

Lean Tools to Improve Efficiency and Effectiveness in Sri Lankan Private Hospital Sector

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Abstract - Lean tools can be identified as one of the main practices that are being used in different industries around the world to enhance the efficiency and effectiveness of the organizational process while adding value to the end customers. When it comes to the private medical sector in Sri Lanka, it is important to uplift the quality standards to ensure customer satisfaction and to become helpful to the public medical sector, and implementing lean practices can be an ideal way to uplift the private medical sector in the country. This paper aims to examine the practical applications that can be used to enhance the impact of lean practices in the supply chain function of the private hospital sector in Sri Lanka. The authors gathered data from in-depth interviews conducted with supply chain professionals such as executives and managers of the private hospital sector and focused more on the suggestions of the interviewees on improving the impact of lean practices on the supply chain system of the Sri Lankan private hospital sector. The final results and conclusions of the study are extracted through thematic analysis which is used to evaluate data gathered through in-depth interviews and the practical applications that can be implemented in the private medical sector to maximize the effectiveness of current lean supply chain practices in the Sri Lankan private hospital sector which provides a considerable impact on the overall performance of the private healthcare sector of the country such as value stream mapping, Focus PDCA, Improve Staff engagement and Reduce medical errors has been identified as the findings of the study which can be beneficial in terms of reducing organizational cost, improving service quality and, eliminating wastage while enhancing overall organizational performances.

Keywords: Effectiveness, Private Healthcare, Lean Supply Chain, Lean Tools and Sri Lanka.

I. INTRODUCTION

In the current context of the Sri Lankan healthcare industry, the implementation of lean tools is an important method to enhance effectiveness, with increasing demand in the healthcare sector compared to the capacity constraints of the Sri Lankan private hospital sector (Wijewardana & Rupasinghe, 2013). In the current hypercompetitive business environment, organizations try to adopt various types of operational strategies to overcome the deficiencies and inefficiencies that occur in day-to-day functions, among which lean practices can identify as one of the popular approaches that can become a great help to overcome such challenges.

With the impact of the economic and social problems in Sri Lanka, the health sector can be identified as an area that is negatively affected to a degree that the health system is unable to satisfy the requirements of the public. There are two segments in the Sri Lankan healthcare sector such as the government-sector hospitals and private-sector hospitals (Wijewardana & Rupasinghe, 2013). Out of these segments, this paper is addressing the private health sector which has been challenged mainly due to inflation, government policies, and lack of medical supplies in the country. To overcome such difficulties, the private sector must apply strategies so that the service delivery of the organization can be done in a well-constructed and systematic approach at an affordable price to the consumers. There are more than a hundred private hospitals in Sri Lanka, and only a minority of them are hospitals with high-quality facilities (Ministry of Health, 2017). Due to the current situation, it is crucial to identify the capacity that the lean approach can influence the efficiency and effectiveness of the private medical sector in Sri Lanka and the methodology to enhance the impact of lean practices in the private medical sector to gain a more competitive advantage to develop as a business unit while delivering the best possible service towards the public of the country.

With the gradual increment in terms of population in the country and due to the advancement of medical science and technology, the private medical sector has been introduced in Sri Lanka to uplift and support the public medical sector which collectively becomes more efficient in delivering facilities to the people who need medical attention. Although the government takes the responsibility to fulfill the majority of medical requirements of the country, the private hospital sector is accountable for approximately half of the annual medical expenditure in Sri Lanka (Wijewardana & Rupasinghe, 2013). Here, the private hospitals in Sri Lanka's healthcare sector with limited resources spend accordingly, and the authors point out that the strategic goals of private hospitals can be achieved by eliminating waste, reducing unnecessary expenses, providing quality service, etc., are to enhance effectiveness and thereby increase efficiency, by using lean tools.

In the private medical sector, different methodologies have been implemented to increase the efficiency and the quality of the service of the organization to the end consumers. These private medical institutes have adopted lean supply chain techniques to practice proper management of medical products and equipment, human capital management, and maintaining proper medical hygiene in the hospitals, and proved to be effective as well. Graban and Toussaint (2018), stated that lean supply chain management can be identified as a long-term method of working that leads to achieving modest and advanced changes in supply processes to enhance efficiency and quality of service or product. Lean practices are identified as one of the main sets of techniques that are in use by supply chain professionals all around the world to achieve a perfect systematic approach in organization process to become cost-effective, to improve efficiency, to improve overall service quality, and to enhance flexibility during their day-to-day activities.

