

# Just in Time Approach – It's Application in Indian Industries

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## ABSTRACT

In today's competitive global business environment, the goal of the manufacturing system is long-term survival. In recent years, Inventory management is continuous challenge for all organizations not only due to heavy cost associated with inventory holding, but also it has a great deal to do with the organizations production process. JIT system has been defined and identified worldwide by many researchers and practitioners for world class manufacturing. This system has potential to compete in the present scenario of rapid development and growth of industrialization. JIT production methods are now widely practiced in many industries. This paper presents the background, benefits, implementation and reviews literature on JIT in developing countries like India.

At the end it is suggested that by implementing the JIT in Indian industries, an enormous saving can be generated and a new productivity ethics can be created that may be helpful to strengthen the Indian economy. Further, Indian labor is usually uneducated, lacking in motivation and more concerned with monetary benefits and job security than carrier progress and development of their potential. Labor unions and their reluctances are also unfavorable for implementing the JIT. Therefore, specific cultural changes are required for successfully implementing the JIT. On this issue some researchers opined that Japanese training models are not very successful in India. Therefore, some specific designed training programs should be organized for Indian workforce after studying their behavior pattern, personal traits, attitudes and social values.

**Key words:** JIT, Total Quality Management, JIT Implementation, Enterprise Resource Planning.

The concept are that the company produces only what is needed, when it is needed and in the quantity that is needed.

JIT is a system whether company starts manufacturing/purchasing once the customer orders the good effectively making zero inventories. In other words, in a JIT environment, materials are purchased and produced as and when it is needed. The whole idea is based on the phrase provide the goods just in time as promised when the order is placed by the customer. The opposite of the JIT production is known as JIC (Just in case) system where it produces goods for inventory with the intention of having goods just in case a customer places an immediate order. JIT production system identifies the hidden problems in the value chain and reduces the production waste of the system while increasing the throughout (Sales-Raw Material Cost). Even though the JIT system seems to be interesting and less complicated it requires lot of coordination with supply chain to avoid delays in the production schedule.

The whole concept of the JIT is differentiated from traditional productions systems using push vs. pull systems of production. The push system of production pushes materials to the next stage of the production irrespective of whether time and resources are needed at the next level of production creating lot of inventories at each level of the production flow. The traditional manufacturing organizations adopt push system where they produce for inventory and work in progress. The pull system of production is where the materials are pulled by next level of the production only when is signaled or required by the next stage of production. This drastically reduces the inventory held as it does not keep any work in progress. JIT concept is built based on the concept of pull production which eliminates the total inventory.

## **1. BACKGROUND**

JIT is a Japanese management philosophy which has been applied in practice since the early 1970s in many Japanese manufacturing organizations. It was first developed and perfected within the Toyota manufacturing plants by Taiichi Ohno as a means of meeting consumer demands with minimum delays. Taiichi Ohno is frequently referred to as the father of JIT. Toyota was able to meet the increasing challenges for survival through an approach that focused on people, plants and systems. Toyota realized that JIT would only be successful if every individual within the organization was involved and committed to it, if the plant and processes were arranged for maximum output and efficiency, and if quality and production programs were scheduled to meet demands exactly.

The Toyota production plants were the first to introduction JIT. It gained extended support during the 1973 oil embargo and was later adopted by many other organizations. The oil embargo and the increasing shortage of other natural resources were seen as a major impetus for the widespread adoption of JIT. Toyota was able to meet the increasing challenges for survival through an approach to management different from what was characteristic of the time. This approach focused on people, plants and system. Toyota realized that JIT would only be successful if every individual within the organization was involved and committed to it, if the plant and processes were arranged for maximum output and efficiency, and if quality and production programs were scheduled to meet demands exactly.

JIT had its beginnings as a method of reducing inventory levels within Japanese shipyards. Today, JIT has evolved into a management philosophy containing a body of knowledge and

encompassing a comprehensive set of manufacturing principles and techniques. 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.

