

# Effectiveness of JIT Production System among Employees Working in Electrical Industry during Pre-Pandemic Situation at Chennai

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## ABSTRACT

*This research has done particularly to identify the effectiveness of JIT production system among the employees working in Electrical Industry at Chennai. JIT production scales include JIT schedule, JIT layout, JIT delivery by suppliers, JIT link with customers, pull system, and setup time reduction. Manufacturing strategy scales are measured in terms of achievement and leadership of functional integration, anticipation of new technologies, and communication of manufacturing strategy, formal strategic planning, manufacturing-business strategy linkage, and proprietary equipment. So, the research mainly aimed to examine the effectiveness of JIT production system among the employees of the selected electrical companies. For this, around 60 employees were selected in a random basis and collected their opinion about the effectiveness of JIT production system through a structured questionnaire. With the help of statistical tools like percentage analysis, mean score analysis, standard deviation, anova analysis and weighted average ranking method. The results found that all the selected employees are equally experienced the JIT production system in an effectively.*

**Keywords:** JIT Production System, Effectiveness of JIT, Problems of JIT.'

## 1. INTRODUCTION

In the current highly dynamic and changing environment, the global competition among organisations has led to higher demands on most manufacturing organisations. Global competition among manufacturing organisations has signalled a tremendous change in approach of management, techniques of product and process, expectations of customer, attitude

of supplier as well as competitive behaviour. The challenges thrown up by this competition has forced the manufacturing organisations worldwide to nurture high reliability, quality, availability and maintainability in the manufacturing systems by implementation of various strategic and proactive market-driven strategies to remain competitive in a highly dynamic environment. Thus, to remain at the top, an organisation needs to change strategies, improve product quality and reduce cost of production at a faster rate than its competitors. To meet all the challenges, organisations try to introduce different manufacturing techniques.

JIT has been a widely recognized production philosophy alternative since the early 1980s. JIT principles and techniques have been widely adopted in many manufacturing firms. JIT is a set of management practices aimed at continuous improvement through the elimination of all wastes and full utilisation of human resources. JIT manufacturing has the capacity, when properly adapted to the organization, to strengthen the organization's competitiveness in the marketplace substantially by reducing wastes and improving product quality and efficiency of production. During the last two decades, many companies have implemented JIT to increase their competitiveness. In fact, inventory reduction is perhaps the most visible result that JIT brings about. The fundamental objective of JIT is to eliminate all waste from the entire manufacturing cycle through continuous improvement. It reduces the complexity of detailed planning of material, the need for shop floor tracking, raw material as well as WIP inventories, qualities and transactions associated with shop floor and purchasing systems. However, benefits of JIT do not just happen but before a manufacturing organisation reaps the benefits of JIT, it must accept JIT as an organisational philosophy.

## **2. REVIEW OF LITERATURE**

In this section, the researcher has discussed about the published research papers covered a wide area of JIT. The authors Gurinder Singh and Inderpreet Singh Ahuja (2014) has discussed to create awareness of contributions made by just-in-time manufacturing (JIT) practice towards building performance measures in Indian manufacturing industry. While conducting this study, survey of reasonable number of manufacturing organisations have been made so as to ascertain contributions made by JIT initiatives in the Indian manufacturing industries for achieving major performance measures. They found that the holistic JIT manufacturing methods outscore the traditional manufacturing practices towards improving the manufacturing performance. The group of researchers Malik et al. (2011) have conducted a research on JIT-based quality management in Indian manufacturing industries, and after employing various statistical techniques in their survey, it has been depicted that the degree of difficulty in implementation of JIT-based quality management was found to be 3.18 on a scale of zero-five, implying that implementation of JIT-based quality management in totality is reasonably difficult in Indian industries. The two authors Kumar and Grewal (2007) have discussed the critical elements of the JIT in the context of Indian service industries. A well-structured questionnaire has been used and 30 respondent's opinion have been received about the critical elements of JIT. Attempt was made to examine the degree of importance and degree of difficulties, of these critical elements in Indian service industries. The results revealed that JIT played an important role in service industries. Authors suggested that elements that were

less difficult but more important should be implemented in the initial stage. The researcher Mohanasundari (2011) has discussed about the phases and importance of insurance for employees working in Various Industries in India. From her literature review the perception of employees towards insurance industry has been considered here.

The researcher Mahadevan (1997) has discussed the readiness of Indian industries in implementation of JIT. From his research survey, it has been found that automobile industry in India made significant changes in many areas like JIT purchasing, implementation of TPM and multi-skill labour. These factors contribute towards successful implementation of JIT in manufacturing industry. Management's commitment and participation of workers are the critical success factors.

