

# Chapter 14

## Auditing for Measuring the Extent of Lean Implementation

**S. Vinodh**

*National Institute of Technology,  
Tiruchirappalli, India*

**V. Kamala**

*Indian Institute of Science, Bangalore, India*

**M. S. Shama**

*SCMS School of Engineering and Technology,  
Kerala, India*

**S. Aravindraj**

*National Institute of Technology,  
Tiruchirappalli, India*

### ABSTRACT

*This chapter presents the details of a lean audit conducted among 25 Indian automotive manufacturing organizations. The audit consists of 59 indices grouped among 20 categories. The study consists of development of comprehensive lean audit procedure, gathering input scores, and grouping the organizations into 7 lean phases. The lean audit investigates the lean adoption and derives the appropriate lean phase. The conduct of the lean audit examines leanness level of organizations and the possible improvement proposals for leanness improvement. The conduct of the survey enables organizations to benchmark with similar organizations from a leanness perspective.*

### INTRODUCTION

The manufacturing system witnessed a key transition from mass manufacturing to lean manufacturing. Lean manufacturing enables speedy, smooth and economical manufacture. Lean manufacturing focuses on streamlining the processes thereby facilitating waste elimination and cost reduction. Lean manufacture necessitates the culture to be inculcated in the organization.

### Importance of Lean Manufacturing

Lean manufacture focuses on elimination of wastes thereby facilitating streamlined processes. Lean requires a significant commitment and successful implementation enable the improvement of numerous indices. This situation stimulates the need for lean audit. The audit inculcates an organisation with a Lean vision. Though manufacturing organisations have been adopting lean

DOI: 10.4018/978-1-4666-5039-8.ch014

tools/techniques/procedures, but there must be exclusive mechanism to measure the extent of lean practices being adopted by the organisations and to provide benchmark with other organisations.

### **Lean Manufacturing in Indian Scenario**

The manufacturing organizations focus on implementing lean manufacturing as it enables them to achieve world class status. Many Indian industries have started implementing lean principles. Ministry of Micro, Small and medium enterprises (MSMEs) also promote the implementation of lean manufacturing using cluster approach ([http://www.dcmsme.gov.in/working\\_group2012.pdf](http://www.dcmsme.gov.in/working_group2012.pdf)). Some of the primary lean tools/techniques implemented by Indian manufacturing organizations include 5S, Kaizen, Value Stream Mapping (VSM). VSM is one of the vital tool/technique of lean manufacturing which promotes the implementation of associated lean tools/ techniques.

### **Need for Lean Audit**

Lean requires significant management commitment and employee involvement. It is a culture to be brought about in the organization. This situation necessitates the conduct of lean audit to investigate whether an organization had adopted lean principles and to determine the extent to which lean practices are being implemented in the organization. The measurement of extent of lean practices also enables the organizations to benchmark with their competitors.

### **LITERATURE REVIEW ON LEAN ASSESSMENT AND LEAN AUDIT**

The literature has been reviewed from the perspectives of lean application in diversified sectors and leanness assessment.

### **Review on Lean Applications in Diversified Sectors**

Lean principles have been originated from Toyota Production System (TPS) known as Just In Time (JIT) production (Tang et al. 2005). The term lean has become widespread after the publication of a book titled “The machine that changed the world” by James Womack. Then the term lean production was widely used. Muda and Hendry (2002) proposed a world class manufacturing concept incorporated with lean principles for the make-to-order sector. Sullivan et al. (2002) presented the performance of equipment replacement decision problems within the context of lean manufacturing. They utilized VSM as a roadmap for providing necessary information for the analysis of equipment replacement decision problem in lean manufacturing implementation. Shah and Ward (2003) examined the effects of three contextual factors, plant size, plant age and unionisation status, on the likelihood of implementing 22 manufacturing practices that are key facets of lean production systems. The authors also postulated four bundles of inter-related and internally consistent practices like JIT, Total Quality Management (TQM), Total Productive Maintenance (TPM), Human Resource Management and investigated their performance over the operational performance and concluded that the plant size has greater influence over the lean implementation. They also pointed out that with respect to lean manufacturing context there is a need for higher concentration on the effects of environmental dynamism, complexity and munificence. Pavnaskar et al. (2003) presented a classification scheme for lean manufacturing tools. They suggested that their classification scheme enables companies to become lean and serve as a foundation for research into lean concepts. Doolen and Hacker (2005) presented a survey instrument to assess the implementation of lean practices within an organisation. A cross-section of the electronic manufacturers in the Pacific Southwest was used for their exploratory study. The authors

12 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/auditing-for-measuring-the-extent-of-lean-implementation/101415](http://www.igi-global.com/chapter/auditing-for-measuring-the-extent-of-lean-implementation/101415)

## Related Content

---

### Blockchain Technology Concept for Improving Supply Chain Traceability in the Ivory Market

Norman Gwangwava (2021). *International Journal of Applied Industrial Engineering* (pp. 1-14).

[www.irma-international.org/article/blockchain-technology-concept-for-improving-supply-chain-traceability-in-the-ivory-market/287873](http://www.irma-international.org/article/blockchain-technology-concept-for-improving-supply-chain-traceability-in-the-ivory-market/287873)

### Standardized Dynamic Reconfiguration of Control Applications in Industrial Systems

Thomas Strasser, Martijn Rooker, Gerhard Ebenhofer and Alois Zoitl (2014). *International Journal of Applied Industrial Engineering* (pp. 57-73).

[www.irma-international.org/article/standardized-dynamic-reconfiguration-of-control-applications-in-industrial-systems/105486](http://www.irma-international.org/article/standardized-dynamic-reconfiguration-of-control-applications-in-industrial-systems/105486)

### Modeling and Optimization of Gas Metal Arc Welding (GMAW) Process

R. Venkata Rao (2012). *Computational Methods for Optimizing Manufacturing Technology: Models and Techniques* (pp. 339-367).

[www.irma-international.org/chapter/modeling-optimization-gas-metal-arc/63346](http://www.irma-international.org/chapter/modeling-optimization-gas-metal-arc/63346)

### How Statistical Analysis Tools Can Be Used to Effectively Plan and Execute a Strategic Plan for an Organization

Brian J. Galli (2021). *International Journal of Applied Industrial Engineering* (pp. 1-16).

[www.irma-international.org/article/how-statistical-analysis-tools-can-be-used-to-effectively-plan-and-execute-a-strategic-plan-for-an-organization/276089](http://www.irma-international.org/article/how-statistical-analysis-tools-can-be-used-to-effectively-plan-and-execute-a-strategic-plan-for-an-organization/276089)

### Rescheduling Activities in Face of Disruption in House Hold Goods Manufacturing Supply Chain

K. V.N.V.N. Rao and G. Ranga Janardhana (2016). *International Journal of Applied Industrial Engineering* (pp. 47-65).

[www.irma-international.org/article/rescheduling-activities-in-face-of-disruption-in-house-hold-goods-manufacturing-supply-chain/168606](http://www.irma-international.org/article/rescheduling-activities-in-face-of-disruption-in-house-hold-goods-manufacturing-supply-chain/168606)