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ON

RECENT TRENDS IN MULTI-DISCIPLINARY RESEARCH AND INNOVATION

ICRTMRI'24

13th September 2024

in Association with

BRITTS IMPERIAL UNIVERSITY COLLEGE
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STRATEGIES, CHALLENGES, AND SUCCESS FACTORS IN LEAN IMPLEMENTATION FOR MANUFACTURING INDUSTRY - A LITERATURE REVIEW

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Abstract
The review aims to contribute to the broader theme of sustainable development goals by addressing lean methodologies that can enhance efficiency, reduce waste, and promote environmentally conscious practices in manufacturing. The objective is to critically examine the strategies employed, challenges encountered, and success factors identified in the implementation of lean principles within the manufacturing industry. This review delves into the core concepts of lean implementation, exploring the principles of waste reduction, continuous improvement, and the overall streamlining of production processes. The review also aims to establish a connection between lean practices and their potential impact on achieving sustainable development goals in both technological and managerial aspects. The literature review adopts a systematic approach to analyze scholarly articles, research papers, and case studies. The findings of this literature review provide an in-depth understanding of the diverse strategies adopted by manufacturing industries in their lean journeys. It also highlights the common challenges faced during the implementation process and identifies the success factors that contribute to the effective integration of lean principles. Some challenges are lack of leadership devotion, mismanagement of resources, customer-centricity flaws, lack of training and knowledge among the employees, and reluctance to change. Success factors that are innovation and transform in infrastructure, project preference, training, dedication.
Keywords: Lean Implementation, Manufacturing Industry, Waste Reduction, Continuous Improvement.

1. INTRODUCTION

Due to the increased competition and global reach in every sector and the ease with which businesses may now expand their market opportunities, companies now need to investigate new approaches to improving their offerings. For companies to maintain a competitive edge, innovation is now more crucial than ever due to industry technical breakthroughs [1]. In this scenario, enhancing operational efficiency and satisfying consumer needs and wants can be accomplished by the incorporation of Lean Manufacturing techniques [2, 3]. The lean manufacturing technique, which has been implemented in many nations and industries, is based

on ideas, procedures, instruments, and tactics that are meant to optimize resource use and minimize customer-facing non-value-adding activities [4].

The phrase "Lean Manufacturing" is very new, having been introduced by Krafcik in the year 1988 and having a prosperous history of around sixty years [5, 9]. In essence, lean manufacturing is the Toyota Production System (TPS), which emerged in the Japanese automobile industry following World War II [4, 5]. According to the study [6] the lean manufacturing can be defined as the comprehensive socio-technical structure, aims to minimize waste by simultaneously cutting down on consumer, vendor, and organizational variability. Lean manufacturing in its simplest form [7], seeks to produce the same result with fewer inputs, including a shorter duration, space, employees, equipment, material, and expenditure. In the attempt of commercial outstanding qualities, lean manufacturing has shown to be an effective substitute in the manufacturing sector, boosting processing effectiveness and productivity as well as overseeing operational tasks [8, 9].

An analysis of the literature reveals that lean manufacturing has made a significant contribution to a wide range of businesses in advanced and developing economies [10]. These contributions encompass encouraging operating efficiency (through increases in reliability, speed of delivery, and/or inventory and expenses reduction), company viability (by means of modifications in revenue, sales, and consumer fulfilment), ecological sustainability (through a decline of harmful debris, such as energy consumption and material waste), community performance (through lowering of current risks regarding staff well-being and security), and, eventually, enhancing long term sustainability through the accomplishment of triple bottom line necessities [8, 9, 10, 11]. These parameters make lean manufacturing crucial from a sustainable development goals perspective; for instance, researcher Bittencourt et al. [12], indicate that there is a lean manufacturing that has cooperative relationships that help businesses and directly support three of the seventeen Sustainable Development Goals: Goal 8: Growth in the Economy and Decent Work, Goals 9 and 12 are infrastructure, industry, and innovation; and responsible production and consumption. However, the idea of lean, which is still relatively unfamiliar and doesn't necessarily currently be adequately entrenched in enterprise frameworks, is still not widely adopted in emerging nations [16]. Additionally, numerous scholars [13, 14, 15] have examined the factors for the unwillingness of companies to adopt lean on an individual basis. According to Singh et al. [17], the government's backing and the dedication of senior management are crucial for breaking down obstacles. According to Abolhassani et al. [18], even non-practitioners acknowledge that appropriate technical understanding and managerial commitment are necessary for the effective adoption of lean.

