



LEAN MANUFACTURING ISSUES AND CHALLENGES IN SMALL MEDIUM ENTERPRISES: A REVIEW

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ABSTRACT

This review identifies the obstacles small and medium-sized businesses (SMEs) face when implementing lean manufacturing systems. One of the most important measures of a country's strong economic progress is the expansion of SMEs. In the current business environment, small and medium-sized businesses' ability to adapt swiftly to the shifting needs of their clients and provide high-quality goods at reduced prices in response to demand determines how competitive they are. SME competition is fierce, and all are striving to meet their goals by improving their skills through automation and cutting-edge ideas like Just in Time, Total Quality Management (TQM), and Lean Manufacturing Systems. In industrial companies, lean manufacturing is a rapidly expanding culture. According to its definition, lean manufacturing is an efficient technique for getting rid of all waste in a production process. Because change is unavoidable, putting new management concepts and methods into practice is never easy or certain. As a result, businesses must design their strategies to meet the needs of their clients. In addition to other advantages, the application of lean in big and medium-sized manufacturing firms reduced material handling costs, shortened manufacturing lead times, and enhanced product quality. A successful lean manufacturing program incorporates methods and instruments for waste identification, management commitment, employee involvement, and training and education.

KEYWORDS: Introduction, Literature Survey, Expected Outcomes, Conclusions, References

1. INTRODUCTION

An analytical method for getting rid of all waste in industrial operations is the lean manufacturing system. LMS, also known as the "Toyota Production System (TPS)," was initially introduced by Toyota. It has since expanded across many industrial sectors and is no longer solely focused on the automobile sector. Organizations are being forced to consider new tools and processes due to global competitiveness, rising production costs, and resource scarcity. Looking at the current market scenario, Footwear Manufacturing sector in India is one of the second largest globally and employs above 2 million people which has a high share of MSME and strong export potential over 150

countries. Major clusters includes Agra, Kanpur, Chennai Ranipet, Ambur, and Kolkata, specializing in leather and non-leather footwear, components, and accessories. As per reports (as of 2024) India has 15,000 footwear manufacturing units in India, covering both leather and non-leather segments of which the organized sector (modern, registered) comprises roughly 15%, i.e. 2,250 units & the unorganized sector (small, cottage, home-based) makes up the remaining 85% i.e. 12,750 units. Having flawless, accurate, and well-organized production processes is crucial for maintaining concentration. Cultural, technological, organizational, and financial factors are the main reasons why manufacturing organizations face

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obstacles while implementing lean (Darabi R et al., 2012). Although lean is a well-known framework for growing an organization in all areas, many businesses struggle to execute it. In India, lean methodology has been used for the past 20 years, although only a small number of companies have successfully adopted lean manufacturing. According to Singh et al. (2010), senior management's mindset and strategy about the lean philosophy need to be improved in Indian enterprises. According to Achanga et al. (2006), there is a direct correlation between management styles and output-influencing variables such as lead time, workforce size, and return on investments (ROIs). Middle and senior management's lack of appreciation is the primary obstacle to lean implementation. This is also evident in the research conducted by Moradlou and Asadi (2015), which indicated that one of the main causes of the failure of lean implementation in SMEs is the mindset of senior management. According to Salaheldin's (2005) analysis, SMEs' shortage of skilled labor is the primary barrier to implementing lean. According to Shah and Ward's (2003) analysis, the biggest barrier to implementing lean methodologies is the organization's size. After more analysis, it was shown that not all Just in Time (JIT) techniques are appropriate for SMEs (Shah and Ward, 2003). According to the authors of the Gallois research from 2012, SMEs face significant obstacles like a shortage of funding, trouble obtaining funding, and a fear of investment risk (Bonavia and Marin, 2006). Perez and Sanchez (2004) showed that due to certain barriers and constraints, small manufacturing companies are the least inclined to adopt lean concepts. The poll, which included executives, quality managers, production managers, and managing directors, established this.

2. LITERATURE SURVEY

According to Jadhav et al. [9], there are obstacles to the adoption of lean frameworks, including social differentiation, inadequate management, betrayal of trust, and lack of thoroughness. The legislatures of several countries throughout the world are enabling small and medium-sized firms to understand and implement lean frameworks by providing them with databases of lean specialists, financial assistance for expert preparation, and the establishment of effective partnerships. Worldwide, the manufacturing sector is the backbone of any economy and has a direct

impact on industries like mining, transportation, and warehousing, according to Moradlou and Perera [10].

