International Journal of Management, IT & Engineering
Vol. 10 Issue 05, May 2020
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Relevance of Lean Manufacturing for MSME Sector

- **Mr. Pradipta Bose ***
- **Dr. GoutamSengupta ****
-
- ***Mr. Pradipta Bose is the Deputy Registrar of Techno India University, West Bengal and a Lean Manufacturing practisioner and specialist**
- ****Dr. GoutamSengupta is the Vice Chancellor of Techn0 India University, West Bengal and a Lean Manufacturing authority**

Abstract

The aftermath of globalization has seen a radical change in technology vis a' vis intense global business competitions over the years. Ever changing customer's expectations, fluctuating demand and competition in the market has posed challenges of competitiveness and survival to all the constituents of the economy, especially for a developing country like India, where many organizations are struggling to conform to the world class standards. The philosophy of lean management has evolved over the years and is based on a set of fundamental tools and techniques that is recognized as one of the best methods of removing this waste, reducing costs and transforming business performance. In the past, due to financial restraints, this has been seen as a tool purely for large organizations. While larger entities have the budget and resources to work on removing this process 'waste',MSMEs often don't have access to the same resources feeling the pinch and impact of every cost. However, using new tools and methodologies, MSMEs can now leverage lean improvement in a manner specifically tailored for their needs and within a realistic cost bracket. In this article, the author has intended to showcase the relevance and applicability of Lean Manufacturing concepts to the MSMEs for achieving competitiveness and sustainable business growth.

Keywords

Lean Manufacturing, waste (Muda) ,MSME, Lean practices, 5S, Kaizen, Visual management, SMED, Poka Yoke, TPM etc.

International Journal of Management, IT & Engineering
Vol. 10 Issue 05, May 2020
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Introduction

Lean manufacturing (LM) is mainly inspired by the Toyota Production System (TPS) which has been focused on elimination of waste and improving customer satisfaction. LM is a set of principles, philosophies and business processes to enable the implementation of it, which iswidely known and implemented since 1960. It can be seen as a production system that focusing continuous flow within supply chain by eliminating all wastes and performing continuous improvement towards product perfection.

Lean Management is often perceived as something just for large organizations.However, researchers agreed that LM could be a mechanism for achieving operational excellence and can be used as a guide to be world class organization. Thus, theoretically, LM can be applied to all industries and it is considered as strategic weapon in competitive market.In fact, the increasing demand for high quality products and highly capable business processes by large organization has left no choice for the MSMEs but to consider LM implementation. Small companies have advantages such as they are more agile, much easier to get management support and commitment, as opposed to large organizations. For decades organizations have been using lean methodology to accelerate delivery performance, improve quality and reduce costs by streamlining processes to drive business-impacting results. There is waste inherently built into all of the processes that we use on a day to day basis and our operational paradigms often stop us from seeing the waste that we constantly work with. This waste increases our lead time, drives up inventory costs, impacts quality and drives an unnecessary burden onto our employees.

By using lean, organizations can quickly identify areas where improvements can be made and from there, plan and implement the changes needed to release these benefits to the bottom line. For example, with global competition and the rising price of materials in the manufacturing and engineering sector, MSMEs have to constantly look for ways to reduce costs and increase efficiency. More and more MSMEs are turning to lean methodology and processes to maximize the use of their resources without affecting frontline services or reducing personnel.

International Journal of Management, IT & Engineering
Vol. 10 Issue 05, May 2020
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Lean is a people focused improvement methodology. One of the advantages that MSMEs have over large organizations when it comes to implementing lean is the simple fact that employees work closer together. The 'bottom-up approach' captures employee job skills and insights to deliver the business improvement needs. With the right lean training, a team leader will be able to work with employees from all departments to find out what they need to do their job better and what they need to do their job faster. Wherever the 'waste' lies, whether in the packaging, paperwork or delivery; using lean management systems will help identify and eliminate unnecessary delays, and in doing so increase productivity in the end-to-end process.