This led to proposed three fundamental questions related to lean manufacturing in the industrial world of its diversified and effective characteristics as follows: "what are the Strategies, Challenges, and Success factors in Lean Implementation for manufacturing industry?". In this context, the factors which play crucial roles in all the three parameters are crucially and comprehensively explored through theoretical review of existing studies being the primary objective of this research. Researcher conduct a review of the relevant literature resources and outline the challenges, success factors along with the strategies followed in the current scenario. The methodology used in this article relies on systematic reviewing of distinct resources available electronically. At the end, the findings are discussed, relevant conclusions are reached, the limits are addressed, and a roadmap for potential future research is provided.

2. Literature Review

Numerous scholarly investigations have explored the elements that facilitate the effective use of Lean Manufacturing methodologies in businesses operating in various international settings. These investigations cover a wide range of methodological techniques, including applied study, theoretical investigation, and quantitative analysis, and they all have the same goal of clarifying the underlying principles, verifying the components that are already in place, and examining additional relevant aspects.

2.1 Background for Lean Manufacturing

Lean is widely utilized in the transdisciplinary field and is defined differently by researchers with varied ideas, goals, viewpoints, ideas, and proposals [14, 15, 16]. Lean manufacturing often refers to waste-free production [18, 19]. The majority of academics have emphasized lean as a strategy for reducing waste. Conversely, lean was described by Shah and Patel [21] as a way to maximize value to consumers by eliminating waste through human and process design aspects. A few definitions include minimizing buffering costs, removing waste at every stage of a product's value stream, and identifying and removing waste in the supply chain's value stream [22].

2.2 Strategies evolving in LEAN MANUFACTURING

The advantages or rationale for its execution may also be used to determine lean. To encourage longevity in business processes and executive leadership, lean, for example, is a method that strives to increase operational effectiveness, discover waste and value, generate knowledge, and create an environment of constant enhancement. Therefore, lowering rework—which by nature consumes greater quantities of energy and resources than necessary—will assist in improving staff comprehension of efficiency [23].

The lean technique's philosophy has been used by academics to articulate lean. Lean, for instance, is defined as a people-oriented manufacturing system. In addition, lean manufacturing broadens the purview of Toyota's production philosophy [24, 25]. With continuous global expansion, the Toyota manufacturing system was created and improved between 1945 and 1970. Reducing waste, as defined by Ohno [26], is the fundamental idea underlying this approach. By providing attractive advantages like minimal errors, customizable manufacturing, constant enhancement of high-quality goods and procedures, and reducing waste, the lean approach improved large-scale manufacturing in this manner. Moreover, lean is a multifaceted methodology that enhances operations and competitive performance through well-maintained equipment (TPM), a well-established quality system (TQM), cellular layout, production with minimal waste (JIT), well-trained and empowered labor force (HRM), and continuous and uninterrupted flow [27, 28].

There are several techniques that may be employed in an organization to efficiently eliminate waste. The techniques encompass material demand preparation, kanban, kaizen, just-in-time, value stream mapping (VSM), and others.

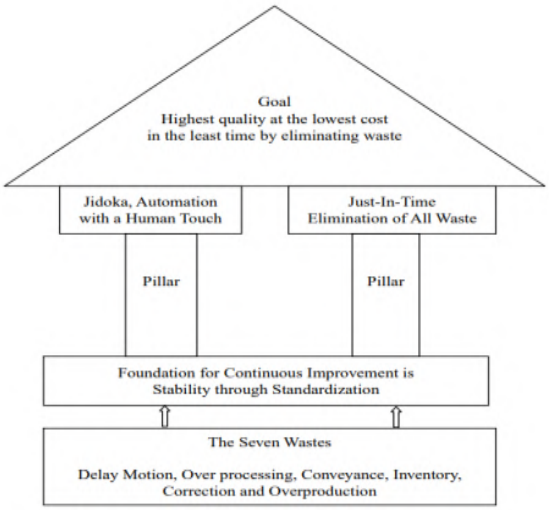

Figure 1: Basic lean concepts and methods. [Source: Dennis (2007)]. Reference -25 Lean Tools which are effectively used for waste elimination by the organization

