

# LEAN IMPLEMENTATION IN INDIAN MANUFACTURING MSMEs: A SAP-LAP ANALYSIS

Misha Matharu, Neena Sinha

*University School of Management Studies, GGS Indraprastha University, New Delhi, India*

**Corresponding author:**

*Misha Matharu*

*University School of Management Studies*

*GGS Indraprastha University*

*New Delhi, India, Pin Code: 110078*

*phone: (+91) 9899-49-0090*

*e-mail: misha.matharu@gmail.com*

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**ABSTRACT**

A robust manufacturing sector is imperative for achieving sustainable and inclusive development. Also, in the Indian context, Micro, Small and Medium Enterprises (MSMEs) are of vital importance due to their contribution to GDP, exports and employment. Indian Government has launched many schemes to vitalize and improve the competitiveness of Manufacturing MSMEs. ‘Lean Manufacturing Competitiveness Scheme’ (LMCS) is a huge step aimed to act as a catalyst for lean adoption by Indian MSMEs. This paper uses SAP LAP framework to address critical questions regarding lean adoption by Indian manufacturing MSMEs in the context of the government scheme ‘LMCS’. The study adds to the existing body of knowledge on lean manufacturing that emphasizes on the importance of soft issues while implementing lean. It also benefits the stakeholders by suggesting suitable actions that can be taken to further improve the competitive priorities of MSMEs.

**KEYWORDS**

lean manufacturing, India, SAP-LAP framework, MSME, soft issues.

## Introduction

The modern economy has distanced itself from traditional mass production paradigm to respond to the dynamic rapidly changing business environment. Organizations today are constantly seeking excellence through improvement in productivity, quality, as well as becoming faster and cheaper than their competitors [1]. In this pursuit, organizations are adopting various approaches such as Total Quality Management, Just-In-Time production (JIT), Business Process Re-engineering (BPR), World Class Manufacturing etc. [2]. Lean Management has assumed a pivotal role in this regard. Lean has made significant impact on both practitioners as well as researchers all over the world. It is no more considered an arcane set of Japanese tools but has refined into management approach, which has far reaching impact on all organizational aspects [3]. Almost three decades ago, study by [4], identifying significant gap in performance of Japanese and western automotive

companies fuelled interest in lean. The European and American manufacturing were quick to emulate their Japanese counterparts in adopting lean practices. Lean has thus found wide acceptance and evolved into much more refined concept since then.

Traditionally considered applicable only for manufacturing units, it had found application in services, healthcare, education etc. [5]. Direct investment by Japanese companies and supply chain integration with Asian economies led to replication of lean efforts across economies [6, 7]. The economic liberalization also fuelled dynamism in emerging nations providing opportunities for technological advancement and improving their capabilities in order to offer products to developed countries and move up the value chain [8]. These factors contributed to widespread interest in lean among emerging economies.

Government is an important contextual factor that influences firm behaviour in emerging economies [9]. In the initial stages of industrial advancement, government acts as a facilitator of

adoption of new age technologies and management philosophies [10] through its support schemes and processes. India is no exception to it; government has been steering Indian economy towards integration with global economy after previously following protectionist policy since independence. A robust manufacturing sector is imperative for achieving sustainable and inclusive development [11]. As per 2020 Predicted Manufacturing Competitiveness, Deloitte [12] India is expected to move up to 5th position from 11th in 2016. To achieve its target of increasing contribution of manufacturing to GDP to 25% by 2025, government has launched many schemes.

In the Indian context, it is paramount to realize the role of Micro, Small and Medium Enterprises (MSMEs) for growth to take place in the manufacturing sector. In India, according to provisions of Micro, Small & Medium Enterprises Development (MSMED) Act, 2006, MSME are classified on the basis of investment in Plant & Machinery

- Micro enterprises – does not exceed Rs. 2,500,000,
- Small Enterprises – More than Rs. 2,500,000 but does not exceed Rs. 50,000,000,
- Medium Enterprises – More than Rs. 50,000,000 but does not exceed Rs. 100,000,000.