The deficiency of knowledge on lean management tools in the supply chain function in the Sri Lankan private medical sector results in not utilizing these practices in the most effective manner which can be beneficial towards the achievement of organization goals and thus have plenty of room to advance with the lean supply chain practices to become successful in terms of performance and generating high revenue margins. This study aims to identify the tactics that can be used to maximize the effect of lean management practices that are currently in use within the supply chain function of the private medical sector in Sri Lanka and to capitalize on those improvement areas to

gain a competitive advantage within the industry. Using lean tools with the highest effectiveness helps to extract the best possible outcome from uplifting the quality standards of those organizations while eliminating wastage, reducing cost, improving efficiency, and becoming flexible to deliver services that can satisfy their customers.

This study follows the qualitative approach to obtain the desired finding by conducting in-depth interviews with the supply chain professionals from leading private medical hospitals in the Sri Lankan context and the results and conclusions are defined based on their answers, opinions, and feedback of the interviewees.

Private Health Care Sector in Sri Lanka is extremely diverse, as are all other industries. Businesses or individuals that provide healthcare services or products but aren't owned by or directly controlled by the national government are in the private sector (Clarke & Paviza, 2018; De Wolf & Toebes, 2016). The main direct suppliers of services in the private medical industry are hospitals, dispensaries, and personal physicians. The supporting key players in the private system of healthcare are manufacturing enterprises and technology firms that cater to the healthcare industry. Business entities like multinational companies and non-profit organizations industriously participate in the direct delivery of medical supplies by providing medical facilities, goods and services associated with health care, and monetary assistance for those operations to improve the quality and standards of the global healthcare sector. The most efficient function of private hospitals is to boost national norms and improve the quality of life of the people by offering healthcare security and continuous support whenever it is needed.

Through government-operated infrastructure and healthcare services, Sri Lanka delivers the comfort of free medical care. However, by providing healthcare facilities at higher prices with greater quality along with faster service, the medical industry in private hands has made a major impact on the country. The Ministry of Health's medical statistics section reports that there are 141 privately operated hospitals in Sri Lanka, with most of them located in the western province (Ministry of Health, 2017). These healthcare facilities supply essential technical and personal offerings to the country by offering health-related facilities to the public, which reduces the burden and overall expenditure of Sri Lanka's public medical system. In accordance with research carried out by Ilangakoon et al. (2021) indicates adopting lean management strategies and recent technological advancements in the industry could boost the effectiveness of corporate operations in the healthcare industry.

Here, the authors were able to identify the Lean tools currently in use in private hospitals in Sri Lanka through in-depth interviews conducted with supply chain professionals in private hospitals. Among them, the interviewees pointed out that lean tools such as 5S, Kanban, Kaizen, and JIT have been well-matched with the operational process of hospitals, and their influence has contributed to the growth of hospital efficiency and effectiveness in the private healthcare sector. It was emphasized that the use of 5S in private hospitals is mainly used in the labeling of drugs and equipment, in the provision of sanitary facilities including cleaning, in the preparation of the arrangement related to the operation of the hospital, in providing a safe environment, in documenting situations, in the preparation of patients and channeling rooms. The use of the Kanban Lean tool can be highlighted as it plays an important role in maintaining a real-time data layer in the hospital. Because hospital time is a very important factor, all parties involved in the operational process of hospitals play a major role in making decisions, obtaining relevant information, maintaining efficient communication between departments, and providing relevant updates to channel patients' doctors.

In further analysis, the Kanban Lean tool meets the need for real-time data to properly communicate information such as the amount of maintaining efficient communication between departments and providing relevant updates to channel patients' doctors. In further analysis, the Kanban Lean tool meets the need for real-time data to properly communicate information such as the number of inpatients, their needs, patients' lab report preparation message, and patients' discharge message. Kaizen was identified as another lean tool in use and a major focus in the hospital is to improve the service process. To that end, reducing patients' idle time by providing improved quality service, simplifying the procurement process as much as possible, streamlining operations, reducing the tack time of operations, developing efficiency and smoothness between retail departments, and quick and easy purchasing. The Kaizen Lean tool is successfully used today to implement a material requisition system. The Just in Time Lean tool is currently used in hospitals to order certain valuable specialty drugs, other stock items, and medical equipment through buyers as soon as the need arises. In many cases, this JIT lean tool is used in hospitals in the process of purchasing high-value medicines and equipment, ordering other items including food for the hospital kitchen, and ordering injections for cancer patients.