Literature Review

With the publication of "The Machine that Changed the World: The Story of Lean Production" (Womack, Jones, &Roos 1990), the advantages of lean principles has been widely recognized. The term Lean implies a series of tools and techniques to eliminate wastes (Muda), reduce non-value added operations, improve value added processes and maximize performance (Womack & Jones, 1996). Lean principles emphasizes on system-level optimization, where the emphasis is on integration and how the parts work together as a whole in the organisation, rather than on individual performance and excellence of any one feature or element (Oliver, Schab, &Holweg, 2007). Originally derived from manufacturing industry, these principles have subsequently been applied to service industry (Cuatrecasas, 2004; Vlachos &Bogdanovic, 2013; Womack, 2004). Although Lean is widely regarded as a business strategy and implementation of lean techniques improves business competitiveness and organizational performance, few researchers have concentrated on the validation of its positive link with business performance (Detty&Yingling, 2000; Li, Sawhne, &Wilck, 2013). Lean management is a managerial approach focused on improving customer value (quality), through the elimination of non-value added steps from work processes (van Dun, Hicks, &Wilderom, 2016). Lean Management is a system of production, which consumes very less resources to achieve the same amount of output, which is better in terms of quality and satisfy the needs of customers. (Mishra O.P., Kumar V. Garg D.,2013). Lean Management is a set of tools and techniques which aim to

create a customer centric organization by developing and adopting best manufacturing practices with the involvement of all level of employees(Kumar & Kumar, 2014).

Manufacturing has been recognized as the substantial driver for development of the economy. With the spread of globalization, India is become a global manufacturing hub and at the same time scope of Lean Management implementation is turning out to be wider in Indian situation. Many companies in India are now feeling the warmth of global competition and this has motivated them to take serious step forward towards adoption of Lean Manufacturing (Singh B., Garg S.K., Sharma S.K, 2010). Frequently fluctuating customer demand and international environment has been putting forward challenge of survival and competitiveness to all the element of the financial system (Upadhayay N, Deshmukh S. G. and Garg S., 2010).Manufacturers in the Indian industry have always faced discriminating challenges such as increasing customer's expectation, demand variation, and competition in markets (KhadsePriti B., SarodeAvinash D. and WasuRenu 2013).

(Vikas K., Garg D and Mehta N.P., 2004) explains that adoption of continuous improvement methodology with the use of different tools and techniques becomes the strength of the manufacturing system. Researchers and practitioners have developed many tools and techniques to improve manufacturing by different ways and means.

Idea behind Lean Management is to reduce production lead-time, cost, reduce inventories and improve quality in the manufacturing system as stated by (Mishra O.P., Kumar V. Garg D., 2013). This is achieved by identifying and eliminating of waste existing in the organisation. Global managers classify that Lean Management is a set of straightforward management tools and systems, and in fact it is a complex plan that Toyota has established all the way through enduring organizational culture and continuous improvement (Shah R a, Ward Peter T., 2003). Lean Management can bring large scale changes in the organisation but cannot be put into practice immediately. To implement Lean Manufacturing system, it must have a clear and careful planning, staff must have full understanding of concept and senior management must plan and execute firmly keeping the employees motivated as stated by (Pingyu Y. and Yu yu, 2010).

Micro, Small and medium enterprises (MSMEs) play a vital role in Indian economy as more than 45% of country's GDP is contributed by them. MSMEs are also the backbone of manufacturing sector as they form critical upstream supply network to the large-scale firms and OEMs. Like their counterparts in other regions of world, Indian MSME are characterized with family based businesses with loose management structure, poor investments levels in new technologies and processes, lack of competent manpower, inadequate research and development facilities and constrained financial resources.

These constraints in MSMEs have caused them to lag behind large-scale firms in implementing improvement initiatives like Just in Time (JIT), Total Quality Management (TQM), Total Productive Maintenance (TPM) and lean manufacturing. Therefore, such management practices have not received any appreciable attention in MSMEs globally (Gunasekaran, 2000). This is despite the importance of improving competencies in small and medium scale industry being emphasized by many experts. For example, need to focus on areas like quality, just in time manufacturing, problem solving and lean management was highlighted by Hall (2005). Lavinson (2002) also stressed upon the inevitability of lean manufacturing in MSMEs to face global competition. However, limitations in terms of management style, manufacturing practices and level of expertise have been the major bottlenecks (Little &McKinna, 2005). Top-level management issues for lean implementation is also very important and top-level management policies and attitude towards lean implementation need some improvement in Indian industries (Singh B., Garg S.K., Sharma S.K, 2010).Therefore, realizing the importance of MSMEs for Indian manufacturing industry, this subject is considered to be of important nature.