Figure 1, presents the lean idea and lean methodologies in a concise manner by showcasing a revised model of the TPS home. Process stability and standardization—also known as leveling production, or heijunka and systemic ongoing enhancement form the cornerstone of the TPS house [25]. The human element, whose significance is demonstrated in a variety of ways, including management dedication, cooperation under governance, employee training and development, inspiration, and incentive programs, has been integrated to these conventional grounds [26,27]. A whole is formed from the combination of its weak and lean pieces.

Just in Time (JIT)-

Taiichi Ohno, the company's first vice president, created just-in-time manufacturing with the intention of cutting expenses by doing away with waste [24,25]. JIT aims to produce just the things that are required in the precise amount required [26, 28]. Thus, when a consumer requests a certain product, a JIT-based manufacturing procedure may supply it in that precise quantity. Customers are concerned about lead times to manufacturers, which is sometimes referred to as delivery times [29]. The amount of time that passes between a client placing an order and when they get the finished product is known as the lead time. Now is the moment when it is accessible to help customers plan their purchases, and it stands to reason that happier customers are those with shorter lead times [30]. One of the most often used pull signaling techniques is Kanban, which is necessary for the manufacture of just-in-time items. According to Hernández and Vizán [30], Kanban is a card-based data collection and management system that facilitates the progression of manufacturing operations by transferring resources into manufacture only when required or whenever the client requests them.

Kaizen

Masaki Imai coined the term "kaizen," which combines the Japanese terms "Kai" meaning to alter, and "Zen" meaning to improve. Kaizen, which literally translates as "change to improve," is not simply an initiative for cutting expenses; rather, it is an organizational mindset that constantly evolves toward standards of excellence. Continuous enhancement, also known as kaizen, is regarded by many as a perfect approach to manufacturing in both a spiritual and material perspective [25, 30, 31]. Three key elements make up this process: understanding,

which identifies issues; ideation, which generates original solutions; and making choices, which puts those solutions into practice and assesses their results. That is, in order to accomplish a certain goal, businesses need to select the finest proposal, organize how to implement it, and really implement it [30]. By gathering information, analyzing underlying causes, finding and choosing the best solution from a range of options, putting the solution into practice, and providing enough documentation, the kaizen technique has been used to gradually eradicate issues. They saw a number of advantages from applying kaizen, including the total elimination of wastes like poor quality, rejections, and product rework, as well as significant cost savings [31].

Value Stream Mapping (VSM)

The term "value stream" refers to the collection of all the particular steps needed to move an item through the three essential management duties of every business: handling data, modification and transformation of information, and resolving issues [23, 24]. VSM is a technique that involves tracing the data and material flows necessary for coordinating the work carried out by distributors, vendors, and producers in supplying products to consumers. The possibility to use several lean strategies was first found by looking at the present-day situation map, which was used to identify the source of waste. It is suggested by [31] that the Visual depiction of VSM makes it easier to identify and eliminate activities that do not generate value from a value stream. The creation of an eventual state mapping according to a revision plan is the subsequent phase in the VSM process. The choice to install a lean tool is made easier and more valid when the information in the VSM is available. It may also inspire the business to achieve the targeted outcomes during the actual implementation [30]. With the use of VSM, which explicitly shows stock, lead time, delay time, etc., as well as process flow, we are able to contrast barrier loop time to Takt time. In the Fawaz et al. research paper, the "before" and "after" scenarios are examined using a simulation, which aids in highlighting the possible advantages such shorter lead times for manufacturing and less inventory of work-in-process. Before implementing lean, [31] found that a simulation model may be utilized to assess fundamental performance metrics.