As the authors identified, the effective implementation of lean practices in private hospitals in Sri Lanka is minimal and there is a requirement to enhance the awareness of lean tools and their positive outcomes towards organizational performance among the professionals associated with the supply chain is minimum and it is crucial to gain high quality private medical sector in Sri Lanka. Therefore, this study is conducted to seek the ideal implementation of lean tools in practice that can enhance overall organizational performance while providing high-quality services to customers for an affordable price to gain a competitive advantage within the industry.

II. LITERATURE REVIEW

A. Introduction

Lean supply chain strategies have tremendously benefited the hospital and healthcare sectors in several ways, including an improvement of those institutions' overall performance and a higher rate of patient satisfaction. Lean management aims to reduce waste while increasing value for both customers and companies. It is a manner of conducting business that prioritizes customer fulfillment, continuous development, and employee empowerment. Since the term "lean" entered the corporate world, the medical industry has significantly embraced these applications. These applications can be evaluated independently as a component that affects how well these firms function generally in terms of working efficiency, cost savings, and demand management that boosts patient fulfillment and their competitive edge.

B. Lean Supply Chain Management Tools

After considering the current scenario, the following lean strategies such as Kanban, kaizen, Just in Time, and 5s are primarily employed for the effective, cost-effective, and productive operating procedure in the healthcare industry in the private sector. The Kanban strategy is implemented to regulate the distribution of goods between the manufacturer and suppliers outside the organization, and customers. When more products are needed, this technique uses sensing devices to autonomously restore inventory. By using signaling cards to inform staff when more products are required to continue running manufacturing or service activities, this lean method helps minimize inventory and

manufacturing waste while maintaining functionality with a requirement for actual stocks (Sengun, 2017). Kaizen's strategy motivates employees who frequently engage actively in improving business processes through the application of the Kaizen tool, which is based on a continual improvement approach. Applying this Kaizen tool, businesses can employ all their assets to develop a systematic process that constantly decreases waste in manufacturing operations (Machado et al., 2015).

The just-in-time manufacturing approach supports gathering parts through manufacturing based on real demand instead of setting parts by way of production based on predicted demand. By implementing the JIT method, with improved cash flow and lessened space requirements, inventory levels can be drastically reduced. (Wijewardana & Rupasinghe, 2013). 5S consists of five primary concepts sorting which removes anything irrelevant, straightening contain setting the remaining items in an order, shine adhering to the work environment must be cleaned and examined, standardizing, and enhancing the standards of the operational process and finally, sustaining that the standards should be adhered to consistently. Using the 5s technique, business entities can eliminate waste that results from an unorganized process of work and enhance efficiency, while getting rid of unanticipated expenditures caused by waste and the spontaneity of procedures (Wijewardana & Rupasinghe, 2013).

C. Enhance effectiveness in Health Care Sector

A research study conducted by Prado-Prado et al. (2020) focuses on strengthening medical care competitiveness by way of the implementation of lean management. This article addresses both the lean conducting viewpoints, which systematically seek to redesign procedures in the healthcare services sector by applying the logical operation to research methodology, and the way implementing lean techniques enhances patients' belief, confidence, and value in the firm. The study of Machado et al. (2013) investigated the advantages of using lean management to enhance the system of healthcare and reduce unnecessary expenditures and delays. According to the study, using lean supply chains and managerial technologies results in better service quality, effectiveness, security, customer satisfaction, and employee fulfillment. To show the influence of the chosen lean approaches on the overall performance of those medical facilities, Machado et al. (2013) performed research on the distinct differences in outcomes achieved by diverse healthcare providers in fifteen distinct nations. This study eliminates waste while increasing value to satisfy the customer.

A study was performed by Alemsan et al. (2022). Although lean supply chain management has been identified as a key component that could have an impact on healthcare and medical company operations, it is not entirely obvious how the association between lean methods and endurance capabilities functions within the supply chain of healthcare. Recognizing the healthcare industry's holes and the demand for lean management in the healthcare supply chain is essential. The required capability for persistence in the supply chain of healthcare will increase because of recognizing reactions and offering healthcare management justifications for prioritizing lean techniques.

