., & Kennington, C. (2001). Buyer seller relationships in the UK insurance market: Is this the key competitive advantage? *Journal of Financial Services Marketing*, 5(3), 207-214.
- Shah, R., & Ward, P. T. (2007). Defining and developing measures of lean production. *Journal of Operations Management*, 25(4), 785-805.
- Siagian, H., Tarigan, Z. J. H., & Jie, F. (2021). Supply chain integration enables resilience, flexibility, and innovation to improve business performance in COVID-19 era. *Sustainability*, 13(9), 4669.

- Silaban, N., & Syah, T. Y. R. (2018). The influence of compensation and organizational commitment on employees' turnover intention. *IOSR Journal of Business and Management*, 20(3), 1-6.
- Sim, C. L., Chuah, F., Sin, K. Y., & Lim, Y. J. (2022). The moderating role of Lean Six Sigma practices on quality management practices and quality performance in medical device manufacturing industry. *The TQM Journal*, (ahead-of-print).
- Simsekler, M. E., Gurses, A. P., Smith, B. E., & Ozonoff, A. (2019). Integration of multiple methods in identifying patient safety risks. *Safety Science*, 118, 530-537.
- Simsekler, M. E., Ward, J. R., & Clarkson, P. J. (2018). Design for patient safety: a systems-based risk identification framework. *Ergonomics*, 61(8), 1046-1064.
- Sila, I. (2007). Examining the effects of contextual factors on TQM and performance through the lens of organizational theories: An empirical study. *Journal of Operations Management*, 25(1), 83-109.
- Sodikoglu, E., & Zehir, C. (2010). Investigating the effects of innovation and employee performance on the relationship between TQM practices and firm performance: an empirical study of Turkish firms. *International Journal of Production Economics*, 127(1), 13-26.
- Sollecito, W., & Johnson, J. (2011). *McLaughlin and Kaluzny's continuous quality improvement in health care*. Jones & Bartlett Publishers.
- Sony, M., & Naik, S. (2020). Industry 4.0 integration with socio-technical systems theory: A systematic review and proposed theoretical model. *Technology in Society*, 61, 101248.
- Tjosvold, D., & Tjosvold, M. (2015). *Leadership for teamwork, teamwork for leadership*. In Building the team organization (pp. 65-79). Palgrave Macmillan, London.
- Vaishnavi, V., & Suresh, M. (2020). Modelling of readiness factors for the implementation of Lean Six Sigma in healthcare organizations. *International Journal of Lean Six Sigma*, vol. 11 no. 4, pp. 597-633
- Wang, C. H., Chen, K. S., & Tan, K. H. (2019). Lean Six Sigma applied to process performance and improvement model for the development of electric scooter water-cooling green motor assembly. *Production Planning & Control*, 30(5-6), 400-412.
- Wang, G., Wei, Y., Qiao, S., Lin, P., & Chen, Y. (2018). *Generalized inverses: theory and computations* (vol. 53). Singapore: Springer.
- Williams, A., Nangia, N., & Bowman, S. R. (2017). A broad-coverage challenge corpus for sentence understanding through inference. arXiv preprint arXiv:1704.05426.
- Womack, J. P., & Jones, D. T. (2003). Banish waste and create wealth in your corporation. Recuperado de [http://www.kvimis.co.in/sites/kvimis.co.in/files/ebook\\_attachments/James](http://www.kvimis.co.in/sites/kvimis.co.in/files/ebook_attachments/James).
- Yadav, N., Shankar, R., & Singh, S. P. (2020). Impact of Industry 4. 0/ICTs, Lean Six Sigma and quality management systems on organisational performance. *The TQM Journal*, 32(4), 815-835.
- Yusaf, T., Noor, M. M., & Wandel, A. P. (2013). Mild combustion: the future for lean and clean combustion. *In Proceedings of the 2nd International Conference of Mechanical Engineering Research (ICMER 2013)* (pp. 1-15). Universiti Malaysia Pahang.
- Yunis, M., Jung, J., & Chen, S. (2013). TQM, strategy, and performance: a firm-level analysis. *International Journal of Quality & Reliability Management*. vol. 30 no. 6, pp. 690-714.
- Yusuf, Y., Gunasekaran, A., & Dan, G. (2007). Implementation of TQM in China and organization performance: An empirical investigation. *Total Quality Management*, 18(5), 509 –530.
- Zakuan, N. M., Yusof, S. M., & Shaharoun, A. M. (2009). The link between total quality management and organizational performance in Malaysian Automotive Industry: The mediating role of ISO/TS16949 efforts. *In 2009 IEEE International Conference on Industrial Engineering and Engineering Management* (pp. 439-443).
- Zhang, Z., Waszink, A. B., & Wijngaard, J. (2000). An instrument for measuring TQM implementation for Chinese manufacturing companies. *International Journal of Quality & Reliability Management*, 17(7), 730-755.
- Zu, X., Fredendall, L. D., & Douglas, T. J. (2008). The evolving theory of quality management: the role of Six Sigma. *Journal of Operations Management*, 26(5), 630-650.