Lean Manufacturing implementation in MSMEs

The systematic implementation of LM in MSMEs will yield huge benefits such as quality improvement, reduction incycle time and good customer responsiveness. Although MSMEs faced difficulties when dealing with suppliersand customers on parts delivery and demand, it is still applicable for MSMEs to implement lean byconcentrating on in house elements whichare

International Journal of Management, IT & Engineering
Vol. 10 Issue 05, May 2020
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

less financial investment in lean implementation such as 5S, quality circle, preventive maintenance andemployee involvement. These practices are very important to MSMEs in order to besuccessful in lean implementation.The best management practice in 21st century as suggested by researchers is lean manufacturing . The strengths and weaknesses of MSME to adopt lean manufacturing as listed below.

Table 1. Strengths and Weaknesses of MSME vis-à-vis Lean Manufacturing

MSME's strengths	MSME's weaknesses
I. Flexible and hence changes can be introduced fairly quickly	I. Low degree of standardization and formalization
II. Flat with few layers of management and fewer departmental interfaces	II. Focus is on operational matters rather than planning
III. Top management highly visible and absence of bureaucracy in management teams	III. Lay off employees when the work becomes superfluous.
IV. Tend to have high employee loyalty	IV. This makes MSMEs work harder to retain a high caliber staff
V. Rapid execution and implementation of decisions	V. Budget and resources constraints
VI. Culture of learning and change rather than control	VI. Responsible for many facets of the business and many decisions. Decisions are generally made for short-term profitability
VII. More responsive to market needs and customers' demand	VII. Lack of skills, time and resources; no specified training budget
VIII. Loose and informal working relationships and absence of standardization	VIII. Formation of strategy process is intuitive rather than analytical

The argument shows that the MSMEs havethe opportunity to implement lean if provided with the correct practices.

International Journal of Management, IT & Engineering
Vol. 10 Issue 05, May 2020
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Lean Practices

Lean is considered as a concept which integrates manufacturing system, comprising of principles, practices and techniques. The objective of lean is to identify and eliminate waste throughout the organization from ordering raw materials to delivering goods to customer.

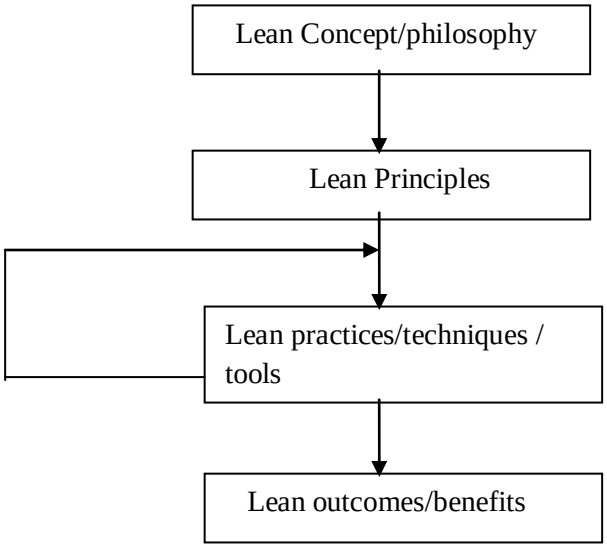

Fig 1. Structure of Lean Manufacturing adaptation

There are more than hundred lean practices available and being practiced by industries. Researchershavesuggested that the company should implement all or most of the lean practices in order to success in leanimplementation.The reviews show that the MSMEs are incapable to implement all practices at once. The alternative toMSMEs is to sequentially run the feasible practices which from the easiest or cheapest lean practice like 5S, Visual Management and Control, Kanban etc. Thisapproach could minimize the financial and employees commitment which should be imposed on lean practices. Inaddition, the MSMEs could make the feasible practices as a stepping stone to be lean enterprise.