Although operation management in the healthcare industry adheres to the lean mindset was another goal of the study. These hospitals adopt management strategies that are in line with lean principles. To enhance productivity and service or quality of products, Graban and Toussaint (2018) claim that the use of lean supply chain management is an overall long-term operating strategy that leads to both bald and significant changes in

supply operations. Managing different materials in a hospital is vital from an economic point of view as well as when taking into consideration their effect on the well-being of patients (Regattieri et al., 2018).

Chiarini (2013) and Sengun (2017) focus on interpreting that the cost of healthcare in the world is higher than the estimated level and analyze how unnecessary careless actions, waste in patient transportation, waste of time, and inefficiencies in the supply chain are affected. Further, the author reveals how hospital logistics strategies and lean thinking techniques are applied to cut waste in patient transportation inside vast medical facilities. The cost of patient transportation inside large public hospitals is included in this study. Transporting patients across wards at hospitals, sections, and outpatient clinics is often related to this cost. Through a qualitative investigation, this article intends to show how particular Lean Thinking techniques, which include spaghetti charts and task worksheets, might aid in lowering expenses associated with the transportation of patients and other types of waste. The mechanics of dispensing medicines were examined from a fresh experience in the research article authored by Pinna et al. (2015). As the private sector's hospitals currently contend with higher inventory levels and organizational responsibilities that are focused on costs, the goal of this study is to show the most recent changes to how pharmaceuticals are distributed inside private hospitals.

Lean management, in the context of manufacturing and the supply chain, focuses on three primary areas, including improving the experience of patients, discovering streams of value, and minimizing waste, according to Poksinska (2010). By using lean principles, the healthcare system can achieve outcomes like increased system effectiveness and enhanced satisfaction among staff and consumers. The complicated nature of the organizational framework, staff resistance to discovering novel concepts, a shortage of skilled staff, a deficiency of customer focus, and employee shortages are just a few of the potential barriers to applying lean principles in the medical sector that were mentioned in the article. According to a study by Wijewardana and Rupasinghe (2013) the management of healthcare, healthcare workers, and patients will all benefit from applying lean thinking. The research's evidence of successful lean executions supports the use of lean management in the healthcare industry and exposes that similar advantages may be reached for related problems. To implement sustainable innovations and adaptable frameworks to conduct medical-related procedures in hospitals, it is crucial to recognize the need for better knowledge of lean management methodologies. These methodologies can also be used effectively to improve competitive advantage in the private healthcare industry.

According to Sengun (2017), due to the high demand and other costs, time wastage, and malpractices utilized in the healthcare industry, the cost of healthcare has been rising quickly around the world. This has created a need for innovative, simple methods to lower the factors that drive up the cost of healthcare. Inventory management, which aims to minimize the size of the inventory and the costs associated with warehousing, can benefit from the technical approach of the "just-in-time" lean tool. Machado et al. (2014) addressed the management components used in the healthcare industry's implementation of lean supply chain management to reduce costs incurred in the health supply chain, reduce waste of physical materials and time, and support decisions that improve the quality of service provided to customers and consumers in the medical health sector. According to the research, lean management practices improve the

overall quality of the healthcare supply chain process with the aid of planning, a strong leadership profile, and clear and well-defined objectives.

The research article published by Munaa et al. (2021) addressed the implementations of lean supply chain management made in Indonesia, emphasizing how those applications were advantageous for both workers and patients in the medical industry and helped to achieve desired results in various aspects, such as waste reduction and cost-effectiveness. By reducing waste like inventory and lead time through lean concepts like kaizen and value stream mapping approaches, organizations can focus more on gaining a higher competitive advantage in the healthcare industry. Lean management in the supply chain can enhance business processes by lowering the number of defective items, cutting down on cycle times, minimizing waste, and speeding up the process of finding the best practices to address the various issues and challenges that emerge in the dynamic business environment.

