

## **A Study on Problems and Prospects of Lean and Green Manufacturing Practices for Productivity Improvement in select SMEs of Telangana State**

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### **ABSTRACT**

Numerous organizations are these days intrigued to adopt lean along with green manufacturing procedure that would empower them to contend in this focused globalization market. In this regard, it is important to evaluate the execution of lean and green assembling in various companies with the goal that the essential accepted procedures can be recognized. This paper portrays the improvement of key regions which will be utilized to survey the selection and implementation of lean and green manufacturing rehearses. Notwithstanding that it is managing issues and prospects of lean and green manufacturing hones for efficiency change in select SMEs of Telangana state. There are some key areas created to assess and diminish the most ideal ventures in order to upgrade their generation effectiveness and increment the motivation behind the financial advantages of the manufacturing unit. This gives the additional edge in the present cost and time aggressive markets. The organization is getting to be solid in all the regular rivalry focuses. They are Price, Quality and Delivery. Lean and green endeavor proprietors can convey quality products rapidly, with low cost.

### **INTRODUCTION**

As per the Taichi Ohno 1988, a Lean Manufacturing idea alludes to the ideal method for producing goods through the removal of waste. At the end of the day, Lean Manufacturing is an operational system situated toward accomplishing the most brief conceivable process duration by disposing of waste. Lean assembling strategies depend on the utilization of five standards to control management's activity toward progress (Value, Continuous Improvement, Customer Focus, Perfection and Focus on squander) Aza Badurdeen, 2007. Similarly, green manufacturing alludes to a deliberate, monetarily determined, and incorporated approach, focusing on all the waste streams related with the planning, manufacturing, functioning, and transfer of products as well as materials (Sezen and Cankaya, 2013).

Green manufacturing includes change of industrial operations in three different ways: (1) utilizing Green energy, (2) creating and offering Green products and (3) utilizing Green procedures in business activities. An ongoing worldwide overview by BCG uncovers that upwards of 92 percent of the organizations reviewed are occupied with Green activities. Manufacturing companies that embrace Green practices advantage through long-term cost funds, as well as similarly critically, from brand improvement with clients, better administrative footing, more noteworthy capacity to pull in ability and higher investor interest. Be that as it may, these

advantages require a long haul duty and making tradeoffs against here and now destinations, as the financial aspects of Green manufacturing is as yet advancing and not surely knew up 'til now.

The inspiration for adopting Green has changed crosswise sectors. Some take it up inferable from administrative impulses (ex: power), while others consider it to be a chance to fabricate a more grounded brand with buyers (illustration: retail). Steel producers have embraced Green activities to balance out rising energy costs, while automobile organizations have considered it to be a chance to dispatch electric and half breed autos to meet progressively stringent emission regulations. The effect of Green activities additionally fluctuates by the business area. For instance, Green activities in the power area have the greatest effect on diminishing CO<sub>2</sub> discharges taken after by transportation and afterward the industrial part. this regard, it is important to evaluate the execution of lean and green assembling in various companies with the goal that the essential accepted procedures can be recognized. In this paper portrays the improvement of key regions which will be utilized to survey the selection and implementation of lean and green manufacturing rehearses. Notwithstanding that it is managing issues and prospects of lean and green manufacturing hones for efficiency change in select SMEs of Telangana state.

### **OBJECTIVES OF THE STUDY**

1. To study and understand the SMEs manufacturing process
2. To identify the prospects of lean and green manufacturing practices in SMEs
3. To analyses the problems of Lean and Green Manufacturing practices in SMEs
4. To provide suggestions for reducing the problems with related to Lean and green manufacturing practices in SMEs.

### **HYPOTHESIS OF THE STUDY**

- H<sub>0</sub>: there is no significant influence of lean and green practices on organizational performance

### **REVIEW OF LITERATURE**

In the 1950's Toyota Motor Corporation made Toyota Production System, at that point it outlined another sorts of administration thought "Lean thinking" (Yongsheng Wang). The use of lean reasoning on assembling i.e. "Lean production", lessen fabricating cost, shorten progression and assembling process duration and enhance enterprise competitiveness. Other than car industry, Lean creation also connects with machinery fabricating, gadgets, customer products, aviation and shipbuilding and gets the chance to be other defining moment of present day age methodologies. In 21st century the use of lean reasoning gets progressions and has changed into another age direction thought of management revolution.

Slack et al., (2004) likewise characterizes the guideline of lean as "moving towards the disposal of all loss keeping in mind the end goal to build up a quicker and more reliable task with higher quality product/ service at a low cost ". In spite of the fact that lean reasoning is regularly connected to assembling lean strategies, center is pertinent anyplace there are procedures to progress. A lean store network is one such process that produces exactly what and what amount is required, when it is required, and where it is required. Lean assembling logic has gotten changes in organization practices to upgrade consumer loyalty and furthermore organizational effectiveness and capacity (Kapuge, A.M. and Smith, M 2007).