Kanban

The Lean Manufacturing System's Kanban module was developed to manage the amount of stock, components, supply and demand of elements, and output. According to Junior et al., the implementer may categorize and evaluate Kanban variances by having an understanding of the framework's development and buildup [31]. Sort the Kanban technique into the manufacturing Kanban method and the supply chain Kanban network employing the multiple card method. In order to smooth out the manufacturing process and reduce inventory during unpredictable demand, buffer maintenance is required [24, 25, 30]. The Kanban System is reconfigured accordingly. In order to reduce lead times for the delivery of goods and optimize the use of resources like labor and machinery, the Kanban technique offers heterogeneous pattern manufacturing in addition to the ideal supply level.

Manufacturing Resource Planning (MRP)

The specifications required for finished goods may be transformed into a thorough raw material schedule with the help of MRP, a very effective technology. Material planning errors lead to a host of issues, such as reduced efficiency, unnecessary inventory creation, and stress [25]. Manufacturing resource planning (MRP) assists in accurately estimating the needs for ingredients and stocks while reducing the likelihood of creating production schedules that are unobtainable. De la Vega-Rodríguez M et al., [31] discovered that a number of issues arise

when systems utilizing MRP are not implemented correctly. The discipline of operation management is greatly impacted by lean manufacturing.

2.3 Most Suitable Strategies used for Lean Implementation Success

For instance, a manufacturing business employed VSM to pinpoint an important production line delay brought on by high inventory levels [32]. They found that the high inventory was driving up handling expenses and needless waiting times by looking at the VS. They were able to end the delay, cut expenses, and boost overall productivity by putting in place a JIT inventory system and lowering inventory levels. However, to increase the effectiveness of their packaging process, a pharmaceutical business planned a Kaizen event [33]. The group found several inefficiencies, including needless inventory, superfluous movements, and duplicate inspections. They collaborated and held brainstorming sessions [34] to make modifications including pulling out a pull system to remove needless motion, moving workstations to decrease motion, and using VSM to shorten inspection times. Another scholar Saboo A et al., [35] describes how VSM was successfully implemented in a manufacturing SME in India. The findings of the research and the practical enhancements made show that using VSM is a successful tactic for these kinds of organizations to enhance their workflows and so address present issues. In order to enhance the efficiency of the Indian manufacturing industry, the study [36] attempts to create a road map that would help those who make decisions successfully implement comprehensive Just-in-Time (JIT)- lean methods. Through a thorough review of the available research and opinions of experts, the present investigation outlines 26 methods employed in the consolidated JIT-lean manufacturing procedure and additionally divides them into 5 primary groups. By analyzing the effects of various lean approaches on the efficiency and effectiveness of 140 manufacturing organizations worldwide, the study [37] looks for supporting data. According to the findings, business efficiency is most significantly impacted by JIT and automation, whereas kaizen, TPM, and VSM appear to have less of an impact—if any—on the efficiency of operations.

2.4 Challenges while implementing lean manufacturing

Leading the transformation path and getting beyond obstacles are the challenges of implementing lean [5, 7, 8]. For this reason, the research examined the current obstacles to lean adoption in order to distill the most important findings and recommendations toward lean transformation. AlManei et al. [6], developed a new lean framework based on the factors that encourage and hinder the application of lean. Early identification of shortcomings is necessary for furniture firms to become aware of their capabilities, better prepare for lean implementation, and maintain unwavering process consistency [38]. Moreover, according to the transformation strategy, lean deployment necessitates modifications to the system, structure, procedure, and employee behavior [23, 27].

Additionally, [5] carried out a thorough literature investigation in addition to researching automobile firms that are implementing or have adopted the Lean method, especially in India. Through the use of surveys, they identified a number of obstacles standing in the way of fully fledged Lean growth. A lack of leadership devotion, poor Lean organizing, mismanagement of resources, customer centricity flaws, an absence of an overall plan and approach for Lean execution, a choice of subpar tools and practices, and improper Lean system orientation for employees were some of these challenges [6, 7]. Short-term vision and an absence of emphasis on performance monitoring are common characteristics of management styles. Notwithstanding,

certain aspects of SME management attributes are advantageous for implementing Lean [8]. Typically, there is little, unofficial, and "hands-on" management. In contrast to large organizations, SMEs often have flatter, less hierarchical organizational structures. Standardization of procedures may be harmed by a casual atmosphere and an adaptable work schedule. However, a few features of SME organizational design, such as significant individual effect on business success and considerable adaptability, might be considered advantageous for a Lean endeavor. Organizational traits of SMEs that are favorable to a lean initiative include their significant individual effect on business success and degree of flexibility [5, 6, 35].

