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The Systematic Review of Lean Practices in India

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ABSTRACT

The systematic review of the literature examines studies on lean practices in India across a number of industries, providing insights into significant results, problems, and possibilities associated with the application of lean. Using a selection of relevant papers published in peer- reviewed journals, the study delivers results on lean performance evaluation, implementation challenges, enablers for lean practices, lean technology application, and sector-specific insights. The research identifies resistance to change and a lack of senior management support as hurdles, but it also underlines the importance of organizational culture, financial resources, and human resource management in supporting lean adoption. This study combines empirical information from a number of researches to give insights into tactics, techniques and best practices for implementing lean methodologies across diverse industry sectors in India. While these reviewed studies offer valuable knowledge, there are limitations to acknowledge which include sample size constraints; geographical focus as well as industry specific concerns. Future studies should focus on the dynamics of lean implementation in India taking account changing business environment within the country while considering emerging organizational management trends applies.

Keywords: Lean practices, Performance assessment, Barriers and Enablers, Lean tools, Machine tools, Footwear, Agriculture.

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INTRODUCTION

Optimization of different processes, reduction of waste, and fostering of efficiency have become in the limelight in changes witnessed in organizational management today. With reference to the evolution of lean concepts that trace back their roots from the Toyota Production System (TPS) in Japan, increasing applications have been found globally. In India, for example, different sectors have corporations that are practicing lean and as such, will make them improve their reputations for quality and competitiveness in obtaining operational excellence. This gives an overview of lean techniques in India based on the exhaustive review of studies carried out in diversified industry backgrounds. In a number of the sectors of its industries, the Lean Principles had relatively recently been adopted and were in the stage of getting adopted gradually in the popular mainstream as well, which included manufacturing, healthcare, construction, machine tools, footwear, agriculture, and so forth in India. The need to slash a plethora of otherwise existent inefficiencies, aiding in the amplification of productivity, and rendering more consumer value, against an existing scenario of increasingly vicious competition and ever-shifting market realities, is defining the implementation of Lean ideas in such sectors.

Research papers have valuated the ideologies of lean approaches and their suitability within different organizational environment. Lean techniques have been quite suitable in the manufacturing industry because they facilitate simple and easily understandable production operations, a reduction in lead time that products move through production systems, and obvious enhancement of the quality of products. Research valuation carried out amongst Indian manufacturing entities indicate the significance of lean approaches and tools in enabling these approaches be influential in the elimination of waste, maximization of resource allocation, and institution of a culture of advancing elements.

On the other side, the Indian healthcare industry is actually based on the implementation of lean management in the process of improvement of care for patients, reducing hospital-based procedures, including work, with an intention to uplift performance to ensure the service quality as a whole.

A recent conducted study on the implementation of Lean in Indian hospitals has concluded that the application of Lean principles can cut the waiting times and optimize the usage of resources involved, hence increasing the happiness experienced by patients. The second case for the next lean shows that lean concepts can be adopted to increase production and results at healthcare institutions, mainly in resource-starved environments caused by the increase in patients' expectations on an exponential basis. In addition, through the sector-specific answers, the basic concepts of lean implementations were observed in the sector of Machine Tool, Footwear, Agriculture, and Construction of India to eliminate the critical problems of the complex issues. Further, the researches done in various sectors are illustrating that the concepts of lean are largely used for the purposes of cutting the wastes and increasing the quality, process re- engineering, etc.

However, even as lean thinking has attracted considerable attention and appeal for business organizations across India, same has not been free of obstacles in the course of its adoption and implementation. In fact, many of research based studies identify that certain major findings are indicative of the lack of commitment of leadership, shortage of resources, problem plagued change and cultural barriers. Most problems often tend to arise when opportunities are depicted in the form of capacity building, improvement of performance and organizational learning.

It further changes the dynamics of lean methods within organizations, hence making the requirement that practitioners, policymakers, and academicians understand the same. It justifies the need for laying the overview of various lean methods within an

organizational context through historical data taken from other research, depicting the trends or problem and opportunities for organizational development within India.

This research based on lean methods has been focused on the information that was collected in sectors related to construction, agriculture, machine tool, footwear, and others. As per the many studies that have been seen, the focus is on how lean approaches are solving the opportunities and restrictions in all of the above industries similarly. Such studies provide good information as it further elucidates how through various means right from the optimization of supply chains to lean management, it is arising in different industries and how efforts are moving towards such sustainability through the adoption of various technologies.