As per Piciacchia, F.R. (2003), the significant reason for the usage of lean assembling are to grow profitability, upgrade product quality and assembling cycle, diminish stock, lessen lead

time and expel manufacturing wastes and to achieve the lean assembling rationality uses couple of thoughts.

Another investigation (Kartik Ramchandran, 2001) illustrated the guideline clarifications behind embracing a lean framework under three board groupings: decreasing creation asset prerequisites and cost, extending customer responsiveness and enhanced product quality and these merge to help association advantages and intensity. Carter and Carter (1998), Zhu and Sarkis (2004) have examined the prescribed procedures in lean and green store network administration and have ordered the practices as coordinated effort and affirmation. To make the connection among lean and economical supply chains, Juin (2011), Pagell and Wu (2009) in their broad survey quote the need to coordinate lean standards, maintainability objectives; store network rehearses into day-to-day management.

King and Lenox (2001) set up that organizations that embrace the quality administration standard ISO 9000 will probably receive the natural administration standard ISO 14000. They likewise demonstrate that such consistence endeavors result in cleaner, more secure activities, lessened utilize and substitutions for unsafe substances, expanded item recyclability and recuperation and enhanced straightforwardness of data sharing among providers, exchanging accomplices, workers and customers. The most convincing explanation behind companies to embrace lean is financial advantages and green is the natural advantages (Faisal, 2010; Hines, 2010).

Kumar and Marimuthu (2011) has demonstrated that usage of lean manufacturing methods accomplishes change in process, environment, extraordinary decrease in human exhaustion and cost with sensible venture. Zhu and Sarkis (2006) have demonstrated that reception of GSCM hones tend to report enhanced natural execution and positive change in the company's economic performance. Subsequently to protect the dynamic part of the lean worldview and to guarantee its harmonization with the financial and natural viewpoints a theoretical model finding out the connections among Lean and Green with Environmental execution and Economic execution of the firm was needed.

Duarate et al., (2010) quote that cost proficiency and ecological obligations are not fundamentally unrelated, they are commonly upholding. This demonstrates the need to build up a framework way to deal with see how firms can best deal with these ideal models to make maintainability. In Indian setting, Lean and green has been investigated in confined setting and regularly limited to the shop floor. Henceforth returning to the built up techniques of SCM to reassess the practicality with the edge of supportability all in all and Lean and green particularly would assist associations with providing tradeoffs between the two to wind up more aggressive and maintainable (Machado and Duarte, 2010).

The U.S. Natural Protection Agency displays a table of ecological effect related with squanders focused by Lean. They prescribe that organizations can enhance their execution of Lean usage by thinking about natural effects, with the goal that ecological squanders can be recognized expressly during Lean movement (U.S.EPA, 2007).

## RESEARCH METHODOLOGY

The research design adopted in the present study consists of the following components.

### *Sources of data*

The primary data is composed from employees in the managerial level who is dealing with the concept of lean and green manufacturing and its application. Secondary data pertaining to lean and green manufacturing were collected from published reports, records of SMEs and websites.

### *Data collection and Analysis*

Data is collected with the help of a structured questionnaire. The questionnaire has the following parts.

- Management type, annual turnover, volume of production, area lean applied, duration in days, ROI and many other factors

The questionnaire is administered through online to SMEs present in and around Hyderabad region of Telangana state and respondents are further personally interviewed in a formal way to gather relevant information. The questionnaires are distributed to the 385 SMEs. About 65 could be obtained but only 50 of them are complete in all respects. The statistical tools used in this research work were Descriptive Statistics and t-test.

## RESULTS AND DISCUSSION

### *i. Descriptive statistics*

Descriptive Analysis performed to the set of definite measures beside with incisive for samples of association that exists between information groups. It refers to a procedure to establish the point of execution of these customs in manufacturing companies. This shows the way to find opinionated or contradictory situations by means of innovative or described thinking to point out the conclusion.

To comprehend the level of Lean and Green usage through Lean practices, Green help practices, and Organizational execution the investigation and elucidation of the information was done on the collected 50 respondents. The investigation was sorted out to give answers to the examination questions. The expressive insights of the factors are quickly abridged as Mean score and standard deviation (S.D) in the table 1.