Contribution of MSMEs to GDP is around 8% and their share in exports is over 40 per cent [13]. Despite low cost labour and engineering skills, MSMEs still struggle with lack of resources, finances and adequate leadership skills. Indian MSMEs are thus striving to improve their competitive potential by adopting advanced manufacturing approaches such as lean [14]. Government is providing support to MSMEs for undertaking lean manufacturing (LM) through its scheme ‘Lean Manufacturing Competitiveness Scheme (LMCS)’.

### **Lean Manufacturing Competitiveness Scheme (LMCS)**

“Lean Manufacturing Competitiveness Scheme” was launched by Development Commissioner, Ministry of Micro, Small & Medium Enterprises (DCMSME), Govt. of India, which aimed at enhancing competitiveness of MSMEs. Initially, for 100 mini clusters on a pilot basis in 2009, the scheme was later up-scaled to 500 mini clusters in 2013.

The scheme is being implemented through mini-clusters as Special Purpose Vehicles (SPV) consisting of 8–12 units. The mini cluster would be aided by empanelled Lean Manufacturing Consultant (LMC) to implement lean tools. The Government grant for the Scheme is upto 80% of the Consultancy fees of

LMC and rest to be borne by the cluster members. The time period for implementation is 18 months, divided into 5 incremental stages.

The tools recognized as part of the scheme are:

- 5S System,
- Visual Control,
- Standard Operating Procedures (SOPs),
- Just in Time (JIT),
- KANBAN System,
- Cellular Layout,
- Value Stream Mapping,
- Poka Yoke or Mistake Proofing,
- Single Minutes Exchange of Dies or Quick Changeover (SMED),
- TPM (Total Productive Maintenance), and
- Kaizen Blitz or Rapid Improvement Process.

The scheme is an initiative aimed at enhancing competitiveness of the manufacturing sector. This initiative provides optimal setting for conducting a case study to analyze lean implementation in MSMEs.

This paper presents a case study aimed at:

- Developing an understanding of lean practices in Indian Manufacturing MSMEs.
- Identifying the problems faced by Indian manufacturing MSMEs while adopting lean along with solutions for assisting lean transformation of these organizations.

### **Review of Literature of Lean in India**

As defined by reference [15], lean provides a way to do more with less of everything – less human effort, less equipment, less time, and less space – while aiming at continuous improvement and customer satisfaction. In the light of volatile business environment and hyper competition, it becomes necessary to adopt and practice lean in order to improve production systems as well as move up the value chain [16]. Indian MSMEs tend to operate on reactive mode, with limited foresight of productivity and growth [17]. Lean provides means to end fire-fighting and adopt a culture of continuous improvement [3].

In order to conduct review of literature on lean in India, following steps were taken

- Articles from three major academic sources were considered i.e. Emerald Insight, Science Direct and Taylor & Francis. ‘Lean’ was used as a keyword to conduct search in title, articles not related to the field were excluded.
- A broader keyword ‘lean’ as opposed to ‘lean management’, ‘lean production’, ‘TPS’ was used to ensure an exhaustive review.

- This led to a final list of 447 articles, from the list, articles in which the research has been conducted in India were extracted leading to 57 studies.

Most of the studies i.e. 36 out of 57 were conducted in the last 5 years which could be conceived as a result of lean management's popularity as means to meet competition and the imminent tilt towards emerging economies. Most of the studies have been conducted in manufacturing sector. Hence, penetration of lean is mostly limited to traditional sector. Following table elaborates on themes commonly found in the papers.

Table 1  
Themes found in literature.

Themes	References
<i>Lean adoption in India:</i> discusses factors impacting lean adoption, barriers to implementing lean as well as its application in various industries such as education, healthcare etc.	[16–21]
<i>Lean Performance</i> includes articles that deliberate impact of lean on organizational performance	[14, 22–25]
Studies discussing lean status of an organization i.e. <i>leanness</i>	[26–29]
<i>lean implementation in Indian Small and Medium enterprises.</i> (MSMEs)	[30–33]

Bulk of the literature (approximately 50%) pertains to Lean adoption which included factors and barriers while implementing lean [19, 20], case studies discussing application of lean to various industries in India [21], followed by impact of lean on performance and leanness assessment (approx. 25%).