The primary challenge firms have while implementing lean manufacturing is navigating change while also eliminating and surmounting barriers, as noted by the writers in [6]. According to these writers, there are organizations that think lean manufacturing is difficult to implement and complicated. There is not enough time in some companies to put the theory into practice [12,39,40,41]. Furthermore, as evidenced by recent studies [41, 42], some firms do not see the advantages of implementing lean manufacturing and instead view it as a passing trend or gimmick. Furthermore, as noted by the authors in [16], impaired employee relations and employees' reluctance to modify their behavior—which leads them to revert to their previous habits—are obstacles encountered during the adoption of lean management [40]. This research demonstrated that workers' opposition to the new ideology, an absence of knowledge about technology related lean manufacturing deployment, and a paucity of encouragement from upper and middle management were among the primary obstacles to implementing the principles of Lean.

Some of the prominent issues or challenges highlighted in distinct published articles

Challenges	**Application**	**References**
Motivation for employing Lean practices	• To enhance consumer satisfaction • To reduce waste • To curtail production expensive • To strengthen the quality of products and services • Improve efficiency and workplace culture • Resolve problems by identifying and preventing them.	[39, 40, 41, 42, 43]

Challenges/ Barriers in Lean implementations	• Inadequate managerial support specifically from higher wings. • Reluctance to change comprising the employees and management • Lack of commitment and empowerment in the workplace. • Lack of knowledge including technical, and how to implement lean techniques • Insufficient supervisory skills to implement lean • Insufficient workforce skills to implement • Lack of well-trained and experienced staff • Inappropriate time and fund for implementing lean • lean unsuitable with employee attitudes in performing their jobs • Culture and human attitudinal issues.	[6, 7, 8, 9, 10, 15, 16, 23, 39, 41]
Challenges related to adopting	• Employee opposition to change. • Without a clear direction from the organization's leadership team and a cultural transformation, it is difficult to maintain the Lean strategy. • Creation of a culture that is sustainable.	
transformation	• The leadership's systems approach to cultural transformation. • Every employee in the company must leave their comfort zone and alter their interpersonal relationships in order to accommodate the changes in attitude and culture. • People must also alter the manner in which they carry out particular duties. • Workers should believe that there is always room for improvement in their operations.	[5, 7, 18, 39, 40, 42, 44, 45]

Table 1: Table illustrates prominent challenges and their references

2.5 Success Factors in lean manufacturing

Numerous scholarly investigations have explored the elements that facilitate the effective use of Lean Manufacturing methodologies in businesses operating in various international settings. For instance, a perceptive study [38] evaluated the degree of Lean Manufacturing application in the Malaysian automotive sector, resulting in the calculation of the average degree of application across five carefully scrutinized factors. Meanwhile, research by [46] concentrated on analyzing soft practices as essential components to effective lean manufacturing deployment. Using SEM and factor analysis, this comprehensively evaluated the procedures closely related to the human element in the Lean framework. In addition, [47] started an investigation to find the Critical Success Factors (CSFs) in using Lean Manufacturing. This study's purview was expanded to include investigating Lean Six Sigma deployment. There were five key Critical Success Factors

