



INFLUENCE OF LEAN SUPPLY CHAIN PRACTICES ON COMPETITIVE  
ADVANTAGE AND ORGANIZATIONAL PERFORMANCE OF SMES

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*Abstract*

*Lean manufacturing is considered as the best manufacturing system in the 21<sup>st</sup> century. Though a variety of World Class Manufacturing Practices have been adopted by firms all over the world, Lean concepts have not lost their novelty as many of the new operation philosophies are either a variant or a derivative of it. This study aims at reviewing the lean practices of SMEs and their impact on competitive advantage and organizational performance. Data was collected from 52 SMEs in Kerala and statistical regression proves significant relationship between lean practices, competitive advantage and organizational performance.*

*Index Terms— Lean practices, competitive advantage, organizational performance, small and medium enterprises, Supply chain practices*

## I. INTRODUCTION

Lean practices have been actualized effectively in numerous organizations however there is still less reported confirmation of its usage in SMEs (Achanga et al. 2006). High quality products and services of large organizations have swept the market, leaving the SMEs with no other choice, but to embrace Lean Manufacturing.

Indian Small and Medium Enterprises (SME is now MSME, definition as per Table 1 ) division has developed as an exceedingly lively and dynamic segment of the Indian economy



throughout the most recent decades. Studies point out that if the backbone of Indian economy, the SME sector is reinforced, India will become a \$5 trillion economy by 2025. Various schemes of the Indian government has given a boost to the SME space. Public Procurement Policy, Pradhan Mantri MUDRA Yojana, Make in India, Startup India, and Skill India are to name a few. Government also has made financial and technical support more accessible. But the internal operations have to undergo a sea change in most of the organizations to reap the true benefits of external conducive ecosystem.

(As Per Micro, Small & Medium Enterprises Development (MSMED) Act, 2006)

Manufacturing Enterprises - Investment in Plant & Machinery		
Description	INR	USD(\$)
Micro Enterprises	upto Rs. 25Lakh	upto \$ 62,500
Small Enterprises	above Rs. 25 Lakh & upto Rs. 5 Crore	above \$ 62,500 & upto \$ 1.25 million
Medium Enterprises	above Rs. 5 Crore & upto Rs. 10 Crore	above \$ 1.25 million & upto \$ 2.5 million

Service Enterprises - Investment in Equipments		
Description	INR	USD(\$)
Micro Enterprises	upto Rs. 10Lakh	upto \$ 25,000
Small Enterprises	above Rs. 10 Lakh & upto Rs. 2 Crore	above \$ 25,000 & upto \$ 0.5 million
Medium Enterprises	above Rs. 2 Crore & upto Rs. 5 Crore	above \$ 0.5 million & upto \$ 1.5 million

**Table 1: Definition of MSME** (Source: MSME website)

Despite their high enthusiasm and inherent capabilities to grow, SMEs in India are also facing a number of problems like sub-optimal scale of operation, technological obsolescence, supply chain inefficiencies, increasing domestic & global competition, working capital shortages, not getting trade receivables from large and multinational companies on time, insufficient skilled manpower, change in manufacturing strategies and turbulent and uncertain market scenario. Hence it is high time the SMEs become innovative and develop a strong global outlook to survive and sustain amidst competition. Indian SMEs have always exhibited acceptance to technologies, ideas and automation.

Lean manufacturing started at Toyota car manufacturing plant, Japan, which is known as Toyota Production System (TPS). The main pillars in TPS are Just in time and automation where the main objective is to identify and eliminate waste in an organization. Lean manufacturing can be applied successfully in all industries, provided a full understanding on lean ingredients



i.e. concept, principles and practices is materialized. Advancement in production and supply chain practices would add to the accelerated growth in terms of efficiency and profitability.