With respect to the industrial sector, the research was towards the study relating to the efficiency of Lean coordinated tools and techniques that would contribute to improving operational excellence, cost reduction, and quality enhancement. The research, therefore, applied the lean concept to specific problems like inventory control, over-processing, and defects and showed prospective benefits that could arise from applying lean for Indian manufacturing organizations.

Similarly, health sector research on lean philosophies in health service sector portrayed the critical role lean production plays in ensuring the provision of increased quality of services to the client and patients in relation to the performance to the hospital and general service delivery. To evaluate the proper impact of lean ideas on resource efficiency, workflow control, and patient satisfaction on medical facilities in India, researchers evaluated the aspects that were claimed to be the operational measures and the key performance indices.

At the same time, India's nascent research enterprise on lean methodologies yields evidence of a few gaps and limitations, including needs for extensive cross-sector comparisons and longitudinal analysis, and also for detailed analysis of the broader sociocultural factors that shape lean adoption. This paper intends to supplement the continuous dialogue towards Lean management within India by synthesizing and suggesting further research based on prevalent literature and further hopes to inform policy and organizational decisions.

LITERATURE REVIEW

Lean management has evolved as a critical strategy for firms seeking operational excellence, increased efficiency, and continual improvement. In India, where enterprises face a variety of obstacles ranging from unpredictable market needs to resource restrictions, the use of lean principles has grown significantly across several sectors. A thorough assessment of the current literature sheds light on the state of lean management in India, emphasizing major results, trends, and implications for organizational performance.

In 2012, Indian SMEs provide evidence of lean manufacturing in emerging nations. India is becoming a new hub for manufacturing, and many companies are searching for ways to increase the value of their goods and services by eliminating pointless steps and ineffective practices from their manufacturing processes. Small and medium-sized enterprises (SMEs) are beginning to grasp the value of the robust lean manufacturing approach, which has shown to be successful as an operational model in developed nations and several significant Indian firms. The purpose of this research is to examine how lean manufacturing is being adopted in India and how small and medium-sized businesses are utilizing lean techniques. This article presents the results of four SMEs in India that have implemented the lean approach using the case study technique to drive significant improvement in manufacturing performance. © 2012 Taylor and Francis Group, LLC.

In 2012, Lean Six-Sigma monitoring of quality targets ensures competitiveness

The goal of this case study is to highlight the particular issue of numerous faults in radial tires made by a well-known Indian tire manufacturer. The study is to demonstrate the application of lean Six-Sigma methodology to the specific problems of defect reduction. Design, procedure, and strategy: Given that it is negatively impacting their financial performance and brand value, the management made this issue their top priority. To address the problem, a lean Six-Sigma consulting firm with offices in Mumbai was contacted. As part of his field study, one of the authors—who is researching the factors that lead to the successful implementation of lean manufacturing in Indian industries—joined this project and spent a significant amount of time observing and discussing the problem with individuals at various levels of the company's hierarchy. Lean Six-Sigma techniques were applied, and root-cause analysis was used to assess the issue. This case is based on the preliminary results of a research conducted at an Indian tire manufacturing company while concealing the true name of the business. A root-cause analysis of the radial tire manufacturing process revealed that the leading sources of defects were foreign particles in the production environment, under- and over-aging of tire components, and an inadequate bead wrapping method. It has been demonstrated that the lean Six Sigma technique might be a useful tool for reducing errors in the Indian tire manufacturing process. Originality/value: In an Indian industrial context where lean methods are still in their infancy and there is a scarcity of literature on the subject, this study provides critical insights into the efficient deployment of lean Six Sigma technologies. Copyright Emerald Group Publications, Ltd.

In 2013, A framework for assessing the car sectors' capacity for lean manufacturing: Manufacturers are forced to implement lean capabilities due to shifts in customer and technological demands. The lean thinking paradigm has been adopted by several companies in an effort to increase productivity and competitiveness. The adoption of lean manufacturing techniques in the automotive sector is discussed in this paper. The findings are based on information gathered from a typical questionnaire study of about 15 Indian manufacturing companies. A conceptual model that links lean techniques to competitive goals served as the study's guidance. To ascertain which of the several lean production tools and enablers are most likely to have a greater impact on putting a lean production system into place, the analytic hierarchy process (AHP) was employed for analysis. © 2013 Inderscience Enterprises Ltd.