Table 2 shows the suggested practices which are categorized to three categories in the perspective of MSME, namely;

i) Less investment – not much cost will be invested on selected practices

ii) Feasible to implement - capable to implement with existing resources and able to improve manufacturingperformance.

iii) Recommended to MSMEs - recommended by researchers and practitioners particularly in MSME environment.

Table 2: The list of selected practices for MSME implementation

Criteria	Less Investment	Feasible to Implement	Recommended to MSME
Practices			
Set up time reduction (MSMED)	Y	Y	X
Visual Control	Y	Y	X
Workplace Management	Y	Y	X
Cell Layout	Y	Y	X
Standard Operation	Y	Y	X
Kanban	Y	Y	X
Continuous Flow	Y	Y	X
Uniform Workload	Y	Y	X
Small Lot Size	Y	Y	X
VSM	Y	Y	X
Poka-Yoke/Andon	Y	Y	X
Continuous Improvement	Y	Y	X
5S	Y	Y	X
Lean Quality Circle	Y	Y	X
Multifunction Employee	Y	Y	X
Training	Y	Y	X
Teamwork	Y	Y	X
Supplier Management	Y	Y	X
JIT Purchasing	Y	Y	X
TPM (including Office TPM)	Y	Y	X
Group Technology	Y	Y	X

Note: Y: Revealed through surveys; X: Suggested by the experts/researchers

Two important and highly relevant lean tools applicable for MSMEs are Office TPM and Lean Marketing.

Office TPM concentrates on eliminating losses and wastes from administrative and support functions. These losses are related to value, processing, accuracy, speed and timing, idleness, communication, cost, decision making and equipment breakdown. Although true for any organization, these are particularly applicable for MSMEs and use of Office TPM can play a significant role in capturing these non-productive practices in the office.

The Lean Marketing Strategy was developed for businesses looking to realistically accelerate their growth through an ongoing agile, ever-improving process of implementation and improvement through iteration, based on real-time market feedback and utilizes digital marketing in a large way aiming to maximize effectiveness and reach with minimum cost and resources. Normally, MSMEs are burdened by lacklustre and non-focussed marketing strategies leading to unnecessary expenses drainage with no real benefits. The use of lean marketing technique can be especially useful for MSMEs to promote an efficient and effective marketing initiative for overall competitiveness and customer satisfaction.

It is imperative to say; to enjoy full benefits of lean, organizations should utilize a package of four or five tools. The organizations should implement most of lean practices in order to fructify greater benefits of lean. If management uses a few of the lean techniques only, then, the real potential benefits and continuous improvement is usually less effective. The major benefits of developing overall system using Lean Tools are:

i. Stocks reduction
ii. Quality improvements
iii. Productivity (direct labour)
iv. Lead / cycle time reduction
v. On-time delivery
vi. Smaller batches
vii. Delivery time improvement

International Journal of Management, IT & Engineering
Vol. 10 Issue 05, May 2020
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Challenges in Lean implementation and Sustainability

The challenges faced in the process of implementing and sustain lean is a tedious job as theconcept relates to time, cost, interest, and involvement, the concepts that together support thenew change for development in an firm. The study tells that new firms introduce and accept leanmanufacturing and other innovative concepts than the old and existing firms. The forcesopposing and driving a change to lean is shown in Figure 2.