Lean as an operational model for MSMEs in developing countries has gained momentum in the past decade [18]. Contemporary literature indicates similar trend with the extension of lean implementation to Indian small and medium enterprises. This could be attributed to adoption of operational strategies to meet the needs of their customers i.e. large organizations and combat competition. However, lean adoption among Indian MSMEs is complex yet necessary due to their typical nature of functioning and management. The focus of this paper is to study lean adoption in Indian Manufacturing MSMEs.

[30] is one of the most influential articles deliberating on lean adoption in Indian MSMEs. [25] Investigates relationship between lean manufacturing practices (LMPs) in SMEs and sustainability performances. [32] studies the extent to which lean practices are adopted by small- and medium-sized manufacturing organizations in India and their impact on firm's operational performance. [33] also studies relationship between lean and operational performance

using SEM. [31] is an empirical study discussing barriers to successful lean implementation in MSMEs in India. Recent trends show that MSMEs have started adopting lean for sustainable development [30]. Most of the contemporary papers are empirical in nature discussing relationship between lean adoption and performance.

This paper aims to extend the efforts of previous studies with the help of in – depth case study elaborating on lean implementation in Indian MSMEs, keeping the contextual factors in mind, from the perspective of experts engaged in the field.

## Methodology

Reference [34] describes case study as a systematic enquiry into an event or set of events which are related in order to describe and understand the phenomenon under study. Case Research in operations Management has helped in the development of breakthrough concepts. It allows development of new theories, testing and refining of theories as well as new insights and perspectives. The undeniable benefit of conducting research in the field is that it permits higher validity with practitioners and consultants as real problems can be addressed and perspective of people at all levels of the organization is taken into consideration [35].

Moreover, Case study has become increasingly popular in operations management as it helps to understand inter-linkages between hard issues and soft issues in an organization [36]. In the light of these benefits case study was considered best fit for this study.

SAP-LAP framework by [37] has been employed in the current study as it can implemented in a flexible manner. Traditional models such as SWOT, PEST analysis and TOWS matrix tend to be static in nature, as opposed to SAP-LAP model which does not stop at providing insight into the current status of the problem but also includes discussion on how to bring about change to bridge gap between expectation and reality.

SAP-LAP analysis is a learning and interpretive framework of inquiry [37]. It has been widely used as preferred model of enquiry in case of operations management [38–42].

Any managerial context consists of basic components which are Situation, Actor and Process. The actor deals with the situation through process or set of processes. This interplay among the components leads to insights or new learning. The learning and insight thus developed would lead to suitable actions resulting into effective performance of the system.

Feedback of performance gap would provide additional learning and control measures to be taken.

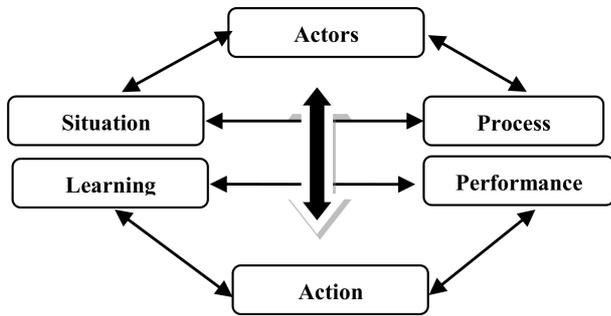


Fig. 1. SAP-LAP Framework (source: [37]).

Snapshot of the SAP-LAP Framework adopted for this study. Adopted from reference [37].

Table 2  
SAP-LAP framework.

Stage	Inquiry
Situation	What is happening now? What is expected to happen? What are the major opportunities and threats?
Actor	What are the roles and capabilities exhibited by the actors? In what domain is the freedom of choice available?
Process	What is being done? How is it being done? Why is it being done? What are the variables?
Learning	What are the key issues related to situation? What are the key issues related to actors? What are the key issues related to process?
Action	What should be done to improve the situation? What can be done to improve the actors? What should be done to improve the process?
Performance	What will be the impact on the situation? How will the actors be affected? How will the performance of the process be improved?

The advantage of SAP LAP lies in its holistic approach and flexibility to be adapted to any managerial context. It allows scope for creativity and in-depth analysis.

The current study offers an insight into lean adoption by select group of organizations participating in the ‘Lean Competitiveness Manufacturing Scheme’ using SAP-LAP framework.