In 2013, A strategic and operational approach to assess the lean performance in radial tyre manufacturing in India: A case based study. According to this study, an organization's financial situation impacts senior management's choice to use lean manufacturing practices in a tire manufacturing firm. Performance improvement is the consequence of developing a change management paradigm, which is greatly aided by organizational culture and human resource management. This study also reveals that the most hazardous wastes in radial tire production are over-processing and excessive defects, which helps to explain why radial tire manufacturing in India is expensive. Limitations and implications of the study: Because of the limited sample size and the fact that the study was done in a single (case) company, the findings cannot be considered for wide industrial relevance. However, this research can assist academics and actual managers in developing lean manufacturing practices.in context with the tyre industry since it encompasses insightful views of experienced lower to upper middle level managers. In the context of Indian tire manufacturing, where lean methods are still in their infancy and there is a dearth of literature on the subject, this study offers some critical facilitators for the effective use of lean technologies. In the tire business, an effort has also been made to create a basic Excel-based template for lean evaluation. By just changing the essential characteristics, this template may be applied to many sectors. Copyright Emerald Group Publications, Ltd.

In 2014, A Scale to Measure the Applicability of Lean Practices in IT Support Services:

Objective - The purpose of this paper is to present research that aims to conceptualize and develop an instrument to measure IT support service providers' perceptions of IT support services. applicability of lean concepts to IT support services. Design/Methodology/Approach
- Scale items were identified from existing literature and a survey instrument was used to collect data from IT support service providers. The measurement models of the structures were tested and the scale was validated by statistical means. Results - The results of the study indicate that the functional measures developed here meet the criteria of one-dimensionality, reliability and validity. Limitations/Implications of the Study - The researchers followed the established principles of survey research in selecting and excluding the measurement units of the study; but this may have been influenced by the author's personal bias. The research sample was drawn from IT support services companies located in India; therefore, the results can be generalized only to the extent that these companies are representative of the general population of all companies. Another limitation is that previous research/case studies have not been conducted to gather IT service professionals' perceptions of the applicability of lean practices. Originality/Value - This paper provides a new measurement tool to measure the applicability of lean practices in an IT support environment. © Emerald Group Publishing Limited.

In 2014, Human resource management implications of adopting the Toyota lean culture paradigm to India This study argues that the social, historical, and environmental settings of the host nations have a major role in the effective worldwide transmission of Japanese lean manufacturing methods, particularly specifically the Toyota Way and Toyota Production System (TPS). Policies and practices related to human resource management are significantly impacted by this. According to the study, lean manufacturing is more than just a set of ideas, methods, and procedures that can be put into practice via command and control. In the process of transferring lean techniques from Japan to overseas affiliates, there was either a lack of consideration or contempt for the unique culturally and environmental aspects of the host country. might have a negative impact on the parent company's organizational results. This point of view is investigated through a case study examination of Toyota Kirloskar Motors, an Indian subsidiary of the massive Japanese automaker Toyota Motor Corporation, which is based in Bidadi, close to Bangalore, India. 2014 Taylor & Francis copyright 2013.
In 2015, A roadmap for implementing lean in the Indian auto component manufacturing sector: A comparative analysis of the ISM and UNIDO modelsIndia's demand for cars has grown significantly during the past 25 years. Numerous multinational automakers and Tier-1 suppliers have already established production, R&D, and research centers in India. To meet these clients' demands, the Indian automotive component sector began embracing lean principles. Since 1999, the Government of India, the Automotive Component Manufacturers Association of India (ACMA), and the United Nations Industrial Development Organization (UNIDO) have worked together to support Indian SMEs in a number of clusters to help them become internationally competitive. Studying the UNIDO-ACMA Model and the Lean Implementation ISM Model, as well as validating the ISM Model through comparison with the UNIDO-ACMA Model, are the main goals of this research. It also seeks to provide a path for the use of lean in the Indian auto component sector. This study's secondary data sources include books, research articles, online articles, doctorate theses, survey reports, and publications about the automotive industry's use of lean, just-in-time, and integrated supply management. The authors worked with lean practitioners to establish the ISM Model for Lean practice packages. While the ISM Model contains eight steps for lean implementation, the UNIDO-ACMA Model only has six. The strong resemblance between the ISM-based Lean implementation model and the UNIDO- ACMA Model validates it.