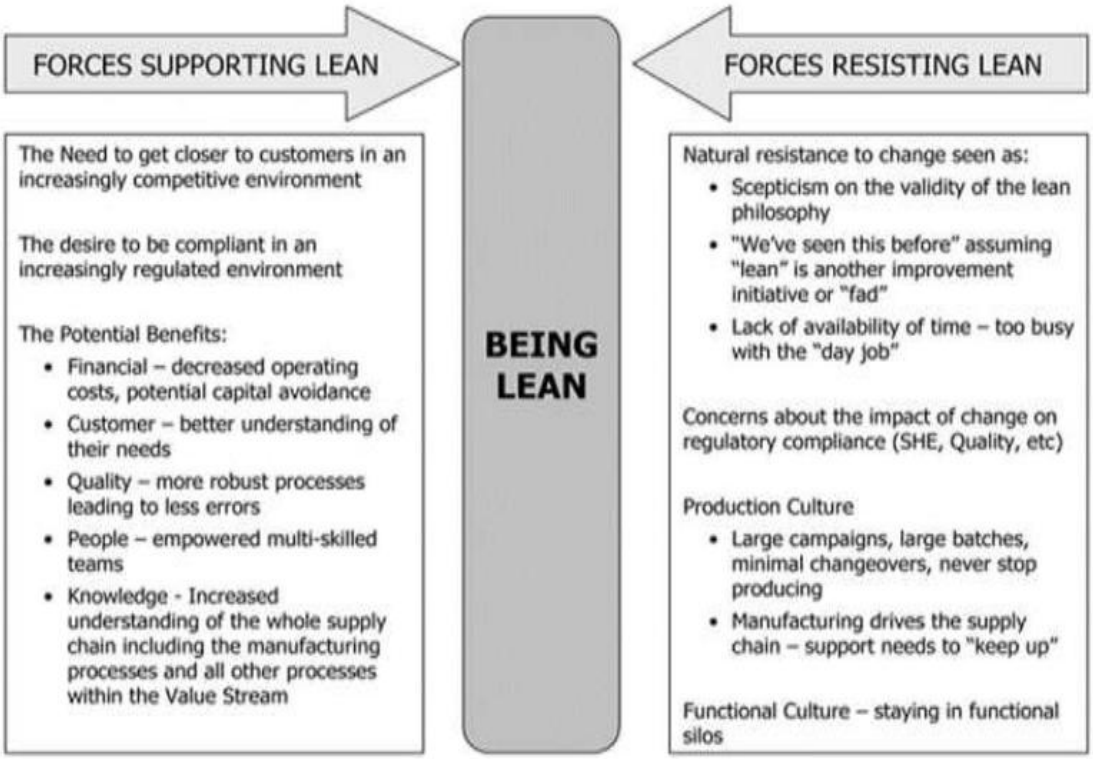

Fig 2: The Forces opposing and driving a change to 'Lean' (T. Melton 2005)

Thus, most of the MSMEs faces same problems no matter where it's located. Among the highlighted problems are:

i) Lack of top management commitment.
ii) Lack or resources i.e. workforce and financial
iii) Lack of expertise and skills in any management system, lean tools and techniques
iv) Lack of support from workers
v) Lack of support from suppliers. Unable to supply in smaller quantities

vi) Lack of knowledge on tangible and intangible benefits.

vii) Lack of knowledge on selecting the relevant lean tools

viii) Unstable demand. Customer may be unable to place predictable orders.

It is necessary to conduct further research on Lean Manufacturing implementation in MSMEs particularly with respect to the following questions:

i) What is the best model/framework that can be applied in MSME?

ii) What are the obstacles and how to overcome these obstacles?

iii) What are the basic lean practices relevant to MSME?

iv) What are the critical success factors for lean implementation?

Discussion and Conclusion

In order to ensure MSMEs could sustain themselves in the global competitive market in the 21st century, lean manufacturing is the best management technique which can improve their performance. To secure the full benefits of lean manufacturing, the organization is required to concentrate on the whole value chain by implementing comprehensive tools. Several research studies have shown that lean manufacturing produces higher levels of quality and productivity and better customer responsiveness.

Large organizations may not face any difficulties to adopt the whole set of lean principles but MSMEs might face problems due to limited resources. However, MSMEs could implement lean manufacturing by implementing the feasible practices and low cost consumption such as 5S, visual management, Kanban without computerized system through employee involvement.

Apart from that, as an immediate action, MSMEs also could strengthen the internal capability by appointing lean management representative. He or she will look into the overall lean process and conduct in house training for particular principles and practices.

As an alternative, MSMEs should actively participate with main customer on lean practices. The smart partnership between supplier and customer in lean manufacturing could benefit both partners.

Since there is no research being conducted on fundamental of lean practices in MSMEs, research should be conducted to

i) Find the basic lean practices which are feasible to be implemented in MSMEs.
ii) Propose the feasible lean model which could help the MSMEs to implement lean successfully.

References

Cuatrecasas, L. (2004). A lean management implementation method in service operations.*International Journal of Services Technology and Management, 5*((5–6)), 532–544.