### **3. STATEMENT OF THE PROBLEM**

Even though, JIT production system and its technique has more success in the present scenario, employees and supervisors not getting entire ready for changing the new working environment. JIT represents a revolutionary change in the workplace. For instances, in term of working performance, a worker cannot produce another unit until the worker at the next station signals that another unit is needed. At the end of a shift, each worker in the group will have produced the same output. Performance, then, must be evaluated on the output of the entire group rather than of the individual. And, among the employees, who have experienced the full effectiveness of JIT production system varies. At this juncture, the researcher has raised the question like how well the JIT production system has effectively activated on employees working in Electrical Industry at Chennai.

### **4. OBJECTIVES OF THE STUDY**

- To study the demographic and working profile of the selected employees working in Electrical Industry at Chennai.
- To examine the effectiveness of JIT production system among the employees.
- To identify the problems faced by the employees while practicing JIT production system.

### **5. METHODOLOGY**

In this research, descriptive research design has been used. For examining the JIT production system among the employees of Electrical Industry at Chennai, the researcher has selected 60 employees from the electrical companies. To evaluate the performance of the JIT production system, designation, working experience and number of training programs attended have taken as independent variables and effectiveness of JIT production system has taken as dependent variable. For examining the effectiveness of JIT production system, percentage analysis, mean score analysis, standard deviation, analysis of variance and weighted average ranking method have been used. These statistical tools are practiced and explained in the following tables.

## 6. DATA ANALYSIS

In this section, the researcher has analysed the opinion of the selected employees working in Voltech Manufacturing Private Limited in Chennai through simple percentage analysis, mean score analysis, standard deviation, analysis of variance and weighted average ranking method. The tables and results are given below.

### Section 1: Working Profile of the respondents

The following table shows the working profile of the respondents.

**Table 1: Designation of the respondents**

S. No.	Designation	No. of Respondents	Percentage
1.	Engineer	28	46.7
2.	Supervisor	21	35.0
3.	Skilled Worker	11	18.3
	<b>Total</b>	<b>60</b>	<b>100.0</b>

It is observed from the above table that 46.7 percent of the respondents are engineers, 35.0 percent of the respondents are supervisors and 18.3 percent of the respondents are skilled workers.

**Table 2: Working Experience of the respondents**

S. No.	Working Experience	No. of Respondents	Percentage
1.	1-3 Years	10	16.7
2.	4-6 Years	15	25.0
3.	6-9 Years	26	43.3
4.	Above 9 Years	9	15.0
	<b>Total</b>	<b>60</b>	<b>100.0</b>

It is indicated from the above table that 16.7 percent of the respondents are having 1-3 years of experience, 25.0 percent of the respondents are having 4-6 years of experience, 43.3 percent of the respondents are having 6-9 years of experience and 15.0 percent of the respondents are having above 9 years of experience.

**Table 3: Number of Training Programs Attended of the respondents**

S. No.	Number of Training Programs Attended	No. of Respondents	Percentage
1.	1-3 training programs	8	13.3
2.	4-6 training programs	16	26.7
3.	Above 6 training programs	36	60.0
	<b>Total</b>	<b>60</b>	<b>100.0</b>

It is showed from the above table that 13.3 percent of the respondents have attended 1-3 training programs, 26.7 percent of the respondents have attended 4-6 training programs and 60.0 percent of the respondents have attended above 6 training programs.

## 7.2 Section 2 : Effectiveness of JIT Production Technique

In this section, effectiveness of JIT Production Technique has been discussed. For the purpose, ten statements have been framed with 5-point Likert's scaling method for examining the effectiveness of JIT production technique. The mean of the statements is given in the following table.

**Table 4: Effectiveness of JIT Production Technique**

No.	Statements	Mean	SD
1	Quality Improvement	4.52	0.50
2	Improvement in frequent deliveries	4.67	0.48
3	Reduction in transportation time	4.52	0.50
4	Increase in Profit	4.70	0.46
5	Improvement in Productivity	4.52	0.50
6	Worker motivation	4.60	0.49
7	Reduction in overhead	4.52	0.50
8	Reduction in inventories	4.53	0.50
9	Reduction in space requirement	4.52	0.50
10	Team work	4.50	0.50
	<b>Overall Mean Score</b>	<b>4.56</b>	

It is examined from the above analysis that among the ten categories of effectiveness of JIT production technique, increase in profit achieves the maximum level of benefits has mean score of 4.06 and followed by increases the employee retention levels with the mean score of 4.00.