## II. LITERATURE REVIEW

Lean manufacturing started at Toyota plant, Japan, which is known Toyota Production System (TPS). It has been widely known and implemented since 1960. According to (Rineheart et al 1997) lean manufacturing will be the standard manufacturing mode of the 21<sup>st</sup> century. There is no alternative to lean manufacturing (Dankbaar 1997). Researchers have propounded that lean manufacturing is a cost reduction mechanism and can pave way to an organization becoming world class (Papadopoulou & Ozbayrak 2005). Lean Manufacturing is applicable to all industries (Womack et al 1990). Meier & Forrester (2001) identified successful implementation of lean practices in various manufacturing firms. Hence, SMEs have also pursued lean (Achanga et al 2006; Womack et al 1990; Womack et al. 1996). It is an established fact that organizations that have embraced lean manufacturing have considerable cost and quality advantages over those who still follow traditional mass production (Pavnaskar et al. 2003). Advantages of mass production and craft production are combined in Lean production (Womack et al. 1990). The goal of lean manufacturing is to reduce the waste in human effort, inventory, time to market and manufacturing space to become highly responsive to customer demand while producing world-class quality products in the most efficient and economical manner (Pavnaskar et al. 2003).

Lean manufacturing is known as manufacturing without waste (Taj 2005). The waste is consisting of non-added value. The seven type of wastes are overproduction, waiting time, transportation, inventory, inappropriate processing, excess motion and product defects (Melton 2005; Womack & Jones 2003; Ohno 1988). Most of the companies waste about 70%~90% of their available resources (Taj 2005).

Dimensions of Lean practices considered are continuous quality improvement program, Pull production system, encouraging suppliers for shorter lead-times, involve customers in product and process design, streamlines ordering, receiving and other paperwork from suppliers, continuous quality improvement programs, proximity to suppliers' factory/warehouses, small lot size orders from suppliers, reduction in inspection of incoming materials/components/products, reduction in inspection of outbound materials (McIvor 2001; Mason-Jones & Towill, 1997; Handfield & Nichols 1999; Burgess 1998; Li 2002.)

Five dimensions of competitive advantage considered are: - 1) competitive pricing, 2) premium pricing, 3) value-to-customer quality, 4) dependable delivery, and 5) production innovation (Stalk 1988; Vesey 1991; Handfield & Pannesi 1995; Kessler & Chakrobari 1996). Stock et al (2000), Vickery et al (1999), Li (2002) have proposed organizational performance as measured by six dimensions: 1) Return on investment (ROI), 2) market share, 3) the growth of ROI, 4) sales, 5) profit margin on sales and 6) overall competitive position. Competitive advantage is the



edge an organization has over its competitors in the marketplace (Porter 1985; McGinnis & Vallopra 1999). This is gained with long term practices of the firm and is not directly controlled by the organization (Tracey et al 1999). Strategic objectives of a firm drive its competitive capabilities. (Koufteros 1995; Cleveland et al 1989; Tracey et al 1999; and Rondeau et al (2000) suggests following five dimensions of competitive advantage:- 1) competitive pricing, 2) premium pricing, 3) value-to-customer quality, 4) dependable delivery, and 5) production innovation.

Organizational performance is measured in six dimensions: 1) Return on investment (ROI), 2) market share, 3) the growth of ROI, 4) sales, 5) profit margin on sales and 6) overall competitive position (Stock et al 2000). This study aims to test the relationship between Customer relationship, one of the important dimensions of SCM practice, supply chain flexibility and organizational performance. Data for the study were collected from 43 manufacturing firms across South India, using convenience sampling. The results of regression analysis indicate that higher levels of CRM practice leads to enhanced supply chain flexibility and improved organizational performance.

### III. RESEARCH GAP

To compete in global competitive marketplace, the SMEs have to strive for world class performance through implementation of innovative approaches in their operations like lean manufacturing. There is a lack of research in the area of lean practices influencing organizational performance in SMEs. The main objective of this paper is to carry out a critical review on the lean manufacturing practices and its impact on organizational performance of SMEs.