Lean management is a technique that may be used to cut back on wasteful operations while increasing the effectiveness of manufacturing and production processes. This strategy is simple to apply in the current healthcare sector. Finding the most suitable form of lean management tool to utilize to help the firm accomplish its desired and anticipated results might be difficult. Brajer-Marczak and Wiendlocha (2018) have carried out a study to determine whether the Lean Management concept can be applied successfully in hospital management. It is a fundamental requirement to concentrate on customer happiness and the organization's financial liquidity when choosing a lean management strategy to manage the healthcare sector. The organization's requirements for cost reduction, waste control, greater efficiency, and improved customer satisfaction should be met by the lean tools that are chosen. However, some restrictions can be found in the real world when choosing lean tools, such as financial constraints, time constraints, customer pressure, and market competition, all of which should be taken into consideration before choosing the best lean management tools for the organization. Researchers understand the knowledge gap of implementing lean tools can reduce the disturbance of the private hospital sector and the purpose of filling the knowledge gap in the Sri Lankan private hospital sector and uplift the standards of the private medicinal industry by reducing cost, minimizing wastage, and improving the service quality. It is crucial to uplift the medical standards while eliminating medication errors and improving effective medical service by using and implementing lean supply chain practices in the Sri Lankan private hospital sector.

III. METHODS & DATA ANALYSIS

This study was used by researchers to investigate design, which entailed gathering and analyzing qualitative data within the study. Study based on the positivism philosophy to demonstrate the practical implementation of lean supply chain tools in the Sri Lankan context and provide suggestions to enhance effectiveness in the field of the supply chain. The study used a cross-sectional time horizon rather than spanning a longer period, focusing on a specific problem or phenomenon at a single point in time. Twelve in-depth interviews with supply chain experts in the private medical industry in Sri Lanka were conducted to collect qualitative data. In the data collection process, researchers identified after conducting 10 interviews with the respondents, captured the same data, and repeated it. Then another two interviews revealed got the saturation point within the selected 12 interviews.

The research focused on the private hospital industry in Sri Lanka, which is regulated by the Ministry of Health. The intended respondents were supply chain professionals in the country's private hospital industry, including managers and executives who were engaged in the supply chain operation of private hospitals. Interviews contain a duration of approximately thirty to forty minutes. Investigate the availability of lean methodologies in Sri Lanka's private healthcare sector and their impact on private hospitals' competitive advantage using the inductive method. To determine the critical effect of lean practices on competitive advantage in the private hospital sector, data was collected and then qualitatively analyzed using thematic analysis. Thematic analysis is a technique used to identify, analyze, summarize, and interpret qualitative data. Data familiarization in this process entails understanding the data while reading it several times. This research entails developing initial codes through data coding and involving meaningful information. The themes that have been identified are combined with the data that has been collected, and the results are then explained. Researchers reached the saturation point of the study after conducting 12 interviews and starting data coding with the Thematic analysis process.

IV. RESULTS & DISCUSSION

A. Results

With the need of much effective and efficient service towards the customers, the private medical sector in Sri Lanka has implemented lean supply chain practices within their organizations.

To find out the extent to which these practices are implemented in the private medical sector, the authors conduct some in-depth interviews with the supply chain professionals of the well-known private medical sectors in the country. After reviewing and analyzing these interview results, the authors have identified four key lean tool practices that entertain in the private medical sector which help to enhance the overall performance of those organizations by giving responses and observations from the supply chain professionals. The below table shows the key lean supply chain practices and their applications in the day-to-day operations of those private hospitals.

Table 1. Current Lean Applications in the Sri Lankan Private Hospital Sector

Themes	Codes	Quotations
5S	Sorting concept	“Labeling medicine and categorizing them according to the priorities can be helpful when an emergency case has occurred in the hospital mainly in the ETU (Emergency Treatment Unit)”.
	Cleanliness	
	Labeling	
	Proper documentation	
	Color coding	
	Safety	
Kanban	Higher efficiency	“Anyone can book an appointment through the hospital website or by contacting the hotline and there is a facility to pay the medical fees through the online platform or to the hospital counter on the day of the appointment.”
	Real-time Dataflow	
	Communication	
	Reduce wastage	
	E channelings integration	

Themes	Codes	Quotations
Kaizen	Continuous improvement	“There are different introductions that have been made to improve the service quality of the hospital. Implementing new technologies such as blood analyzing machines provides the luxury of conducting all varieties of blood tests and providing results within a day which can enhance the efficiency of the organization and contribute to improving customer satisfaction as well”.
	Contribution of employees	
	Using technologies	
	Service quality	
	Training employees	
	Minimizing cost	
Just In Time	Waste reduction	“There are three inventories in our hospital according to their end-use. The first inventory is for drugs and medicine, the second inventory is for consumables and the last inventory is for the kitchen.”
	Lead time	
	Inventory management	
	Purchase decisions	
	Insourcing	

Source: Author’s compilation.