Detty, R. B., &Yingling, J. C. (2000).Quantifying benefits of conversion to lean manufacturing with discrete event simulation: a case study.*International Journal of Production Research, 38*(2), 429–445.

Gunasekaran, A.,L. Forker and B.Kobu,. (2000). Improving operations performance in a small company: A case study. *International Journal Operation Production Management, 3*, 316-336.

KhadsePriti B., SarodeAvinash D. and WasuRenu. (2013, September 1). Lean Manufacturing in Indian Industries :A Review . *International Journal of Latest Trends in Engineering and Technology, 3*(1), 175-181.

Kumar, R., & Kumar, V. (2014). Barriers in Implementation of Lean Manufacturing System in Indian industry : A survey. *International Journal of Latest Trends in Engineering and Technology (IJLTET), 4*(2), 243–251.

Lee, Q. (2004). Lean manufacturing strategy. *Strategos*. Retrieved from www.strategosinc.com

Li, Y., Sawhne, R. S., &Wilck, J. H. (2013).Applying Bayesian network techniques to prioritize lean six sigma efforts.*International Journal of Strategic Decision Sciences, 4*(2), 1–15.

Mishra O.P., Kumar V. Garg D. (2013). JIT supply chain: An investigation through general system theory. *Management Science Letters, 3*(3), 743-752.

Mishra O.P., Kumar V. Garg D. (2013). JIT supply chain: An investigation through general system theory. *Management Science Letters, 3*(3), 743-752.

Nagesh S, NVR Naidu. (2015, June).Implementation of Lean Manufacturing concepts for CRP assembly at Bosch Ltd, Bangalore.*IRJET, 2*(3).

NCSU IES. (2007, January). National textiles forest city plant continues lean journey with IES. US. Retrieved from http:// www.ies.ncsu.edu/ Unpublished manuscript.

Oliver, N., Schab, L., &Holweg, M. (2007). Lean principles and premium brands: conflict or complement? *International Journal of Production Research, 45*(16), 3723–3739.

Pingyu Y. and Yu yu.(2010, June).“The Barriers to SMEs’ Implementation of Lean Production and Countermeasures.*International Journal of Innovation, Management and Technology, 1*(2).

Ravikumar, M. M., Marimuthu, K., Parthiban, P., &Zubar, H. A. (2014). Critical issues of Lean implementation in Indian micro, small and medium enterprises - an analysis. *Research Journal of Applied Sciences, Engineering and Technology , 7*(13), 2680–2686.

Shah R a, Ward Peter T. (2003). Lean manufacturing: context, practice bundles, and performance. *Journal of Operations Management , 21*, 129-149.

Singh B., Garg S.K., Sharma S.K. (2010). Scope for Lean implementation: a survey of 127 Indian industries. *International Journal of Rapid Manufacturing, X*(Y), 1-11.

Upadhayay N, Deshmukh S. G. and Garg S. (2010). Lean manufacturing system for medium size manufacturing enterprises: an Indian case. *International Journal of Management Science and Engineering Management, 5*(5), 362-375.

Van Dun, D. H., Hicks, J. N., &Wilderom, C. P. M. (2016). Values and behaviors of effective lean managers: Mixed-methods exploratory research. *European Management Journal*.Retrieved from https://doi.org/10.1016/j.emj.2016.05.001

Vikas K. ,Garg D and Mehta N.P. (2004). JIT practices: in Indian context. *Journal of scientific and Industrial research, 63*, 655- 662.

Vlachos, I., &Bogdanovic, A. (2013).Lean thinking in the European hotel industry.*Tourism Management, 36*, 354–363.

Vorne.(2017, 08 16).*http://www.leanproduction.com*. Retrieved from http://www.leanproduction.com/top-25-lean-tools.html.

Womack, J. P. . (2004). An action plan for lean services. *Lean service summit Europe 2004*.

Womack, J. P., & Jones, D. T. (1996).*Lean thinking. New York:*.The Free Press.

Womack, J. P., Jones, D. T., &Roos, D. (1990).*The machine that changed the world: the story of lean production.*New York: Harper Collins.