After analysis, the primary obstacles can be divided into four groups:

1. Inadequate top-level management support;
2. Financial incapacity;
3. Staff skill gaps; and
4. Organizational culture.

Lean Production Systems (LPS) have been described by Sieckmann et al. [11] as a solution to requirements related to flexibility, costs, process quality, and time. Human considerations and proper lean procedures are given special consideration. The limited application of specific lean strategies and tools in production processes is a significant obstacle to the pharmaceutical industry's adoption of lean production systems.

Kherbach et al. [12] assessed the degree of acceptance of lean principles and examined how lean was implemented in small businesses. Employee training is essential to the lean's successful adoption and benefits. Small-scale manufacturing companies face challenges throughout the implementation phase. As a result, 87% of factories are determined to require personnel training. Understanding the diverse needs of SMEs can assist management in setting up employee training appropriately and developing suitable plans for the effective adoption of a lean. Numerous organizations are worried about the well-being and job happiness of their human resources, according to research by Cirjaliu and Draghici [13]. These days, this is beneficial for an organization's long-term goals, particularly for its workers. Lean manufacturing is difficult to implement, and potential alterations may result in ergonomic problems. Nirwana and Dhewanto [14] assessed the obstacles brought about by a limited consumer base and the inability of the media to obtain the response. Only by having direct conversations with clients interested in incremental products was the feedback feasible. The administrative rule was the root of the Quick Iteration concept's issues. Othman [15] noted a number of reasons why choosing the lean generation framework was difficult. Reception of the lean creation framework is argued to be an information exchange

activity. Unwillingness to share knowledge can also be attributed to the knowledge recipient. One issue with LPS adoption stems from a lack of knowledge transfer that offers a more thorough comprehension of the obstacles to LPS implementation.

It offers a fundamental paradigm for seeing the deployment of Lean Production System techniques as a knowledge transfer problem rather than a technique application problem. It creates a new avenue for analysis in the study of LPS adoption, addressing the several facets of human motivation, the type of knowledge that is imparted, and the intricate process adjustments that ought to go along with LPS deployment.

Almanei et al. [16] looked into the organizations who struggled with lean implementation and thus failed to do so. These companies not only negatively damage their resources, but more significantly, they undermine the trust that employees have in the lean ideology. Barriers may vary throughout firms and include things like leadership, employee involvement, tools and strategies, etc. The main conclusion reached is that there is no one-size-fits-all road map for becoming “lean,” and that each organization must customize the procedures, resources, and methods required for a lean system.

The most underappreciated management-related obstacles were examined by Kumar and Kumar [17]. These included a lack of management support, a lack of focus on lean methods, an inability to generate a feeling of urgency for implementation, and a lack of a long-term vision for the business based on lean methods. In order to deploy new technology and adopt better technology for improved communication, management should assist in providing sufficient time, money, and financial assistance as well as adequate consulting.

According to Ankomah et al. [18], SMEs continue to suffer from a variety of problems, including poor product quality, inefficient operations, budget overruns, and more. Even though the Lean methodology has been gradually adopted as a possible remedy for organizations that have discovered that Lean standards may be important in SMEs, it must be placed within the context of their

unique features, including size, financial capacity, organizational culture, and human resources. This is a crucial discovery for SMEs in the construction industry that lack the capacity to apply Lean methodologies but aim to establish a Lean execution framework to enhance its performance. According to Antosz and Stadnicka [19], lean manufacturing employs a variety of techniques to cut costs, enhance product quality, and lessen workload, but they are unaware of additional options for boosting business efficiency. Waiting for supplies, needless movement of personnel, supplies, equipment, and breakdowns all contribute to significant waste in any organization. Gaining a competitive edge and optimizing the production process are the main motivations for LM implementation.

Dombrowski and Karl [20] looked into how lean development (LD) standards have gradually defined the product development process (PDP) in the industrial industries. Manufacturers have successfully embraced lean development, yet such norms and methods show that suppliers hardly or never work. The difference between the supplier-specific task and the procedure is what leads to this dilemma. According to Matt and Rauch [21], small businesses struggle to apply LMS because they worry that they don't know enough about lean and other resources like time, money, and people. Due to their limited resources, small businesses find it particularly challenging to obtain expert counsel. Additionally, highly skilled and seasoned engineers find these businesses less appealing. Many small businesses employ novice engineers for whom Lean principles and methods are unthinkable.

According to Kumar [22], there are a variety of obstacles to implementing lean in any organization, including a lack of methodology, inadequate planning, top management's reluctance, resistance to change, and other human factors. Lack of thorough lean knowledge and problem-solving solutions is one of the biggest challenges organizations face while implementing lean. Understanding the reciprocal reliance of barriers is made easier with the use of the ISM methodology. It distinguishes between barriers that exacerbate other barriers (dependent barriers) and barriers that contribute to other barriers (driving barriers). Relationships between these barriers are

developed using the ISM technique.

