Manufacturing Excellence through JIT Approach- A Review

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Abstract

This paper present a review on attaining manufacturing excellence in an industry using Just In Time manufacturing system. Just In Time manufacturing system refers to approaches which are initially developed by Taiichi Ohno, father of Toyota production system that focuses on elimination of waste in all forms. The principle of Just in time (JIT) manufacturing system is to eliminate sources of manufacturing wastes by getting the right quantities of raw material and producing the right quantities of product in the right place at the right time. In the current scenario of extremely fast technology upgradation, traditional manufacturing system used by industries are replacing by advanced manufacturing system such as Just In Time manufacturing system due to various benefits of inventory reduction, improved operation efficiency, faster response to customer, reduce lead times, etc. It is important to stress on eliminating manufacturing non value adding operations and non moving inventories in production line. JIT philosophy is increasingly occupying a significant place in the operations strategy of companies all over the world. Studies illustrates that various countries have adopted and get benefitted by implementing Just In Time manufacturing in industries Therefore, it is important to use advanced manufacturing system for attaining manufacturing excellence. Past research have shown that Just In Time manufacturing system is considered as the best manufacturing system for attaining manufacturing excellence in the present scenario of globalization.

Keywords: Just In Time (JIT) manufacturing, manufacturing excellence, JIT benefits, Global Competitiveness Index (GCI)

1. INTRODUCTION

In the present scenario of competitive global business environment, the goal of all manufacturing systems is to survive in a long term race. A manufacturing company’s probability of surviving in an increasingly competitive market depends on its ability to produce highest quality products at lowest possible cost and with shortest possible lead-time. Just-In-Time (JIT) manufacturing is a Japanese management philosophy applied in manufacturing which involves having the right items of the right quality and quantity in the right place and the right time. It has been widely reported that the proper use of JIT manufacturing has resulted in increases in quality, productivity and efficiency, improved communication and decreases in costs and wastes. The potential of gaining these benefits has made many organizations question and consider this approach to manufacturing. For these reasons, JIT has become a very popular subject currently being investigated by many worldwide organizations. Just-In-Time management involves the application of old management ideas; however, their adaptation to the modern manufacturing firm is a relatively new practice. Presently, many firms are studying and applying the JIT approach in response to an ever more competitive environment. Over the long run, application of JIT manufacturing may assist these companies in achieving these goals of manufacturing excellence.

Web definitions: Just in time is a production strategy that strives to improve a business return on investment by reducing in-process inventory and associated carrying costs.

Just-in-time (JIT) is defined in the American Production and Inventory Control Society (APICS) dictionary as “a philosophy of manufacturing based on planned elimination of all waste and on continuous improvement of productivity.”

According to JIT manufacturing system, there are major seven types of waste. They are as follows:
1. Transportation waste
2. Process waste
3. Inventory waste
4. Waste of motion
5. Waste from defects
6. Wastage of time
7. Overproduction

Some of the other reasons of this wastage are recognized as improper layout, incapable processes, poor methods, lack of knowledge and training, unscheduled maintenance, etc. JIT aims at minimizing these and similar wastages taking place in various operations while a company manufactures its final product.

JIT is a manufacturing philosophy that emphasizes achieving excellence through the principles of continuous improvement and waste reduction. Some of its purported benefits include higher Quality production, lower inventory...
levels, improved throughput times, and shortened customer response times. [1] The basic elements of JIT were developed by Toyota early in the 1950's, and became known as the Toyota Production System (TPS). JIT was well-established in many Japanese factories by the early 1970's. U.S started adopting JIT in the beginning of the 1980's (General Electric was an early adopter), and the JIT or Lean manufacturing concepts are now widely accepted and used.

2. LITERATURE REVIEW

2.1 Just-in-Time Production Systems (JITPS) in Developing Countries: The Nigerian Experience, S. L. Adeyemi says that:

This study examines the extent of JITPS in a typical third world country—Nigeria, with a view to identifying the extent of adoption as well as the hindrances on the part of adopting the technique. Structured questionnaires were administered to companies to indicate whether or not they were adopting the technique. Author also elicited information on the nature of JITPS adopted by companies as well as the benefits accruing from adopting the method.

This study had concluded with the following objective:
- To identify the benefits of a JITPS in companies currently adopting the technique in Nigeria.
- To identify the factors that hinder the adoption of the technique among companies not applying it.

In this paper author focuses on the application of JIT in Nigeria. The survey conducted by him had revealed that JIT is just as workable in Nigeria. The prerequisites in achieving successful JIT implementation are management commitment, responsiveness to market tastes and that education and communication would be necessary to achieve general acceptance of a JIT system. He concluded that, If Nigeria is to develop and be able to compete at the international market, its manufacturing sector has to acknowledge JIT and work towards achieving it.

2.2 Just-in-Time Manufacturing System: From Introduction to Implement, Akbar Javadian Kootanaee1, Dr. K. Nagendra Babu2, Hamidreza Fooladi Talari3 says that:

This study discusses in depth the implementation of JIT manufacturing. The objectives are twofold. The first objective is to acquaint the reader with the overall JIT concept and the factors necessary for its implementation; the concepts presented here represent the ideal principles and methods of implementation.