B. Suggestions to improve the effect of Lean Applications in the Private Medical Sector in Sri Lanka

To propose recommendations for improving the competitive advantage of the private hospital sector in Sri Lanka with lean supply chain practices. Healthcare is one of the most crucial factors influencing people's well-being in a country. As a country with a strong public medical sector, it is critical to establish a strong private medical sector to meet the people's need for medical services and to seek investments from stakeholders to cover the country's medical expenses. Competition and continuous improvement among Sri Lanka's major private hospitals are vital for maintaining a consolidated private medical service in the country. According to Basturescu and Kechagias (2014), the private medical sector is one of the world's fastest-growing industries, and it will improve over time to fill gaps in public medical services.

Competitive advantage can be achieved or obtained by developing skills and other attributes required to outperform an organization's competitors. It should assist the organization in increasing revenue and establishing a dominant market position in the industry (Cegliski, 2017). When it comes to the private medical sector in Sri Lanka, the application of lean practices in the supply chain function can improve those organizations' competitive advantage by lowering costs, minimizing waste, providing quality services, and satisfying customers' needs and desires. Through the ideas and recommendations of supply chain professionals in the private healthcare sector in Sri Lanka, some suggestions have been identified to effectively apply lean practices in the supply chain function to improve the competitive advantage of those private medical hospitals.

1) Application of Value Stream Mapping: According to supply chain professionals, the first step of enhancing organizational performance is identifying opportunities that add value to the organization's service and its customers. Following that, the hospital should define the term “value” to the organization and the major functions that can add value to the service provided to customers. One of the interviewees brought up

“As a private organization we always try to give our best service to the customer. But to provide the best, we must regularly monitor the changes in requirements and use advanced methods to provide quality services to our customers. This will help add more value to the customers and in return give us more value by trusting us and continuing their relationship with us”.

According to the supply chain professionals, it is crucial to figure out the delivery channels of the service-providing process from the organization to the customers to identify the occasions where more value can be generated for the customers, from the time they enter the hospital until they complete their treatment or service. After identifying the areas where value can be added to the process, investing in them to generate high value will have a direct impact on customer satisfaction and make customers loyal to the organization. This method is known as Value Stream Mapping and implementing it will ensure an improvement in the quality of the private medical sector in Sri Lanka.

2) Focus PDCA (planning, doing, checking, and acting): Focus PDCA is a lean application that goes hand in hand with value stream mapping to enhance the efficiency of an organization with the ideology of planning, doing, checking, and acting according to the observations and the results of a process. During the interview process, the authors realized that, when paying attention to the Sri Lankan private hospital sector, it is crucial to identify what should be done to improve the value of the organizational process which becomes beneficial for both customers and organizations through value stream mapping. After identifying those key elements, the next step should be taken immediately to plan and launch those identifying key points to improve the organizational process. After planning that process there should be a mechanism to launch and monitor those implications and should review the results of those projects to identify better improvements and changes that can be applied to gain further development in the organizational process. As a final step, it is important to act upon the identified improvement areas as soon as possible to avoid any mistakes and to grab all potential opportunities created in the market. This process can be systematically applied to the Sri Lankan private health sector to obtain continuous improvement while eliminating wastage and reducing operational costs of the organizational process.

Establish and implement the PDCA lean application in the hospital in the healthcare sector there should be active and interactive communication among the staff within the hospital, from the beginning of the process, and necessary to have a strong leadership that can direct the relevant parties, resources and a work environment that improves with this PDCA process. As supply chain professionals suggested, another important requirement is a platform that can propose or suggest important ideas and plans that can be contributed to this PDCA lean application from the frontline hospital employees and adding them to a common platform enhances the improvements needed to achieve the effectiveness of the hospital will be valuable in these processes.