According to Alefari et al. [23], implementing lean manufacturing is typically a lengthy process, and employee engagement and management commitment are ultimately crucial to its success. There is a common belief that lean methods cannot be successfully implemented unless upper management is prepared to modify the strategy in accordance with lean manufacturing requirements. Lean leadership inclination can be viewed as a strategy for preserving and improving worker performance in lean manufacturing systems. Reviewing lean practice guidelines that can improve employee performance should be the leadership's main priority.

According to Singh and Jain [24], inadequate organizational structure, inappropriate methodology, and a lack of systems of procedures (SOPs) are the main obstacles to the adoption of lean manufacturing in SMEs. In their analysis of the obstacles to Lean implementation in SMEs, Moef et al. [25] noted a number of conflicts between the characteristics, including a lack of formal procedures, a lack of competence, a lack of resources, a lack of short-term strategy, and a lack of functional structure. Poor decision-making, a lack of leadership, and the inaccessibility of qualified consultants are additional significant obstacles to implementing lean manufacturing.

According to Prakash and Prasad [26], there are a few obstacles to putting the lean mindset into practice, including inadequate finance, misunderstandings about it, inadequate training, and a lack of commitment from top management. In order to compete successfully in the global manufacturing environment of today, it is strongly advised that organizations abandon their conventional methods and mindsets and adopt lean methods and tools. According to research by Lodgaard et al. [27], employees at different levels perceive unanticipated barriers to leaning. Top management ascribed the limited achievement to obstacles found with lean tools and procedures. While middle managers mostly reported that worker duties and responsibilities were not clearly defined and that the appropriate tools and approaches were not chosen, employees generally cited management-related issues. To upgrade the

outcomes more research is required.

According to a study by Widiasih et al. [28], top management requires fundamental decision-making skills in order to recognize, assess, and analyze possible risks. In order to accomplish this, a risk management model that integrates many technologies is created. To identify the connections between risk events, interpretive structural modeling, or ISM, is used. After examining the connections between these obstacles, it was determined that ISM approach needed to be coordinated with another method, structural equation modeling, for validation purposes in order to meet KPIs and provide employees with lean knowledge. Organizational culture, human-related problems, and a lack of resources are the three types of impediments to lean practice in businesses, according to Wyrwicka and Mrugalska [29].

According to Jaiswal and Kumar [30], there are a number of obstacles that are preventing SMEs from adopting lean manufacturing, including a lack of commitment from top management, budgetary limitations, organizational bureaucracy, reluctance to embrace new technologies, and employee opposition. Balaji and Muniraju [31] analysed MSMEs in India are not financially sound and always adopt traditional methods in manufacturing. Individual Lean implementation obstacles have been found and categorized into three main groups, including financial, organizational, and management issues. Implementing lean principles should be encouraged by the knowledge of obstacles and the ability to overcome them with the help of creating an organizational culture of persistent change and waste elimination.

According to research by Sundareshan et al. [32], one of the most frequently mentioned obstacles to the adoption of lean in a business is employee disengagement. These factors also affect quality of work life, therefore it is concluded that in order to identify and eliminate obstacles in any business, QWL (quality of work life) must be examined throughout the lean implementation. According to a study by Abdul et al. [33], construction practitioners can overcome their lack of awareness of lean development by learning about its benefits through conferences and seminars. The government ought to enact laws

that incentivize businesses to embrace lean concepts. Lean construction should be promoted by managers since it can significantly reduce the company's production costs. Managers must be creative thinkers and adapt to changing times. This can be accomplished by implementing new regulations that minimize waste, changing the organization's culture to make lean methods mandatory, and collaborating with suppliers and subcontractors who use lean construction techniques or are at least open to doing so.

3. EXPECTED OUTCOMES

Following a review of all the aforementioned papers, some crucial conclusions are reached, which are listed below:

1. The primary goal is to create and convey a concept that compares traditional and lean approaches, emphasizing their distinctions, with a focus on small and medium-sized businesses.
2. In order for an organization to successfully implement lean manufacturing, it must plan to prioritize ensuring that personnel receive sufficient training. Since successful lean implementation depends on efficient communication, the knowledge and information exchange challenge must be addressed.
3. Senior management blamed a number of obstacles for lean manufacturing's failure. Employees mainly identified management-related issues. Although middle managers acknowledged a number of obstacles, they focused mostly on the improper delegation of tasks and duties and the failure to select the most effective tools. To improve the outcome more research is required. To increase the accuracy of result, future research should include more organizations trying to implement lean principal and tools.
4. There are a number of obstacles to the successful implementation of lean in manufacturing industries, including insufficient management support, staff skill gaps, organizational culture, human attitude problems, and bad worker leadership and attitude.
5. Following the identification of obstacles, lean implementation techniques can be created. Tools like failure mode and effect analysis, quality function deployment, balance score cards, etc. are used for a successful and long-lasting

lean implementation. Modeling techniques like interpretive structural modeling and the analytical hierarchy process can be used to analyze how the barriers interact.