In 2015, Probing the part of spare practices in allowing BIM relinquishment

substantiation from two Indian cases Construction systems remain to be agonized by cost and time overruns, primarily due to penurious information- sharing between design actors. erecting information modeling(BIM) has surfaced as a digital platform through which design brigades can partake information more and ameliorate design interpretation. still, numerous walls to BIM relinquishment live. The prosperous alignment of BIM technology with work processes as well as amenability to conciliate among design actors are considered most overcritical for prosperous BIM relinquishment. spare construction practices manipulate the conclusion of perfecting collaboration within a design platoon and give some fashions for how meliorated collaboration can be brought around around. While the use of BIM as a interceding intervention to enable operative spare practice perpetration as an outgrowth has been proved, the use of spare practices as intercessors for scoring meliorated situations of BIM use has not been adequately studied. This paper attempts to manipulate this gap and understand if and how spare practices can be exercised to enable BIM relinquishment. utilizing an ethnographic action exploration methodology, two metro rail position systems are studied in India, a country where cost and time overruns in numerous spots are much advanced than the global normal. On one design, erecting information models were erected and an attempt was made to exercise these models for meliorated resolution timber. On the alternate design, the last diary system was enforced for 6 months, after which BIM was acquainted on the design. The extent to which BIM was exercised for operative resolution making leading to accurate planning and timely completion of conditioning was measured. On the first design, BIM was hardly exercised for resolution timber. On the alternate design, spare practices created a cultivation of collaboration that incentivized the planning platoon to define the stripes of erecting information models that were to be erected, which would align with expostulations faced on point. These models were latterly batted upon inclusively and were exercised for resolution making with respects to planning and sequencing, alluding meliorated BIM relinquishment. It's argued that spare practices can enable BIM relinquishment and the two support each other. This paper contributes to knowledge on BIM relinquishment by showing off how spare practices reduce collaboration- related effects within the design association, paving the expressway for BIM relinquishment. erecting information modeling in confluence with spare practices can thus be exercised on construction systems to ameliorate design interpretation. © 2015 American Society of Civil masterminds.

In 2015, Lean administration practices to further develop store network execution of cowhide footwear industry, Calfskin Industry in India is among the best ten unfamiliar trade workers and commodity of footwear adds to 44 % of the all out commodity of endlessly cowhide items from India. The bullwhip effect caused by the highly fluctuating demand for leather footwear and its price elasticity exacerbate additional issues. Lean administration rehearses are material to all areas. However, appropriate models must be developed for various industries. The motivation behind this paper is to recognize the arrangement of lean practices adoptable in footwear area and to research the synergistic impacts of rest the board rehearses on production network functional execution of footwear area. Lean idea isn't simply material to creation yet can likewise be stretched out to inventory network to further develop the production network functional execution. The upgrading ascribes of Store network Functional Execution (SCOP) intended for footwear industry has been distinguished and focused on. The footwear industry's supply chain operational performance is the focus of a model designed to maximize the effectiveness of a comprehensive set of lean management practices. © 2015 IEEE.

In 2015, Impact of spare practices on performance measures in environment to Indian machine tool assiduity Purpose- The purpose of this paper is to probe the impact of spare product practices on performance measures in machine tool assiduity and determines the spare criteria that can have significant positive impact on performance. Design/ methodology/ approach- The exploration paper presents a mix of theoretical

frame and practical operations. Extant literature was reviewed and to achieve the exploration objects, an exploratory check was carried out in machine tool force chains located in the public capital region of India. trustability test, factor analysis and accretive multiple retrogression analysis bring out several spare criteria that can affect crucial performance measures. Findings- It was set up those two spare criteria, videlicet, strategic cooperation with suppliers and cross-functional cross-organizational design and development brigades significantly told utmost of the crucial performance measures. Some spare criteria were set up to negatively affect the overall competitive eventuality of machine tool enterprises. Originality/ value- The findings can encourage the operation of non-adopter enterprises to borrow spare thinking and to elect the spare product criteria that can be enforced to have significant positive impact on crucial performance pointers in machine tool value chains. This study is maybe among the first many that focus on machine tool assiduity in India. The paper provides useful perceptivity to the spare product device, advisers and experimenters.