The Specific research questions to be addressed through the case study are:

RQ1: How has the lean initiative in Indian MSMEs helped to mitigate environmental threats and organizational weaknesses that exist?

RQ2: Who are major players in lean implementation in Indian MSMEs?

RQ3: What is the process of implementing lean in MSMEs?

RQ4: What are the learning that can be derived from implementing lean among Indian MSMEs?

RQ5: Has the government initiative provided the desired results? Can this model be improved?

RQ6: Can the process of implementing lean be replicated outside the scheme?

The information regarding the participating organizations was obtained through national level organizations: Quality council of India (QCI) and National Productivity Council (NPC), India who are responsible for implementing and monitoring the scheme. The approach for the present research has been semi-structured interviews with 3 empanelled consultants participating in the ‘LMCS’ scheme. It has been further supplemented through visits to participating organizations in Delhi NCR region, India and workshops conducted by government and Lean Consulting organizations. The Lean Consultants participating in the scheme evaluate the existing manufacturing system of the participating cluster members and provide them with detailed procedures as well as guidance for implementing lean techniques. They are engaged with the organizations at length for a period of 18 months through 5 phases. Thus, they are in a unique position of having unrestricted access to the nitty-gritty of organization’s operations.

Consultant A is a senior consultant working with renowned Lean consulting company. He has 37 years of industry experience and 3 years as Lean Consultant.

Consultant B has experience in Lean Manufacturing, Operations, Factory, Purchase, Projects, Administration, Human Resources, Business Planning & Budgeting, Costing, Manpower Management and Training & Development. He is managing partner of Lean consulting firm since 2001. He has been spearheading lean consultancy for many mini clusters participating in LMCS.

Consultant C is director at a firm consulting in lean, ZED (Zero Defect and Zero Effect) and HRD (Human Resource Development).

The SAP-LAP framework has been developed based on their combined experience of the 3 lean Manufacturing consultants with their 7 ongoing clusters.

Table 3  
Details of Mini-Clusters.

Number of Mini-Clusters	7
Number of organizations	54
Region	Delhi NCR (Faridabad, Gurgaon, Manesar, Noida)
Sectors	Auto – component, plastic mould, engineering, leather goods, manufacturing tools

## SAP-LAP framework

### Situation

MSMEs in India have immense potential forming backbone of Indian economy. Their contribution to GDP, exports and employment make them the focal point of development of India. Considering vitality of MSMEs government has launched many schemes for promoting inclusive growth focusing on availability of credit, technology up gradation, marketing support and focus on quality improvement. 'Make in India' strategy is another huge step to promote and foster confidence in Indian business sector. Despite such steps turbulent business environment poses serious threat to small and micro sector. India faces stiff competition from China, Taiwan, and Bangladesh. The impact of demonetization in 2016 and GST roll-out (Goods and Services Tax) in 2017 have been severe on manufacturing MSMEs, as they have not been able acclimatize themselves accordingly. There is an urgent need to catch up on good manufacturing practices and focus on eliminating wastages. This has made lean adoption even more imminent.

Apart from external environment, Indian MSMEs face a multitude of barriers. Organizations are hesitant to share information due to fear of leakage of valuable information and fear of constant pressure from customers to cut price and improve quality. Organizational inertia towards technology up gradation and process improvement methodologies acts as a major impediment. There is also mistrust between labour and management causing organizational inefficiency as well inhibiting implementation of any improvement programmes. The current scenario requires sensitization and training on various lean tools and techniques.

### Actors

Usually the push for lean in India has been originating from outside the organization, i.e. government or the customer but the driving force for lean transformation in any organization is the top man-

agement. The scheme entails hiring consultants to implement lean along with top management. Consultants try to understand the pain areas and guide the organization to become lean. Establishing trust with the management in order to bring about change is their primary concern.

Effective transformation occurs when consultants and management work as a team. Though reigns are in the hand of management who are the main actors along with consultant providing guidance, lean is successful only when it reaches shop floor level. Thus, employee buy -in becomes important, although it is the prerogative of the Top management who exert freedom of choice.

### Process

LMCS scheme requires setting of target earlier on with consent of the Top Management and controlling body (National Productivity Council and Quality Council of India), which the consultants are required to meet.