4. CONCLUSIONS

This review paper concluded that the biggest obstacles to implementing lean manufacturing are a lack of resources, poor management, inadequate technical knowledge and training, human attitude problems, ignorance of the lean philosophy, inadequate planning, a lack of methodology, and employee resistance to change. This study demonstrates that the main obstacles to implementing lean in an organization are a lack of understanding about the practice, a lack of appreciation from management, and a failure to adopt a lean culture. Some managers attempt to apply lean methods using certain tools, but they overlook the fundamental lean idea of "respect for people." Top management requires fundamental decision-making tools in order to analyze and assess the obstacles. In order to accomplish this, a risk management model that integrates many technologies is created. The model created using the ISM model can be statistically tested using structural equation modeling, or SEM. The intricate connections between different barriers in lean implementations are also examined using ISM (interpretive structural modeling) methodologies. To determine the connection between the difficulties encountered during Lean implementation, a hierarchical relationship model (HRM) is created. These tools, which are based on research, assist decision-makers and upper management in determining the best course of action, as well as in developing policies and strategies to lower risks and vulnerabilities when implementing lean manufacturing.

REFERENCES

1. Darabi R, Moradi R, & Toomari U, "Barrier to Implementation of Lean Accounting in Manufacturing Companies", International Journal of Business and Commerce, Vol. 1(9), pp. 38-51, 2012.
2. Singh B, Garg S.K., Sharma S.K., "Scope for Lean Implementation: a survey of 127 Indian industries", International Journal of Rapid Manufacturing, Vol. 1(3), 2010.
3. Achanga, P., Shehab, E., Roy, R., & Nelder, G., "Critical success factors for lean implementation within SMEs", Journal of Manufacturing Technology Management, Vol. 17(4), pp. 460-471, 2006.
4. Moradlou, H., & Asadi, M., "Implementation of Agile Manu-