In 2015, Application of lean in Indian process industries: some actual data. Goal: To prosper in today's highly competitive market, businesses are using lean manufacturing processes. Lean manufacturing is a fresh concept in India's process sectors. This article will look at the present situation of lean manufacturing in Indian process industries, focusing on lean methodologies, implementation reasons, and challenges. Design, Technique, and Approach: A survey was used to determine the level of lean adoption in India's process sectors. Statistical tests were used to assess the importance of lean methods, the reasons of lean implementation challenges in Indian process sectors. Conclusions: Lean manufacturing is still not extensively implemented in India's process industries. The findings indicate that lean is very successful in lowering waste and raising quality in Indian process enterprises that have adopted it. Most lean techniques created by Indian process industries concentrate on eliminating waste or improving quality. Indian process industries found that hiring lean experts, educating employees, and manufacturing in small batches are the main obstacles to lean implementation. Research constraints and outcomes Because of the small sample size in this study, care should be used when interpreting the results. While the study indicates that lean may be very beneficial if implemented in Indian process industries, further empirical research is required to quantify the performance gains brought about by lean adoption. This research looks at how lean adoption is going in India's process industries. Given the unique characteristics of these sectors, the current research will be valuable in establishing methods for implementing lean in process industry setups. Copyright Emerald Group Publishing Ltd.

In 2015, A case study on lean approaches in the equipment manufacturing industry.Lean manufacturing is a new idea in the Indian industrial landscape. Many small and medium-sized businesses in the country are seeking to become lean and thereby increase production. This report is based on a case study of one such firm in India that manufactures and assembles offset printing technology. As a vendor-based company, part shortages caused by process delays were a key issue. A complete examination of the many suppliers and processes that the product passes through was performed, and the process flow was mapped to create a clear image of the whole system, with software modeling assisting in the production of quantitative data. Pareto analysis, five-why analysis, source inspection, and other lean methods were used to identify and eliminate the many variables contributing to the delay. Proper task scheduling is also necessary to decrease wait time, hence an algorithm has been created to assist in determining the optimal scheduling sequence. The findings of this case study have proven effective in lowering the lead time of the component under consideration. © 2015 Inderscience Enterprises Ltd.

In 2018, The influence of lean methods on operational performance—an empirical research of Indian process industries:When selecting to implement lean manufacturing, it is critical to analyze where and how lean methods may most effectively affect manufacturing and business performance. Such an analysis is required when lean thinking is explored in a production setup other than the traditional, repetitive, high-volume, stable-demand, and discrete-manufacturing setting. This paper explains how adopting lean methods improves performance in the process industry. This is a somewhat under-researched subject when compared to the performance benefits of introducing and implementing lean concepts in traditional, discrete production. This study, which is based on a survey of Indian process industries, aims to create an empirical association between lean methods and performance improvement using multivariate statistics. The study concluded that lean approaches are positively connected with timely delivery, productivity, first-pass yield, waste elimination, inventory reduction, cost reduction, defect reduction, and enhanced demand management. However, in a process-industry setting, lean methods linked to pull production were found to have only a minor influence on performance improvement. The study includes a full examination of the findings, as well as their theoretical and management implications. © 2017 Informa UK Limited, business as Taylor & Francis Group.

In 2018, Incline generation hones and bundles: a comparative investigation Add up to beneficial upkeep and add up to quality administration are two incline fabricating activities that are utilized by fabricating plant supervisors to make strides operations capabilities. The reason of this paper is to examine the impacts of standalone incline hones and incline bundles on fabricating commerce execution. Design/methodology/approach: A quantitative approach was utilized. The study information was drawn from 160 fabricating organizations in India. The respondent companies were assembled on the premise of the length of incline generation in operation and at that point classified based on the profile of their operations procedure. The approach, based on comparative evaluation between standalone incline hones and incline bundles, has been coordinated toward legitimization of incline bundles for its back to competitive fabricating in the setting of the Indian fabricating division. Discoveries: The paper builds up the long-term impacts of incline bundles in altogether moving forward fabricating commerce execution as compared to standalone incline hones. Assist discoveries of the think about uncovered the noteworthiness of the length of incline generation in operation in accomplishing higher levels of fabricating commerce execution. Inquire about limitations/implications: The think about is cross-sectional in nature. It would be curiously to test the expository system embraced for this consider for more businesses and in distinctive nations. The utilize of subjective measures in study survey is too another confinement of the ponder. Viable suggestions: This consider offers clear suggestions for specialists, demonstrating that they ought to deliver higher accentuation on the usage of incline bundles utilizing add up to profitable support and add up to quality administration hones together, to prioritize their item, generation and trade techniques, to accomplish economical competitive advantage. Originality/value: This paper experimentally looks at and assesses the impact of incline hones and bundles in the setting of medium- and large-sized fabricating businesses in India. Other than, there are exceptionally few ponders that comparatively evaluate the contrasts in execution commitment of different incline operational procedures considering length of usage of incline. Moreover, the hypothetical commitment of the think about builds up the pith of joining add up to profitable administration and add up to quality administration for achieving world course fabricating is of tall esteem. © 2018, Emerald Distributing Limited.