### IV. OBJECTIVES

The study tries to find out the relevance of lean practices in SMEs with regard to competitive advantage and organizational performance. The study aims at identifying the major elements of lean practices in SMEs. Further, to analyze the influence of lean practices on competitive advantage and organizational performance. The study also intends to analyze the moderating influence of competitive advantage in the relationship between lean practices and organizational performance.

### V. HYPOTHESES

**H1<sub>1</sub>** : There is a significant relationship between lean practices and competitive advantage

**H1<sub>2</sub>** : There is a significant relationship between lean practices and organizational performance

**H1<sub>3</sub>** : Competitive advantage moderates the relationship between lean practices and organizational performance



## VI. METHODOLOGY

The study is descriptive in nature with the use of secondary data from research articles and primary data from questionnaire survey. Survey was conducted among 52 SMEs in South India. Multistage cluster sampling is adopted. Regression tool was used for statistical analysis in SPSS.

## VII. RESULTS AND DISCUSSIONS

Analysis of lean practices, competitive advantage and organizational performance shows that there is a significant relationship between Lean practices and Organizational performance, lean practices and competitive advantage, and also a moderating effect of competitive advantage in the influence of lean practices on organizational performance.

### 1. Lean practices and Competitive advantage

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.586 <sup>a</sup>	.343	.307	.44650

a. Predictors: (Constant), CA

**ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.138	1	1.138	4.247	.045 <sup>b</sup>
1 Residual	13.396	50	.268		
Total	14.534	51			

a. Dependent Variable: CA

b. Predictors: (Constant), LP

The significance value is 0.045, which is less than the significance level of 0.05; hence the null hypothesis is rejected. ie. Competitive advantage significantly explains variation in organizational performance. R Square value is .343, which denotes that 34.3% variation in competitive advantage is explained by Lean practices.

### 2. Lean practices and Organizational performance

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.450 <sup>a</sup>	.203	.158	.49199

a. Predictors: (Constant), LP



ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.492	1	2.492	8.204	.006 <sup>b</sup>
	Residual	14.577	48	.304		
	Total	17.069	49			

a. Dependent Variable: OP

b. Predictors: (Constant), LP

Regression analysis shows that there exist a significant influence of lean practices on organizational performance ( $p$  value $<0.05$ ). R Square value of .203 represents 20.3% variation in organizational performance being explained by lean practices.

### 3. Moderating influence of competitive advantage

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.622 <sup>a</sup>	.387	.353	.43137

a. Predictors: (Constant), MCA

ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.027	1	4.027	14.820	.000 <sup>b</sup>
	Residual	13.042	48	.272		
	Total	17.069	49			

a. Dependent Variable: OP

b. Predictors: (Constant), MCA

Competitive advantage significantly moderates the influence of lean practices on organizational performance ( $p$  value of  $0.000<0.05$ ). Lean practices, moderated by competitive advantage, significantly explain the variation in organizational performance by 38.7%, over and above the previous model.

## VIII. CONCLUSION AND SCOPE FOR FUTURE RESEARCH

In order to ensure SMEs sustain competitive advantage, lean manufacturing is the best management technique which can improve their performance. Securing the full benefits of lean manufacturing requires the organization to concentrate to the whole value chain by implementing comprehensive tools (Liker 2004; Sanchez & Perez 2000). Several research studies



have shown that lean manufacturing produces higher levels of quality and productivity and better customer responsiveness (Krafcik 1988). The strategic alliance between suppliers and customers in lean manufacturing could benefit both partners. The current study establishes a significant relationship between lean practices, competitive advantage and organizational performance.

Lean practices when combined with other supply chain practices like supplier partnership, customer relation, information quality, information sharing, postponement among the many, will lead to better organizational performance. Further research may lead to identifying the major predictors of performance which could help SMEs to focus on those performance drivers.

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