Lean project is divided into 5 incremental phases with audit at the end of each phase.

Table 4  
Phases of Lean project.

Phase	Steps
Phase I	Diagnostic study along with action plan. Value stream mapping is done. Projects to be undertaken as well as KPIs are decided in this phase
Phase II	Lean implementation starts with 5S system, visual control, Kaizen (for Total Employee Involvement), safety tools which are common for all cluster members and do not require huge investment
Phase III & IV	Organization specific projects are undertaken in this phase
Phase V	project completion report and meeting of target. It is expected by phase V that financial savings would be realized by then.

At the end of the project sustenance plan for next 1 year to be adhered by the organizations is decided.

For the purpose of training and practical implementation, on the basis of diagnostic study conducted in phase 1, worst area of the factory is identified and targeted first followed by the whole factory. The improvement in the worst affected areas acts as a motivator for smoother adoption throughout the factory. It also helps in boosting confidence in the scheme.

Ideally, Lean improvement teams are formed with 1/3 representation from each of the departments. A lean coordinator is also appointed to coordinate

and follow up with consultants. Worst Point Photography at the time of diagnostic study helps to track improvement.

One of first indicators towards a leaner factory is that it becomes more “Visual” i.e. visible improvement through 5S, visual control and sensitization among employees regarding wastes.

Throughout the lean project, there is stress on TEI (Total Employee Involvement). Suggestion schemes, Quality circles, Kaizen reward Schemes are initiated to ensure maximum participation. Lean project cannot be implemented in isolation; it has to be integrated into the operations of the factory with the support of employees at all levels. Hence, lean extends beyond the team to all the employees at all levels of the organization.

The process is a general representation of the process followed by the consultants as a part of Lean Manufacturing Competiveness Scheme.

### Learning

Lean should be interpreted as “**Less Efforts Are Needed**” throughout the value chain. It offers solutions to many of the perennial problems of MSMEs like limited resources, pressures from customers to improve quality while reducing costs.

Lean diffusion in auto component sector in India is remarkably more than non auto component sectors as it has been largely customer driven. Automotive OEMs have emphasized and encouraged adoption of lean among their suppliers. This has led to higher receptiveness for lean among auto –component sector in Indian MSMEs who are tier 1, tier 2 and tier 3 suppliers.

Indigenous success stories required to motivate lean adoption among organizations as most organizations feel that lean not applicable to them due to its Japanese origin.

The management sometimes misunderstands lean as a shop – floor activity thus not adopting it throughout the organization leading to failure. They delegate it to lower level management.

Mini-Clusters formed under the scheme are not always ‘business clusters’ leading to implementation issues and inhibiting knowledge sharing among cluster members.

Large concentration of contractual labour acts as a hindrance for imbibing culture of lean in the organizations.

The biggest asset and change instrument in any organization is manpower. Success and sustainability of any tools and techniques are dependent on the human resources. There should be focus on soft lean which are related to people and relations along with

hard lean which consists of techniques and analytical tools [43]. This is major improvement area for MSMEs.

### Actions

MSMEs suffer from time and resource constraint. For an operation management tool such as lean to be successful, it would require constant training and handholding. Suggested steps are:

- Management should allot time for the employee to “Think”. Importance of group solving teams, kaizens cannot be over emphasized.
- Sometimes the improvement need some investment and that becomes a problem – the consultant face hard time convincing the management. Focusing on quality adds up to the costs that are explicit where as many of its benefits are implicit such as customer satisfaction, improved productivity etc. It is necessary to educate regarding the benefits of focusing on quality to beat competition. A period of time dedicated towards lean training and education would help to convince management and easier implementation in the following phases.
- Indian MSMEs are habituated to fire fighting as in most cases there is lack of PPC (Production Planning and Control).
- Initial audits should be done to understand actual factory fundamentals. Lean in essence would be possible only if cultural changes are made, employees are involved in the organization.
- Consultants need to embrace the approach of WIIFM “**What Is In It For Me**” for the organization in order to motivate them to actively participate in lean project.

The sustenance phase should be a part of the lean project in order to make sure that lean drive does not end with end of the project.