In 2018, Implementing Sustainable Manufacturing Practices in Indian Manufacturing Companies In today's global industrial context, almost all key companies may now commit to sustainability in all of their operational activities, and each of them has their unique technique for achieving their sustainability goals. The goal of this article is to

evaluate sustainable manufacturing practices (SMP) in the Indian manufacturing sector. This article also focuses on how lean practices contribute to sustainable manufacturing (SM). Design/methodology/approach: The survey approach is employed in this study. The SMPs were chosen for the literature study, and a survey questionnaire was created. In all, 345 usable replies from four sectors, namely vehicle, electrical and electronics, machinery, and process, were obtained using Google survey. This research focuses on SMPs. According to this research, sustainable product and process design (SPPD), lean practices (LP), agile practice and customisation, sustainable supply operation and distribution, and product recovery and return practices all contribute to the SM. Research limits and implications: This work has significant limitations that future researchers should consider. After considering the big industries of Indian manufacturing across four sectors, the research may be expanded to include micro, small, and medium-sized firms in the Indian manufacturing landscape. The questionnaire may be further modified so that it can be used in a worldwide survey across several industries, allowing for a comparison of Indian enterprises to their global counterparts, Future longitudinal research can take into account additional SMPs such as mass customization and smart manufacturing processes. Practical implications: The current research assists stakeholders in developing strong regulatory norms/policies to support SMPs in the Indian manufacturing industry. This study may assist production/manufacturing managers/practitioners in understanding numerous topics linked to SM and how they may be used profitably to enhance their practices and performance towards sustainable development. Impacts on society This research improves the organization's corporate social responsibility. The company's corporate social responsibility activities will include poverty and malnutrition, promoting health care, including preventive health care, and sanitation, including a contribution to the Swachh Bharat Kosh, which was established by the Government of India to promote sanitation and provide safe drinking water. This underlines the company's overall goal of contributing to people's well- being and sustainable development through its commercial operations. Originality/value: This research provides evidence of the use of SMPs such as SPPD, LP, agile practices and customisation, sustainable supply operation and distribution, and product recovery and return procedures in Indian manufacturing organizations. The authors present a conceptual paradigm for SMPs that is practically tested. Copyright 2018. Emerald Publishing Limited.

In 2022, Organizational culture's impact on lean methods and operational performance:Purpose: There is a lack of study on the cultural dimensions of organizations relevant to lean deployment. Findings: The study found that the constructs of lean practices and organizational culture had a substantial and direct impact on the operational performance of Indian manufacturing SMEs. Furthermore, this study demonstrates the role of organizational culture in maintaining lean processes in small-medium manufacturing firm sets. study limitations/implications: More study in a more diversified setting is needed to establish the generalizability of the findings. Future study might look at the effects of lean practices and organizational culture on financial, social, and environmental performance metrics. Practical implications: The findings will assist managers of manufacturing SMEs in better understanding the relationship between lean and operational performance, taking into account the element of cultural change management within an organization. The findings of this study give important insights into how firms might attempt to preserve the lean manufacturing concept in their workplace. Originality/value: There is a scarcity of research on the essential junction between organizational culture and the durability of lean adoption. Culture is critical to making the necessary adjustments for lean adoption and maintaining the push toward lean production and management. This study is an attempt to close that gap. Copyright 2021 Emerald Publishing Limited.

In the past till date based on the article publications on lean practices in India, here

is the comprehensive overview of the research landscape regarding Lean practices in Indian industries, highlighting their impact on productivity, performance, and sustainability, as well as the challenges and opportunities associated with their implementation.
Lean manufacturing processes are widely regarded as efficient tools for increasing productivity and performance in a variety of sectors throughout India.
Small and medium-sized firms (SMEs) in India are rapidly implementing Lean methods to produce major gains in manufacturing performance.
Indian automotive SMEs have low lean performance, emphasizing the importance of comprehensive lean assessment systems for gaining long-term strategic advantage.
Combining lean and agile principles can improve sustainability in Indian manufacturing businesses, especially in response to global environmental concerns.
Industry 4.0 technologies are being integrated with lean techniques in manufacturing industries, with various sets of practices and technologies recognized as key to achieving high performance.
In the context of tire production in India, financial capability motivates top management commitment to lean implementation, while over-processing and excessive defects are found as major wastes.