3) Implement Continuous flow: *“It is important to maintain a continuous flow of working process in the organization, especially in the supply chain functions to eliminate unnecessary inventory holding costs. When there are several stoppages in between the organizational workflow it affects the efficiency of the organization, and such stoppages lead to the discontinuation of the organizational process that negatively affects the quality of the service provided to the customers”.* During the study's interview, one of the supply

chain professionals mentioned these important factors, and the continuous flow of work will ensure the smooth operation of the process of working and reduce the time duration and total cost element of the operations conducted within the organization. Customers can benefit from the services of these hospitals without any delays or spending much time, which provides a competitive advantage for the organization and helps retain existing customers and attract new customers.

From the point of view of the interviewees, there are systematic steps to be followed in setting up a continuous work floor and if they are properly followed and implemented repeatedly, it will be simple, and efficiency will be achieved as mentioned in the above interview. During implementation, a combination of several Lean tools will be used for this purpose. These are Value Stream Mapping, Kanban, and Kaizen. First, the process from admitting to discharge should be identified and the inefficiencies and bottlenecks faced by patients in dealing with the hospital process should be identified.

Further, if the inefficiencies are to be improved efficiently, it is necessary to remove actions and resources that do not add value to the process. As a next step, all the identified procedures should be improved to an acceptable level so that there will be a good working environment in the factory and employees will be impressed with the process in the factory. It is a positive change for competitive advantage. An automated communication process can be implemented through visual presentation tools for managers and staff to provide a real-time data floor. During the visit to the hospitals, it was possible to study the fact that a few employees do more work without dividing the work order among the staff in a way that can be done effectively as a main factor that causes the inefficiency of the hospitals. It is important to divide the workload between the staff and the sections in a better way.

As a further step forward, instead of distributing resources throughout the warehouse based on the constant annual needs of the warehouse, the process of distributing resources based on the actual demand will be implemented. As mentioned above, the systems should be continuously monitored and improved over time. According to the steps mentioned above, a continuous work floor should be set up with patients as the focus in hospitals and this will be a main foundation to gain a competitive advantage with the ability to utilize resources well and increase the satisfaction of patients. Finally, above mentioned procedure will help to effectively achieve future business goals set by private hospitals with expectations to be achieved in the healthcare sector.

4) Reduce Medical Errors: Lean practices are defined as versatile and adaptable sets of tools that can be easily implemented in a business. Despite their simplicity and ease of implementation, lean tools can play an important role in ensuring patient safety in the private medical sector. Lean practices can be used to improve organizational processes that affect service quality. According to supply chain professionals, an improved set of organizational processes contains no fatal errors or opportunities for safety hazards. This method helps to reduce medical errors, lower patients' risk levels, and ensure their safety while interacting with a private medical service provider.

Lean practices are defined as a versatile and adaptable set of tools that can be easily implemented in a business. Despite their simplicity and ease of implementation, lean tools can play an important role in ensuring patient safety in the private medical sector. Lean practices can be used to improve organizational processes that affect service quality. An improved set of organizational processes contains no fatal errors or

opportunities for safety hazards. This method helps reduce medical errors, lower patients' risk levels, and ensure their safety while interacting with a private medical service.

5) Improve Staff Engagement: Lean applications can be used effectively to improve communication among employees in an organization. Improving lean applications such as Kanban to provide employees with real-time updates on the status of the working process will ensure that the relevant staff members are aware of when their engagement should be completed, and responsibilities should be met. This will assist in ensuring that continuous development occurs in the hospital and that staff members are effectively participating in the improvement process while making changes to the processes to improve quality and efficiency. *“When there is clear communication about the work in progress, it is easy to manage the workload of the staff and any mistakes can be reduced because every staff member is getting updated about the current progress and they can get ready to complete their tasks without panicking or delaying,”* said a supply chain expert. This method can improve employee cooperation and reduce certain obstacles such as misunderstandings, the flow of incorrect information, and employee conflict to improve the hospital's effective working platform.

6) Improves Capacity: When a private medical hospital implements lean supply chain practices in its organization to reduce costs and eliminate waste, it may be open to some additional opportunities. Supply chain professionals always try to expand their inventory capacity by applying different types of methodologies to reduce costs such as transportation and labor costs. When lean practices are used effectively in inventory management, extra capacity is created to store essential items for use in an emergency, allowing hospitals to act quickly when needed. It helps maintain a competitive advantage over competitors by lowering other supply chain-related costs such as third-party warehouse a competitive advantage over competitors by lowering other supply chain-related costs such as third-party warehouse costs and transportation costs.