Material management, inventory control are weak areas in Indian MSMEs. JIT (Just-in-Time) and kanban are not implemented as suppliers and customer relations are not developed enough to support implementation of these tools. Efforts in this direction can vastly improve operational performance and free up capital invested in inventory.

“Train the trainer” – there is dearth of lean experts who can provide adequate support and guidance to Indian MSMEs.

### Performance

LMCS is a monumental step towards assisting MSMEs gain competitive advantage, imbibing a culture of continuous improvement. It provides an opportunity to MSMEs who have limited financial resources to be able to begin their lean journey, with

the aid provided by the government and expertise of the consultants.

Participation in the scheme should be considered as a giant step towards lean journey.

During the period 2014–2018 around 658 awareness programmes have been conducted and more than 456 SPVs formed. There has been some discussion about further improving the scheme in light of benefits as a result of the scheme. 15 KPIs recognized during the Diagnostic Study conducted in the phase 1 of the lean project for the participating organizations, provide a clear guideline to the organizations. Initiation of lean projects with diagnostic report led to many organizations conducting assessment of the current status of the organizations brought into light existing issues as well as areas that need immediate attention.

Table 5  
KPIs enlisted as part of Diagnostic Study Report.

KPIs	
Labour productivity	Lead time
Capital productivity	Value add Ratio
Annual savings	On time delivery
Quality performance	Throughput Yield
Inventory turnover	Equipment Availability
Kaizens implemented	Overall Equipment Efficiency
Certificates and recognition from customers	Floor Area freed up
HR development	

The success of the participants in the scheme can motivate MSMEs to adopt lean philosophy.

The tools and techniques are means and not end to achieve desired result. It has been noticed the most troubled area in MSMEs is usually manpower management. The MSMEs recruit untrained freshers at cheap rate and given huge work load. The employee frequently change organization for betterment, hence the consultant has to train again from beginning. Lean adoption with employee involvement at all levels would ensure that organizational machinery doesn't breakdown or halts due to changing internal and external environment.

Auto component sector is at the forefront of lean transformation in India [30]. Focus on the other sectors such as apparel, process, and electronics to implement lean would improve the overall performance of the MSME sector.

Better co-ordination among management, consultant and government would provide for positive environment. Organizations should aspire to be lean in spirit rather than on paper.

## Discussion

SAP-LAP Framework integrates hard and soft systems thinking by combining learning and action in a collaborative manner along with performance [36]. In the current study, the framework takes into consideration amelioration of manufacturing processes in Indian MSMEs through lean management from the perspectives of participating actors. The model of enquiry helps to delineate the process involved in adoption of lean philosophy, while taking in to account the external and internal environment, understanding the complexities that occur at adoption level and endeavours to offer learning and suitable actions to be taken.

Indian manufacturing sector has immense potential due to bulging domestic demand, engineering talent, increasing young working population and favourable government schemes [44]. India's MSME sector is one of the most vibrant and dynamic sector. They boost entrepreneurship and innovation apart from serving as auxiliary to large scale units. To survive in today's competitive markets, it is extremely necessary for SMEs to re-calibrate themselves to match the needs of changing customer base and adopt new age operation management tools to gain competitive advantage.

Lean has been recognized as one of the most successful operational paradigm of 21st century. Applicability of lean in Indian MSMEs is even more as they are growing through a phase of growth, thus there is a need for streamlining their production processes in order to better utilize their capacity [30].

The SAP has led to various learning issues regarding lean implementation in MSMEs. Manpower management, Inventory control and lack of documentation are some of the weak areas. Based on these learning issues, corrective actions that can be undertaken to overcome these problems as well as making lean more effective in these organizations have been suggested.

Manufacturing MSMEs, due to investment in production processes and equipment and limited resources have reduced flexibility. Approaches like lean help them to gain flexibility in product volume as well as mix [45]. Lean provides an opportunity to these small organizations to move out of firefighting mode. An inherent problem expressed by the consultants was that most organizations don't keep track of inventory, productivity, sales trends etc., work is conducted by estimation rather than based on precise data. It is necessary to measure in order to manage more effectively and lean as an operational model elucidates problem areas as it requires baseline mea-

surements to provide adequate solutions. It necessitates performance tracking. The participant organizations experiences illustrate that cognizance of value of inventory in stock, help organizations get rid of excess; similarly tracking labour productivity helps to better manage manpower. Another ancillary benefit was ergonomic interventions undertaken by consultants vastly improving productivity of the labour. This aspect had not received attention by owners of these organizations. Basic layout changes have also helped reducing lead time and better utilization of space.