RESEARCH METHOD

PROBLEM STATEMENT:

Background and Objectives of the Study

Despite the growing global recognition of the benefits offered by lean management concepts, there remains a noticeable scarcity of studies that explore their practical implementation within the Indian context. This gap in academic literature highlights the need for a comprehensive analysis that not only consolidates existing empirical findings but also uncovers the key challenges and opportunities associated with lean practices in India. Addressing this gap is crucial for guiding future research directions and enhancing practical efforts aimed at supporting effective lean implementation across various Indian industries.

The objectives of this study are twofold. First, it aims to conduct an in-depth analysis of empirical studies related to lean methods in India. Second, it seeks to identify and categorize the major findings, implementation challenges, and potential opportunities connected to the use of lean practices.

Scope of the Study

This research focuses specifically on empirical studies related to lean techniques that have been published in peer-reviewed journals, with a particular emphasis on the Indian context. The scope of the study spans various sectors and organizations, offering readers a comprehensive overview of how lean practices are applied across different industries in India.

Methodology

This study adopts a secondary data approach, utilizing previously published research indexed in the SCOPUS database. The research process was carried out through a structured and systematic literature review.

Search Strategy

The literature search was performed on the SCOPUS database using the search string: "lean practice*" AND "India". This search was conducted on January 18, 2024, at 6:50 PM (IST), and initially yielded 57 relevant records.

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Identification
A total of 57 records were identified through the initial database search.

Screening
Titles and abstracts of the retrieved records were screened to determine their relevance to the study's focus. Four records, including non-article and non-conference publications, were excluded at this stage, resulting in 48 relevant records.

Eligibility
The abstracts and, where necessary, the full texts of the 48 remaining records were thoroughly reviewed. One non-English article was excluded, leaving 47 eligible studies for detailed analysis.

Inclusion
A total of 47 records met the eligibility criteria and were included in the final systematic review and meta-analysis process. These selected studies were further analyzed to extract insights related to lean implementation in India.

Data Extraction
A manual literature review was conducted using Excel to extract critical data from the selected articles. Extracted data included article titles, publication years, and abstracts.

Data Analysis
The extracted data were systematically analyzed to identify recurring themes, methodologies, challenges, and outcomes associated with lean practices in the Indian context. The analysis enabled the synthesis of key findings and facilitated a deeper understanding of the landscape of lean implementation across Indian industries.

Reporting
The entire review process and its findings were reported following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, ensuring methodological transparency and reproducibility of results.

PRISMA SYSTEMATIC LIT REVIEW

<table>
<tr><td colspan="3">Search String:((“lean practice*”) AND (“India”))
Source: Scopus
Date & Time: 18th January 2024; 06:50PM(IST)</td></tr>
<tr><td rowspan="2">Identification</td><td>Records identified through database search (n= 57)</td><td></td></tr>
<tr><td></td><td>Excluded non article type, non-conference type
(n= 4)</td></tr>
</table>

Screening	Screening the titles and abstracts (n= 48)	
		Non-English articles removed (n= 1)
Eligibility	Downloading and reviewing the abstracts/full paper (n= 48)	
		Excluded articles those without abstract (n= 0)
Included	Literature included for Systematic Review/Meta analysis (n= 48)	

RESULTS

The survey indicates a varying degree of lean implementation across different sectors of Indian industries, with some industries showing significant progress while others are still in the nascent stages.The survey highlights various challenges to lean implementation, such as organizational culture, resource constraints, and resistance to change. Additionally, it identifies enablers such as top management support, employee empowerment, and supply chain integration. The literature underscores the importance of considering the socio-cultural, environmental, and regulatory context of India when implementing lean practices, as these factors can significantly influence the success of lean initiatives. Lean practices, combined with organizational culture, significantly impact operational performance in small- and medium-sized manufacturing enterprises (SMEs) in India. Lean practices contribute to sustained operational performance, especially when supported by a conducive organizational culture.Lean practices positively affect various performance metrics such as timely deliveries, productivity, quality improvement, waste reduction, and cost reduction.Lean practices, such as Kaizen and innovation management, positively influence economic, environmental, and competitive performance through green supply chain management.