recognized: culture, innovation and transforming infrastructure, project preference, training, dedication and motivation of the executive managerial body. Furthermore, an intriguing example that highlighted an Indian car company where instructors and pupils engaged in the process of instruction and learning using Lean techniques was presented. Through this project, several critical success factors were identified, including top-level managerial involvement, collaborative teams, techniques for management, along with successful leadership [46]. These factors generated enduring competitive advantages as well as developmental and financial advantages. In a different area, research examined how 14 Indian SMEs that manufacture automobiles were implementing lean manufacturing and other efforts. Through the careful collection of data through semi-structured evaluations and assessments, it was eventually discovered that these organizations had a deep comprehension of Lean principles, with leadership and the culture of the organization emerging as critical components for Lean achievement [46]. The effective execution of Lean projects is said to depend on top management commitment, which is shown by having a clear vision, providing sufficient resources, and exercising strategic leadership [45]. In this context, managers are seen to be crucial in emphasizing traits of leadership including idealized influence, encouragement, drive, and stimulating thinking. It is anticipated that the company's overall achievement and the effectiveness of Lean Manufacturing methods would benefit from these leadership-focused measures [20].

Lean implementation inside a corporation works effectively when there exists close collaboration and interaction with suppliers, as well as innovative production methods from suppliers that meet industrial specifications. The reduction of waste and costs is accomplished by setting a shared objective between suppliers and organizations [24]. Moreover, integrating supplier management with Lean technologies as an organization's strategy enhances compliance, lowers the time dedicated to audits of quality and modification, and raises the standard of raw materials [31, 48]. This favorable connection with suppliers therefore has an advantageous effect on inventory reduction, value chain optimization, and the capacity to manufacture in accordance with client requirements. With a well-thought-out plan based on a sound strategy and an easily understood process, companies can give top priority to meeting specific customer needs, including those related to design, cost, and shorter lead times. Establishing a strong and long-lasting business relationship with clients is achieved by regularly showcasing products that are either better than or equal to those of other companies in the sector [6, 8, 18]. Additionally, process improvement and waste and complexity reduction contribute to more customer satisfaction and greater customer-oriented performance, as well as dependable transportation, quicker turnaround times, and an agile reaction to demand. In light of this, companies that successfully use Lean, guided by the requirements and expectations of their consumers, have a competitive edge over their rivals by providing greater value to their clients [29,32,38].

Some of the success factors and their references are discussed below in tabular form.

Success Factors	**Effects**	**Reference**
Management Involvement and Commitment	• Responsibility for coordinating and optimizing all individual departments and operations. • Encourages employee participation • Direct and positive effect on Project Leadership • Hiring middle management and employees	[5, 7, 13, 38, 46, 47, 49, 50]
Commitment of management in Lean implementation through innovation and skill building.	• Increased adoption and effective application of Lean methodology • Investment in infrastructure and skills development • Improve knowledge and capabilities of employees, promoting greater participation and commitment to Lean practices • Investment in Training and Education are expected to achieve better results in the implementation of Lean and achieve sustained improvement. • Increased employee awareness of operational issues. • Employee empowerment, training, and good leadership all have a positive impact on individual productivity as well as an organization's long-term competitiveness and performance. Employers should also cherish their workforce and encourage individuals to exercise initiative. • Organizations can enhance their productivity and effectiveness by offering structured training that emphasizes improving employees' mindsets, coordinating their goals and values with the company. • Training and knowledge building embracing ideas of professionalism, effectiveness, and dedication	[43, 45, 46, 47, 49, 50]

Leadership and Customer Orientation	• Lean principles are essential for constructing a robust model and striving for excellence in Lean practices through improving consumer focus and satisfaction. • Customer expectations will experience process improvements, such as reduced waste, complexity, and variability • Improved customer-centric performance. • Leaders are essential in bringing about change, fostering an environment of excellence, establishing goals and policies, and creating a forward-thinking perspective that puts the needs and expectations of clients first.	[18, 31, 43, 47, 51, 52]
Leadership, Vendors and Lean Manufacturing	• Incorporating lean supplier management techniques into a business's strategy improves raw material reliability and compliance while reducing the amount of worker time needed for quality assurance procedures. • Companies may maximize the incentive structure, accomplish effective manufacturing, and ensure prompt shipment of products to clients by supporting vendors in their Lean development and building strong relationships with them. • For Lean Manufacturing to be successful, an efficient relationship between Lean and vendors is therefore crucial. • Leadership and Lean Manufacturing techniques are essential to guiding all staff members toward a shared objective of creating high-quality products and making sure their employer thrives in a dynamic business environment.	[43, 48, 51, 52]