This scheme provides an opportunity to MSMEs to adopt lean as management system rather than just a project. It is hoped that benefits accrued through lean would push these organizations on the path of global competitiveness.

Most common form of organizations in India are one man business and family run business. In such cases any operational improvement programmes must be top driven in order to succeed. It was realized that success of lean activity among mini clusters was possible when management was convinced of its advantages. The major hindrance is that lean requires time and resources and there are no immediate results. It becomes imperative that people who are the helm of the organization realize the importance lean principles and set right expectations.

Lean organizations depend on well drafted SOPs, which reduce dependence on a single individual in an organization. This helps to combat issues arising due to labour turnover. It focuses on 'respect for people' which leads to better working environment. It stabilizes operations through tools like TPM, mistake proofing. Thus, it has proven itself to be an extremely successful management system especially when external environment is unpredictable.

Focus on skill development and soft techniques such as employee involvement, group problem solving, and supplier and customer relationships are common themes that need to be addressed. Reference [46] also reiterated the need for management involvement, employee engagement, group problem solving and continuous improvement for successful lean adoption.

Organizational culture supportive of lean intervention would ensure its sustainability beyond the scheme. Alignment between organizational culture and lean management is necessary for performance improvement [47].

Another recommendation was in collaboration with universities to start relevant courses in field of operations management in order to meet the need of experts in the field. Linking of Skill Development

centers as well as vocational and training courses in the operations field would create skilled workforce that can be employed in these organizations.

*Thus, spread of lean management in India is necessary to bolster its operation and move towards becoming a global manufacturing hub. The scheme provides level playing field to small units to be able to contribute to India's GDP up to their full potential.*

Lean management is a powerful operational improvement methodology but in order to reap and sustain its benefits, manufacturing MSMEs must overcome issues such as:

- management issue such as lack of management support, lack of long term vision, lack of technical know-how [48, 49],
- organizational issues such as lack of employee involvement [50], supportive organizational culture [47], Human resources issues such as labour turnover, employee well being [50, 51],
- other issues such as inventory control, lack of documentation, supplier and customer relations [43].

## Conclusion and implications

SAP-LAP model permits succinct presentation of the present situation of manufacturing MSMEs, identification of gaps in lean adoption, along with suggestions for improvement in operational performance. Such analysis would benefit the stakeholders involved i.e. management, consultants and government by suggesting appropriate measures that might be taken for improving operational efficiency of the MSMEs. Managers are concerned with achieving better results with fewer resources.

This case study emphasizes weakness persisting despite lean interventions and progress made so far. An understanding of lean benefits would motivate organizations (not only limited to scheme participants) to adopt lean as a way of life. Better understanding of contextual factors would assist managers in implementing operational improvement methodologies successfully. In India, Government scheme has provided an opportunity for small, micro and medium enterprises to implement lean which is a huge step to bolster their operational efficiency; it would be prudent to analyze the effectiveness of the scheme to ensure that efforts can be redirected to areas that require attention such as development of soft skills, ergonomic interventions, integration of value chain, technological advancement etc.

*SAP LAP framework allows synthesis of soft and hard issues while implementing lean in MSMEs. The case study makes contribution towards body*

of knowledge that asserts that while applying any process improvement tools softer side of equation must be taken into account. The study also sheds light on the process of implementing lean in MSMEs. The lean process followed by the consultants in the five phases provides a broad outline of lean implementation in MSMEs in India. It suggest that tools that require small investment and are easier to implement such as 5S, Visual control, kaizens etc. are followed by organization specific projects. It also highlights the existing hurdles in the process such that research can be directed towards overcoming them.

The present case study restricts itself to the view point of consultants and observations by the researcher. Only organizations participating in the scheme have been considered for the study. An empirical analysis would further help to triangulate results and overcome difficulty of generalizing on the basis of case study. Future studies can include perspective of the other stakeholders i.e. management and government. An empirical analysis studying the impact of soft and hard lean practices on operational performance would be beneficial.

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