Lean practices are applicable and beneficial across various industries in India, including manufacturing, retail, healthcare, IT support services, and machinery manufacturing. Implementing lean practices leads to improved performance metrics such as product quality, operational efficiency, and customer satisfaction in different industry sectors. The implementation of lean practices requires a systematic approach tailored to the specific industry context, such as textile manufacturing or IT support services.There is a growing trend towards integrating lean and green concepts to achieve sustainable development in organizations.Future research directions include exploring the synergy

between lean and green practices and identifying strategies for effectively adopting these concepts for sustainable development. Lean practices are beneficial for improving overall productivity in central India-based manufacturing industries. Lean manufacturing is increasingly recognized and implemented by small and medium- sized enterprises (SMEs) in India.

Case studies of four SMEs in India demonstrate significant improvements in manufacturing performance through Lean strategies. Indian automotive SMEs have poor lean performance. Fuzzy set theory and the best-worst method (BWM) are used to identify and prioritize effective practices for Indian industrial leaders. Companies achieving higher performance extensively implement start-up and in- transition practices/technologies. Financial capability drives top-management commitment to lean implementation in tyre manufacturing. Lean social practices and technical practices positively influence organizational performance in SMEs.

Lean adoption positively correlates with operational performance in SMEs in India. The study provides insights into the perception of Lean in SMEs and its impact on performance. Workplace organization, management, inventory control, and quality improvement practices are significant in Lean and green implementation. Lean initiatives improved efficiency, patient satisfaction, and quality of care in healthcare services. Implementation of Lean practices improved firm performance in a manufacturing unit in Northern India. Understanding these barriers can help in devising strategies to overcome challenges in Lean implementation. Management commitment, individual contribution, and resistance to change are critical barriers to Lean implementation in Northern Indian SMEs. in SMEs. Lean manufacturing practices like 5S, preventive maintenance, and supplier management are favoured by SMEs in Northern India. Lean implementation measures significantly impact Lean adoption in pump manufacturing industries in India.

IMPLICATIONS:

- **Strategic Importance:** The findings emphasize the strategic importance of lean practices for Indian industries aiming to improve productivity, quality, and competitiveness in the global market.
- **Managerial Insights:** Managers and practitioners can gain insights into the effective implementation strategies, key success factors, and potential pitfalls of lean initiatives in Indian organizational contexts.
- **Policy Implications:** Policymakers may draw upon the findings to formulate supportive policies and initiatives that foster the adoption and diffusion of lean practices across diverse sectors of the Indian economy.
- **Research Directions:** The survey identifies gaps and opportunities for future research, including longitudinal studies, comparative analyses across industries, and investigations into the integration of emerging technologies like blockchain and Industry 4.0 with lean principles.

CONCLUSION:

With a special emphasis on areas like manufacturing, healthcare, construction, and supply chain management, the literature review of the collection of papers provides insightful information about the application and effects of lean principles in Indian industries. Consistent evidence from numerous studies suggests that Lean concepts have the ability to improve productivity, quality, and operational performance. The poll does note certain difficulties, though, including low acceptance, cultural hurdles, and the requirement for corporate commitment and leadership support. In addition, research highlights how crucial it is to use context-specific strategies and combine Lean with other frameworks like Agile and sustainability in order to achieve long-term success. The surveyed research offers a basis for comprehending the dynamics of Lean

implementation in Indian contexts, but more investigation is necessary to fill in knowledge gaps, especially with regard to the practices' scalability, sustainability, and wider implications in various industries and organizational settings.

LIMITATIONS OF THE STUDY:

- **Limited Scope:** The survey's only purpose is to provide an overview of the conclusions and ideas from a certain collection of studies on lean techniques in Indian business. It might not cover the entire range of writing on this subject.
- **Contextual Restrictions:** The survey's primary focus is on research carried out in the Indian setting, which can make it less applicable to other sectors or geographic areas with distinct socioeconomic contexts.

Selection Bias: Since other pertinent studies may have been left out of the survey, the inclusion of only particular research publications could lead to selection bias.

- **Lack of Recent Research:** Given that the survey appears to contain articles written as late as 2023 or before 2023, it may not accurately reflect the most recent research trends and advancements in the area of lean techniques in Indian industry.
- **Heterogeneity of Findings:** It may be difficult to reach firm conclusions or pinpoint broad patterns since the survey synthesizes data from a variety of research publications with differing approaches, purviews, and goals.
- **Potential Publication Bias:** Research articles published by reputable publishers or in prestigious journals may be more likely to be included in the survey, which might have an impact on how the findings are presented.
- **Interpretation Bias:** Because the poll depends on the research articles' given summaries, it is possible that it will interpret results biasedly because these summaries do not accurately reflect the subtleties and complexity of the original studies.

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