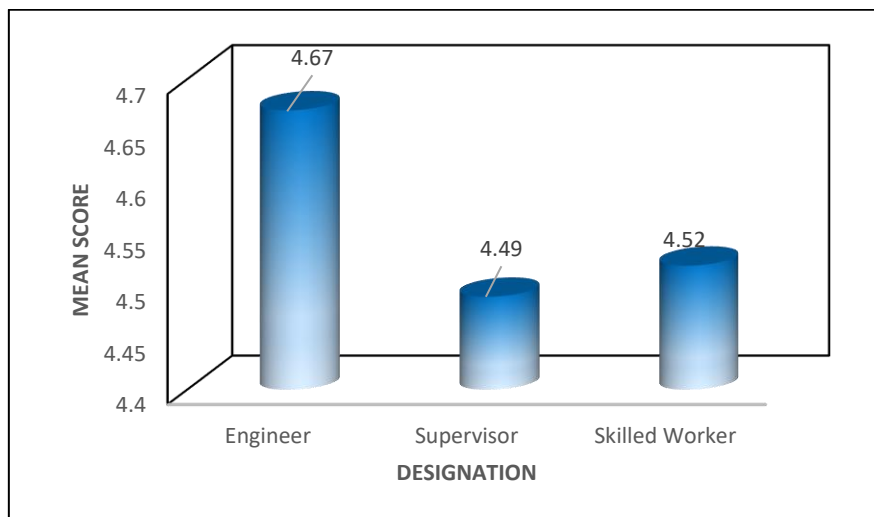
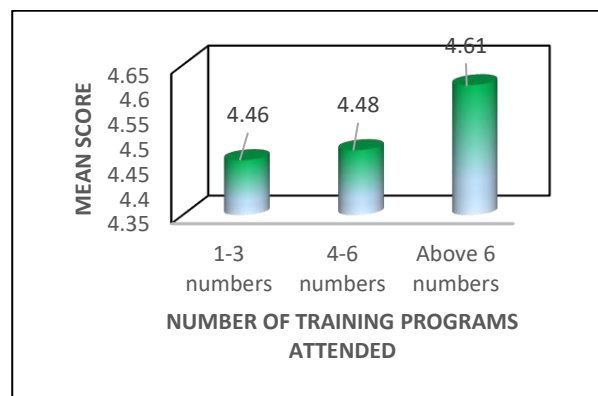
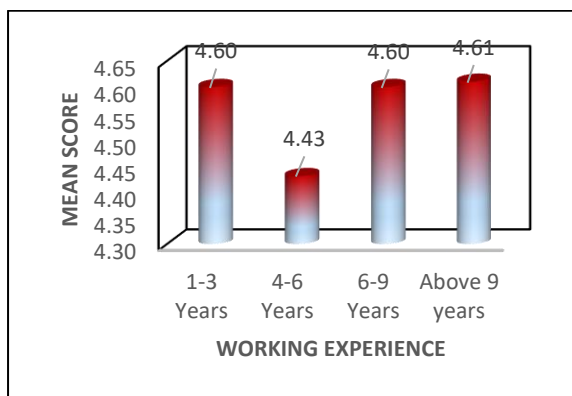
## 7.3 Relationship between working profile and Effectiveness of JIT Production Technique (Anova Analysis)

In order to find the relationship between demographic variables of the respondents and effectiveness of JIT production technique, a hypothesis has been framed and tested by Anova test. The test results are discussed in the following tables.

**Table 5: Working Profile and Effectiveness of JIT Production Technique**

S. No.	Variables	Mean Score	SD
	<b>Designation</b>		
1.	Engineer	4.67	0.27
2.	Supervisor	4.49	0.27

3.	Skilled Worker	4.52	0.34
<b>Working Experience</b>			
1.	1-3 Years	4.60	0.26
2.	4-6 Years	4.43	0.32
3.	6-9 Years	4.60	0.29
4.	Above 9 Years	4.61	0.27
<b>Number of Training Programs Attended</b>			
1.	1-3 training programs	4.46	0.34
2.	4-6 training programs	4.48	0.27
3.	Above 6 training programs	4.61	0.29



- It is revealed from the analysis that among the three categories of designation of the respondents, engineers are having maximum level of effectiveness of JIT production technique.
- It is showed from the analysis that among the four categories of working experience, the respondents got above 9 years of experience are having maximum level of effectiveness of JIT production technique.

- It is indicated from the analysis that among the three categories of number of training programs attended, the respondents attended above 6 training programs are having maximum level of effectiveness of JIT production technique.

### Relationship between Designation and Effectiveness of JIT Production Technique

H<sub>0</sub>: All the selected respondents are having equal level effectiveness of JIT production technique with respect to their designation.