Table 2: Illustrate the success factors and their references

3. Results and Key Findings

According to this study, the main goals of implementing lean techniques are to boost productivity, make better use of available space, and maintain a tidy and orderly work environment. The main intention of this review paper is to keenly observe the strategies, challenges and success components throughout the implementation of lean technique in the manufacturing sector. When looking toward the strategies used to employe lean in manufacturing the study review distinct type of techniques because lean is a multifaceted methodology that enhances operations and competitive performance through well-maintained equipment (TPM), a well-established quality system (TQM), cellular layout, production with minimal waste (JIT), well-trained and empowered labor force (HRM), and continuous and uninterrupted flow. Value stream mapping (VSM), one of the lean manufacturing techniques, improves environmental sustainability by determining and recording how the energy, water, and

raw materials are utilized in manufacturing operations. On the other hand JIT (Just in time) aims to produce just the things that are required in the precise amount required and Kanban is a management system that facilitates the progression of manufacturing operations by transferring resources into manufacture only when required or whenever the client requests them.

Another focus area of the review is to comprehensively explore the challenges faced by the organizations while implementing the lean manufacturing and the study underlined that the reasons and obstacles to lean adoption amply justify the importance of the difficulties. Two of the biggest obstacles to lean adoption have been identified: a lack of technical expertise and inadequate training. Inadequate proficiency, technical expertise, and training in lean methodologies will lead to incorrect implementation, which will ultimately result in subpar outcomes and advantages. Furthermore, lean enterprises concur that they encountered challenges in allocating time, material, and human resources to guarantee the triumph of lean execution.

When the article explores the success factors, Lean methodology has demonstrated its efficacy in enhancing manufacturing businesses' performance in recent years, as evidenced by gains in productivity, cost reduction, and profit margins, all of which boost the companies' competitiveness. Establishing a work environment that prioritizes motivation and communication among employees is a key component of Lean Manufacturing adoption. If the management of these businesses maintains Lean principles with inspired and motivated staff, these businesses may endure economic ups and downs while increasing performance and profitability. Furthermore, enhanced performance, lower costs, shorter lead times, greater versatility, better resource utilization, higher productivity, and lower inventory are all facilitated by having a strong training program on the adoption of lean that improves employees' abilities, competencies, and ability to make choices.

CONCLUSION

Companies that wish to identify the path that they would like to pursue for their firm in order to increase earnings as well as advantages for their employees need to have a business objective and an innovative attitude. This can only be accomplished by executing improvement initiatives, like putting Lean Manufacturing into practice, by assembling multidisciplinary teams headed by capable individuals who engage in and effectively complete the tasks required to meet the project's goals. The approach taken in this review research aims to illustrate strategies, success factors and the crucial challenges facing the organization and their efforts toward implementing Lean Manufacturing in the manufacturing sector. The current research emphasizes three factors while implementing lean manufacturing: strategies, challenges, and success factors. Moreover, review some existing studies to determine the most effective strategy among some distinct approaches like VSM, JIT, Kaizen, and others. Although no specific and concrete finding is extracted, some scholars find JIT to be the most effective approach, while others believe VSM is the best. Moving to another competent review, i.e., challenges associated with lean manufacturing while implementing it in organizations, the study identifies that management and higher authority play a significant role and that their unwillingness, non-cooperation, and reluctance attitude are responsible for other issues like lack of commitment and empowerment in the workplace, employee opposition to change, culture, and human attitudinal issues. These problems drag and are reflected in implementing lean manufacturing by creating challenges such as insufficient supervisory skills to implement lean, inappropriate time and funds for implementing lean, lean unsuitable with employee attitudes in performing their jobs, among others. The study also explores successful factors for lean manufacturing such as

culture, innovation, transforming infrastructure, project preference, training, dedication, and motivation of the executive managerial body. These factors generated enduring competitive advantages as well as developmental and financial advantages. The success factor for effective execution of lean projects is assumed to rely on top management commitment, which is shown by having a clear vision, providing sufficient resources, and exercising strategic leadership.

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