The study shows various examples of benefits achieved by JIT implementations in the U.S.
- The Oldsmobile division of general motors (GM) has implemented JIT project that permits immediate electronic communication between Oldsmobile and 70 of its principal suppliers, who provide 700 to 800 parts representing around 85% of the parts needed for the new GM -20 CARE.
- PTC components, a supplier to GM, has assisted GM in its use of stockless production by sending one truck a week to deliver timing chains to several of GM’s engine plants rather than accumulate a truckload to ship to each plant.
- Ford introduced JIT production at its heavy-duty truck plant in Kentucky, which forced firestone to switch its tire searching point from Mansfield to Dayton, Ohio. By combining computerized ordering and halving inventory, firestone has been able to reduce its own finished-goods inventory. In addition, its production planning is no longer guesswork.
- Each day a truck from Harley-Davidson motor co. transports 160 motorcycle seats and assorted accessories 800 miles to Harley’s assembly plant in York, Pennsylvania, as a part of their advanced “materials as needed” (MAN) programs-its version of JIT.
- The Hoover Company has used JIT techniques in its two plants at North Canton, Ohio, for a number of years for production scheduling and material flow control of 360 different models and 29000 part numbers.
- Some plants of Du Pont used JIT and had an inventory savings of 30 cents on the dollar for their first year.
- The Vancouver division of Hewlett-Packard reported the following benefits two years after the adoption of the JIT method: 6

<table>
<thead>
<tr>
<th>Type of JIT Benefits</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Inventory Investment</td>
<td>11</td>
<td>69</td>
</tr>
<tr>
<td>Large Space Savings</td>
<td>11</td>
<td>69</td>
</tr>
<tr>
<td>Increased Flexibility</td>
<td>8</td>
<td>50</td>
</tr>
<tr>
<td>Increase in Employee Morale</td>
<td>7</td>
<td>44</td>
</tr>
<tr>
<td>Reduction in Lead Time</td>
<td>7</td>
<td>44</td>
</tr>
<tr>
<td>Improvement in Productivity</td>
<td>5</td>
<td>31</td>
</tr>
<tr>
<td>Reduction in Customer Complaints</td>
<td>5</td>
<td>31</td>
</tr>
<tr>
<td>Reduction in Defects</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Reduction in Machine Downtime</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Reduction in Setup time</td>
<td>4</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: Author’s Survey.
2.3 The production performance benefits from JIT implementation, Rosemary R. Fullerton, Cheryl S. McWatters says that:

Besides many benefits of JIT adoption, its implementation rate in the US has been relatively conservative. This study uses survey responses from executives at 95 JIT-practicing firms to better understand the benefits that firms have experienced through JIT adoption, and whether a more comprehensive implementation is worthwhile. The research results demonstrate that implementing the quality, continuous improvement, and waste reduction practices embodied in the JIT philosophy can enhance firm competitiveness. JIT implementation improves performance through lower inventory levels, reduced quality costs, and greater customer responsiveness. This study indicates that JIT is a vital manufacturing strategy to build and sustain competitive advantage.

The respondents who indicated that they had formally adopted JIT were asked to identify the extent of operational change that occurred post-JIT adoption in the following areas: quality, production timeliness, employee utilization, accounting, firm profitability, and inventory reduction. They were given five choices for the level of change: significant increase, moderate increase, little or no change, moderate decrease, or significant decrease. Approximately, 28% of the responses indicate that firms have had significant improvements in their operations since implementing JIT. More than 61% of the responses are positive, whereas only 5% of the responses are negative with respect to changes after adopting JIT. When examining only inventory effects, over three-fourths of the respondents report declines in total inventory.

This study indicates that managers adopting JIT practices have experienced considerable benefits in all of the measured areas: quality improvements, time-based responses, employee flexibility, accounting simplification, firm profitability, and inventory reductions. International competition continues to intensify as firms strive to attain a greater share of the world marketplace. These research results demonstrate that JIT implementation improves competitive performance by lowering inventory levels and reducing quality costs and throughput time. The evidence supports the concept of JIT as a comprehensive, vital manufacturing strategy that can build and sustain competitive advantage.

2.4 Implementation of a Just In Time in a small company: a case study, A.Gunasekaran & J Lyu says that:

This study deals with the implementation of JIT in a small company in Taiwan that produces different kinds of automobile lamps. JIT systems have tremendous effects on all operations of a firm including design, account, finance, marketing, distribution, etc, and thus are of interest to all levels of a firm management.

A major success in the implementation of the JIT system is the reduction in the amount of inventory and workers. The work-in-process inventory level has reduced from a market value of 30 million NT to 5 million NT, parts inventory has reduced from 130 million NT to 60 million NT, and the number of workers has reduced from 580 to 520 during the past three years- where the growth rate of the company is 5-10% per year. Besides the physical outcomes from operating a JIT system, a major advantage is allowing every worker to have improvement motivation and ability. From this, quality and productivity problems ‘under the water’ have shown up and are solved. This kind of cycle can strengthen the organization and spirit of the Daioku Company so that it can be more competitive in the long run.

3. CONCLUSION

As per the Global Competitiveness Index (GCI) Report 2012-2013, India is ranked at 59th position out of 144 countries. India was at 56th position out of 141 countries in the previous year 2011-2012 GCI report. Now India is 59th on the list, India has slid 10 places since it peaked in 2009. Once ahead of Brazil and South Africa, the country now trails them by 10 ranks, and is lagging behind China by 30, according to The Global Competitiveness Report 2012-2013. India’s decline in competitiveness is shockingly reducing in the competitive era. This illustrates that we have to go far for achieving the better positions.

Based on the various paper studied, we can conclude that in the current scenario of globalization, Just In Time manufacturing system is coming as boosting source for attaining manufacturing excellence in an industries. The various benefits receiving from the implementation of JIT practices are Quality Benefits, Time-based Benefits, Employee Flexibility, Production process Simplification, Firm Profitability. INDIA is a developing country in the field of manufacturing. Implementation of JIT practices in a firms leads to contribution towards the economic growth of the country. To provide a new era resolution of JIT practices in the manufacturing firm of India for attaining manufacturing excellence.
References