- facturing Principles in Small and Medium Enterprises", *Journal of Modern Processes in Manufacturing and Production*. Vol. 4, No. 3, pp. 31-44, 2015.
5. Salaheldin, S. S., "JIT implementation in Egyptian manufacturing firms: some empirical evidence", *International Journal of Operations & Production Management*, Vol.25(4), pp 354-370, 2005.
 6. Shah, R. and Ward, P. T., "Lean manufacturing: context, practice bundles and performance", *Journal of Operations Management*, vol. 21, pp. 129-149, 2003.
 7. Bonavia, T. and Marin, J. A., "An empirical study of lean production in the ceramic tile industry in Spain", *International Journal of Operation & Production Management*, vol. 26, pp. 505-531, 2006.
 8. Perez, M. P. and Sanchez, A. M., "Lean production and supplier relations: a survey of practices in Aragonese automotive industry", *Technovation*, vol. 20, pp. 665-676, 2000.
 9. Jagdish R. Jadhav, Shankar S. Mantha, Santosh B. Rane "Exploring barriers in lean implementation" *International Journal of Lean Six Sigma*, Vol. 5 (2), pp.122-148, 2014.
 10. Hamid Moradlou & Terrence Perera "Identification of the Barriers in Implementation of Lean Principles in Iranian SMEs: Case Study Approach" *Global Journal of Management and Business Research* Vol. 17 (1), 2017.
 11. Sieckmann, Hien Nguyen Ngoc, Rene Helm, Holger Kohl "Implementation of lean production systems in small and medium sized pharmaceutical enterprises" *Procedia Manufacturing*, Vol. 21, pp. 814-821, 2018
 12. Oualid kherbach, Marian Liviu Mocan and Cristian Dumitrache "Implementation of the Lean Manufacturing in Local Small and Medium Sized Enterprises" *Journal of Innovation Management in Small & Medium Enterprises*, Vol. 2017 (2017).
 13. Bianca Cirjaliu, Anca Draghici, "Ergonomic Issues in Lean Manufacturing", *Procedia - Social and Behavioral Sciences*, Vol. 221, pp 105 – 110, 2016.
 14. Michael Dwianto Nirwana, Wawan Dhewanto, "Barriers in Implementing the Lean Startup Methodology in Indonesia – Case Study of B2B Startup", *Procedia - Social and Behavioral Sciences*, Vol.169, pp.23 – 30, 2015.
 15. Rozhan Othman "Barriers to Adoption of the Lean Production System" *Journal of Advanced Management Science*, Vol.4, pp.77-81, 2016.
 16. Mohammed Almani, Konstantinos Salonitis, Yuchun Xu, "Lean implementation frameworks: the challenges for SMEs", *Procedia CIRP*, Vol.63, pp. 750 – 755, 2017.
 17. Rakesh Kumar and Dr. Vikas Kumar "Barriers in Implementation of Lean Manufacturing System in Indian industry: A survey" *International Journal of Latest Trends in Engineering and Technology (IJLTET)*, Vol. 4 (2), 2014.
 18. Ankomah E. N.1, Ayarkwa J.2 and Agyekum K. "A theoretical review of lean implementation within construction smes" *International conference on infrastructure development in Africa* (2017).
 19. Katarzyna Antosz, Dorota Stadnicka, "Lean Philosophy Implementation in SMEs – Study Results", *Procedia Engineering*, Vol. 182, pp 25 – 32, 2017.
 20. Uwe Dombrowski, Alexander Karl, "Lean Product Development for Small and Medium-Sized Suppliers", *Procedia CIRP*, Vol. 63, pp.615 – 620, 2017.
 21. D.T. Matt, E. Rauch, "Implementation of Lean Production in small sized Enterprises", *Procedia CIRP*, Vol.12, pp.420 – 425, 2013.
 22. Akhil kumar "A Qualitative Study on the Barriers of Lean Manufacturing Implementation: An Indian Context (Delhi Ncr Region)" *The International Journal Of Engineering And Science (IJES)* Vol.3 (4), pp.21-28, 2014.
 23. Mudhafar Alefari, Konstantinos Salonitis, Yuchun Xu, "The role of leadership in implementing lean manufacturing", *Procedia CIRP*, Vol. 63, pp.756 – 761, 2017.
 24. Vikram Singh and Pankaj Jain "Implementation of lean manufacturing in small and medium enterprises" *International journal of advance research and innovative ideas in education* Vol.3 (2) (2017).
 25. A. Moeuf, S. Tamayos. Lamouri, R. Pellerin, A. Le-lievre, "Strengths and weaknesses of small and medium sized enterprises regarding the implementation of lean manufacturing", *IFAC-Papers On Line* 49-12, 071-07, (2016).
 26. Nihit Prakash and Prasad "Lean Practices in Small and Medium Manufacturing Enterprises – A Structured Literature Review" *Journal of Basic and Applied Engineering Research*, Vol.1, pp. 78-84, 2014.
 27. Eirin Lodgaard, Jonas A. Ingvaldsen, Inger Gamme, Silje Aschehoug, "Barrier to lean implementation: perception of softop managers, middle managers and workers", *Procedia CIRP*, Vol.57, pp.595 – 600, 2016.
 28. Wiwin Widiastih, Putu Dana Karningsih, Udisubakti Cip-tomulyono, "Development of integrated model for managing risk in lean manufacturing implementation: a case study in an Indonesian manufacturing company", *Procedia Manufacturing*, Vol.4, pp.282 – 290, 2015.
 29. Magdalena K. Wyrwicka, Beata Mrugalska, "Mirages of Lean Manufacturing in Practice", *Procedia Engineering*, Vol.182, pp.780-785, 2017.
 30. Piyush Jaiswal and Amaresh Kumar "Analyzing Barriers of Lean Manufacturing Adoption in Indian SMEs Using an Integrated Approach of Grey Decision Making Trial and Evaluation Laboratory" *Proceedings of the World Congress on Engineering*, Vol. 2 (2016).
 31. Balaji M, and Dr. M. Muniraju "Challenges in implementation of lean management in india – a study" Vol.4(1), 2017.
 32. Sundareshan S D, Dr Swamy D R, Dr T S Nanjundeswara Swamy "A Literature Review on Lean Implementations – A comprehensive summary" *Int. Journal of Engineering Research and applications*, Vol. 5(11), pp.73-81, 2015.
 33. S M Abdul Mannan Hussain, Apoorva Mercy Nama, Asra Fatima "Barriers to Implement Lean Principles in the Indian Construction Industry" *International Journal of Innovative Research in Advanced Engineering (IJIRAE)*, Vol.3(1), 2016.