**Table 6: Designation and Effectiveness of JIT Production Technique**

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Between Groups	0.384	2	0.192	2.349	0.105 <sup>NS</sup>
Within Groups	4.662	57	0.082		
<b>Total</b>	5.046	59			

**Note:** NS – Not Significant

It shows that 'p' value is greater than 0.05, the null hypothesis is accepted. Hence, it is found that selected respondents are having equal level effectiveness of JIT production technique with respect to their designation.

### Relationship between Working Experience and Effectiveness of JIT Production Technique

H<sub>0</sub>: All the selected respondents are having equal level effectiveness of JIT production technique with respect to their working experience.

**Table 7: Working Experience and Effectiveness of JIT Production Technique**

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Between Groups	0.348	3	0.116	1.381	0.258 <sup>NS</sup>
Within Groups	4.698	56	0.084		
<b>Total</b>	5.046	59			

**Note:** NS – Not Significant

It clears that 'p' value is greater than 0.05, the null hypothesis is accepted. Hence, it is obtained that selected respondents are having equal level effectiveness of JIT production technique with respect to their working experience.

### Relationship between Number of Training Programs Attended and Effectiveness of JIT Production Technique

H<sub>0</sub>: All the selected respondents are having equal level effectiveness of JIT production technique with respect to their number of training programs attended.

**Table 8: Number of Training Programs Attended and Effectiveness of JIT Production Technique**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.280	2	0.140	1.672	0.197 <sup>NS</sup>
Within Groups	4.766	57	0.084		
<b>Total</b>	5.046	59			

**Note:** NS – Not Significant

It observes that 'p' value is greater than 0.05, the null hypothesis is accepted. Hence, it is indicated that selected respondents are having equal level effectiveness of JIT production technique with respect to their number of training programs attended.

### Problems faced by the respondents while practicing JIT Production Technique

In this section, the researcher has identified the problems faced by the employees those are using the JIT system in the electrical companies. For this, six problems had been identified and these are ranked by the sample employees with the magnitude of the problems. Based on the weighted average method, the ranks are ordered and indicated in the following table.

**Table 9: Problems Faced by the respondents while practicing JIT system**

S. No.	Problems	Weighted Average Score	Ranks
1.	Less awareness of JIT among employees	184	VI
2.	Meagre support from employees	202	III
3.	Rigid workforce	253	I
4.	Less response from the employees to innovation and change	196	IV
5.	Less motivated workforce	188	V
6.	Less mutual trust and Co-operation with the management	221	II

It is examined from the above analysis that most of the respondents have faced the problem like rigid workforce while practicing JIT system with maximum weighted score of 253. It is followed by the second and third ranks engaged by the problems 'less mutual trust



and less co-operation with the management' and 'meagre support from employees' with the weighted score of 221 and 202 respectively. It is followed by the fourth and fifth ranks involved by the problems 'less response from the employees to innovation and change' and 'less motivated workforce' with the weighted score of 196 and 188 respectively. The last rank is identified as 'less awareness of JIT among employees' with the weighted score of 184.

## 7. FINDINGS AND RECOMMENDATIONS

- It is indicated from the analysis that the majority of the respondents are engineers, having 6-9 years of experience and attended above 6 training programs.
- It is explored from the analysis that increase in profit achieves the maximum level of benefits among the ten categories of effectiveness of JIT production technique.
- It is showed from the analysis that most of the respondents are having maximum level of effectiveness of JIT production technique who are engineers, having above 9 years of working experience and above 6 training programs attended. The electrical companies should give JIT production training to the below 9 years of working experienced employees that may increase the productivity of the employees.
- It is examined that selected respondents are having equal level effectiveness of JIT production technique with respect to their various designation, difference categories in their working experience and number of training programs attended.
- On the other hand, the analysis found that most of the respondents have faced the problems like 'rigid workforce' and 'less mutual trust and less co-operation with the management' while practicing JIT system. So, the companies may reduce and diversified the work force to all the employees that helps to increase the production of the electrical companies and also increase the satisfaction of the employees.

## 8. CONCLUSION

This study is focused on effectiveness of JIT production system among the employees working in Electrical Industry at Chennai. Both primary and secondary data had been used in this research. It includes that respondents' opinions and compilation of research articles, web articles, survey reports, books, etc. on JIT production system in electrical industry. It is not free from barriers although JIT production is one of the most powerful systems. The barriers not only affect the effective implementation but also influence one another. This study shows that JIT production system can improve the operational performance of the selected electrical companies. It is very helpful for organization to focus on critical barriers for successful implementation of JIT production system and achieve operational excellence.

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