7) Root Cause Analysis: One of the supply chain professionals stated during an interview, *“Mistakes can happen here and there.”* However, it is critical to identify the initial event that caused an employee, department, or the entire organization to make that error. To that end, conducting a proper root cause analysis is critical to identify the reasons for those errors and to take precautions to avoid such errors in the future. According to the interviewee, the best option is to implement a monitoring and controlling team to identify any mistakes in the organization's working process, determine the root cause of those mistakes, devise preventative measures to avoid such mistakes in the future, by developing fishbone diagram and five why analysis to ensure that the organization runs smoothly.

This root cause analysis method ultimately contributes to the improvement of the quality of the organization and as mentioned above, by referring to a group-based investigation, the organization's systems, and processes as well as the influence on the behavior of people are specifically targeted and directed. Supply chain employees of the private medical sector always try to set up and implement the root cause analysis in the hospital of the healthcare industry, in addition to the above-mentioned employee contribution, more facilities are needed, and it takes time to get a specific result regarding the incidents. This analysis is best suited for organizations with well-connected, repetitive communications.

Using root cause analysis works to resolve an incident properly and systematically after it has occurred rather than providing a quick fix. Further, the ways to repeat the incident are completely closed. The analysis considers how the systems and processes put in place have influenced the staff's decision-making process, and based on the findings of the analysis, systems change is made to change behavior. As a result, the improvement and security of the organization will be created, which will enable the organization to provide quality service and establish the trust of the customers of the organization. The above important aspects have led interviewees to consider root cause analysis for the private hospital sector and the possibility of using root cause analysis for complex incidents has become of additional importance.

C. Discussion

After critically analyzing the results of the study, there is a significant impact of lean applications on the organizational effectiveness of the private hospital sector in Sri Lanka. However, implementing new lean methodologies suggested in the study by supply chain professionals contains the ability to enhance the impact of lean practices on the private hospital sector to a great extent. Munaa et al. (2021) suggested that implementing a value stream map in the hospital sector can be beneficial for both employees and patients by helping to achieve expected outcomes in some variables such as waste reduction and cost efficiency of the entire chain of organizational process. Limitations of the private hospitals in Sri Lanka such as lack of technology and in-house patient capacity can negatively affect the overall quality standards of the industry. According to Alemsan et al. (2022), it is crucial to identify the gaps existing in the hospital industry and provide healthcare management with justifications to prioritize the use of lean practices to enhance the capacity for resilience in the healthcare supply chain and the healthcare infrastructure. A study conducted by Wijewardana and Rupasinghe (2013) by developing a framework for identifying lean practices that may be suitable for adoption in the healthcare supply chain which can be integrated and contribute to the sustainable performances of the Sri Lankan hospital sector. With the literature support of past researchers and the results based on the study, the correct application of lean practices can enhance the effectiveness of the private hospital sector in Sri Lanka, and with the help of lean applications the private hospital sector can reduce organizational wastage and operational cost that uplift the quality standards of the entire organizational process.

V. CONCLUSION

Applying lean management to the organizational framework and supply chain function of the private hospital sector has the potential to provide the push needed to go beyond the boundaries and collect the specific skill set required to perform much better than their competitors. Cost reduction, waste management, quality improvement, and increased efficiency are key attributes in a private hospital that can be developed using lean applications, and these factors, when combined with aspects such as safety and cleanliness, effective communication, and continuous improvement, will ensure the organization's stability in the market with an advantage in performance, quality, and customer satisfaction. The use of lean tools assists the organization in keeping the operating environment clean, neat, and in a specific order to ease the working process, as well as improving the safety levels of the employees who work with the organization and leaving a positive impression on the minds of the customers. These private medical service providers can reduce waste by using lean tools, a process known as "Eliminating

Muda" Lean practices support the efficient management of hospital inventory, resulting in fewer obsolete, expired, or damaged stocks. This will reduce inventory holding costs and save the organization a significant amount of money. Also, adhering to the above-mentioned strategies in the private healthcare sector can uplift the standards of the service and value added to the organizations. Identifying the current trends of lean supply chain management and 5twish to establish them in a practical context can reap more benefits by reducing all types of wastage, enhancing efficiency, reducing lead time of operations, and enhancing better medical service to the customers. It can help to gain smooth operation while minimizing errors.

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