**Table-1 Descriptive Statistics**

Variables		Mean	Standard Deviation
Green support Practices	Management support	3.69	0.70
	Customer support	3.86	0.86
Green Practices	Green inbound practices	3.51	0.61
	Green outbound practices	3.90	0.55
	Green operational practices	3.68	0.68
Lean Practices	Demand management	2.43	0.99
	Value addition	2.44	1.06

	Process standardization	2.94	0.98
	Culture	2.70	1.01
	Industry standardization	3.39	0.89
	Cross enterprise collaboration	2.51	1.14
Organizational performance	Environmental performance	4.11	0.69
	Financial performance	3.81	0.61

From the table 1 it is clear that client choice for green products (3.88) and stakeholder force (3.69) were bring into being significant in implementing Green practices. The SMEs paid interest of execution of green operational practices (3.68), go after by green outbound practices (3.90). Only industry standardization (3.39) is found to being significant in implementing Lean practices. The environmental performance (4.11) constituents and the financial performance (3.81) components help in improvement in firm's environmental situation and development in corporate image.

*ii. Prospects of Lean and green manufacturing practices in SMEs*

Table 2 shows the benefits of Lean and green manufacturing practices in SMEs rank ordered based on importance by the respondents. Through the survey optimal environmental management (4.78) ranked first by the respondents and Increased employees involvement (4.60) ranked second. The remaining ware explained in the below table.

**Table 2 Prospects of Lean and green manufacturing practices in SMEs**

<i>Statements</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Rank</i>
Focus on enhancing competitiveness through value creation for customers	3.91	0.69	6
Long term benefits	2.92	1.88	7
Elimination of waste	2.36	1.26	8
Manufacturing process improvement	3.40	1.58	5
Supply chain improvement	4.29	0.98	3
Increased employees involvement	4.60	0.57	2
Time saving in operational process	3.51	2.09	4
Optimal environmental management	4.78	1.01	1

### ***Problems of Lean and green manufacturing practices in SMEs***

What are the important problems in lean and green practices? Table 2 shows that there are many. Those elements which got a score more than 4 on a 5-point scale of importance are: High expectations with limited time and investment (4.51), Lack of commitment from the management itself (4.23), Team members not taking seriously training programs indicating poor Organizational Culture (4.19), and Lack of Proper people to Lead the teams (4.13) The other important ones are: Team members not devoting time on kaizen projects and Kaizen circle activities (3.82) and Heavily dependent on Lean and green Consultant only (3.61). Table 3 and 4 show that there are no statistically significant differences across production type and area lean applied.

**Table 3 Problems of SMEs in implementation of Lean and Green concepts**

<b>S. No</b>	<b>Problems</b>	<b>Mean*</b>	<b>SD</b>
1	High expectations with limited time and investment	4.51	0.64
2	Lack of commitment from the management itself	4.23	0.45
3	Lack of Proper people to Lead the teams	4.13	0.44
4	Team members not taking seriously training programs indicating poor Organizational Culture	4.19	0.43
5	Team members not devoting time on kaizen projects and Kaizen circle activities	3.82	1.15
6	Heavily dependent on Lean and green Consultant only	3.61	1.19

\*5 –point Scale: 1=Very Unimportant, 2=Unimportant, 3=Neutral, 4=Important, 5=Very Important.

**Testing of hypotheses**

***H0: there is no significant influence of lean and green practices on organizational performance***

Table 4 examines the relationship between lean and green practices on organizational performance. ANOVA is conducted to test the significance at 0.01 level. There is a significant relationship between lean and green practices on organizational performance

**Table 4 lean and green practices on organizational performance**

Variable		Sum of Squares	Df	Mean Square	F	Sig.
Green support practices	Between Groups	28.344	4	7.086	17.901	.000*
	Within Groups	32.609	45	.396		
	Total	60.953	49			
Green practices	Between Groups	52.065	4	38.016	54.276	.000*
	Within Groups	34.641	45	.700		
	Total	50.706	49			
Lean practices	Between Groups	834.959	4	458.740	46.292	.000*
	Within Groups	970.438	45	8.867		
	Total	2805.397	49			

\*Significant at 0.01 level.

**SUGGESTIONS**

The samples depend on assembling organizations that are just receiving a considerable lot of these practices from the ongoing past. The causal model proposes to specialists that execution of Lean and Green rehearses as a solitary element instead of as isolated elements could encourage acknowledgment of advantages.

**CONCLUSIONS**

The manufacturing organizations are Green as well as Lean pioneers. Green and Lean assembling is center to their aggressive systems. The change excursion to Green and Lean assembling has recently begun. While there are a couple of early adopters, the industry everywhere needs to create far reaching intends to address all territories of Lean and Green practices. The Government needs to assume a viable facilitator part in this change with both more grounded impetuses on one hand and administrative instruments on the other. The business affiliations can unite the diverse partners and bolster the take off of a correspondence methodology.

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