There is strong culture aspects associated with the emergence of JIT in Japan. The development of JIT within the Toyota production plants did not occur independently of these strong cultural influences. The Japanese work ethic is one of these factors. The work ethic emerged shortly after World War II and was seen as an integral part of the Japanese economic success. It is the prime motivating factor behind the development of superior management techniques that are becoming the best in the world. The Japanese work ethic involves the following

- Workers are highly motivated to seek constant improvement upon that which already exists. Although high standards are currently being met, there exist even higher standards to achieve.
- Companies focus on group effort which involves the combining of talents and sharing knowledge, problem solving skills, ideas and the achievement of a common goal.
- Work itself takes precedence over leisure. It is not unusual for a Japanese employee to work 14-hour days. This contrasts greatly when compared to the Western emphasis on time available for leisure activities.
- Employees tend to remain one company throughout the course of their career span. This allows the opportunity for them to hone their skills and abilities at a constant rate while offering numerous benefits to the company. These benefits manifest themselves in employee loyalty, low turnover costs and fulfillment of company goals.
- There exists a high degree of group consciousness and sense of quality among the Japanese. The Japanese are a homogeneous race where individual differences are not exploited or celebrated.

In addition, JIT also emerged as a means of obtaining the highest levels of usage out of limited resources available. Faced with constraints, the Japanese worked toward attainment of the optimal cost/quality relationship in their manufacturing processes. This involves reducing waste and using materials and resources in the most efficient manner possible. The input of sustained effort over a long period of time within the framework of continuous improvement is key. This is achieved by a focus on a continuous stream of small improvements known in Japan as 'kaizen' and has been recognized as one of the most significant elements of the JIT philosophy.

Furthermore, Japanese firms tend to focus on enhancing the long-run competitiveness rather than emphasizing the realization of short-term profits. They are willing to experience opportunity costs by introducing and implementing innovative ideas within their firms. Stockholders and owners of Japanese companies also encourage the maximization of term benefits. This enables them to experience the rewarding long-term profits as a result of their efforts.

## **2. OBJECTIVES OF JIT**

JIT manufacturing tries to smooth the flow of materials from the suppliers to the customers,

thereby increasing the speed of the manufacturing process. The objectives of JIT are to change the manufacturing system gradually rather than drastically.

- To focus on continuous improvement with less scrap
- To achieve 'zero defects' goal in manufacturing with quality
- To Increase productivity and worker efficiency with less idle time
- To achieve flexibility and administrative efficiency
- To reduce product cost by reducing space requirement
- To eliminate wastage in transportation, process, inventory, production, etc.,
- To be more responsive to customers with increased competitive position
- To improve profit margin with shorter lead time

### 3. ELEMENTS OF JIT MANUFACTURING

- Top management commitment
- Eliminating waste/reducing inventories
- Enforce problem solving and continuous improvement

People make JIT work- Employee Empowerment

- Total Quality Management (TQM)
- Parallel processing
- Kanban production control
- JIT purchasing
- Working toward repetitive manufacturing
- Cellular Layouts



## LIMITATIONS OF JIT

Although the benefits of using JIT are numerous and cited more frequently than any potential limitations, several shortcomings have been identified as follows:

- Cultural differences have been cited as a possible limitation of JIT. There exist many cultural differences which may be intrinsically tied to JIT success. These will be problems that may be difficult to overcome or work around without changes in attitudes and worker philosophy. The magnitude of their impact may be difficult to measure because of their nature.
- The traditional approach to manufacturing involves the use of large inventories with safety stocks. Safety stocks can act as a buffer for companies to fall back on to offset inaccurate demand forecasts. This has the potential to cause problems for the organization which relies heavily on safety stocks to absorb any increases in demand.
- The benefits associated with increased employee involvement and participation resulting from the use of quality circles may be evident in Japanese organizations. However, Western ideas of participation involve largely 'empowering' the workforce with respect to decision making. This suggests that the level of involvement established within Japanese organizations using JIT is not compatible with the degree of employee participation required to satisfy western workers. The benefits associated with JIT may be culturally bound and somewhat limited to the Japanese environment.

Loss of individual autonomy has been suggested as another possible short-coming of JIT. Loss of autonomy has largely been attributed to limited cycle times or the 'time between recurring activities'. Buffers such as slack or idle time are significantly reduced resulting in greater amounts of stress and pressure placed upon the worker to perform. The time which would otherwise be present would allow the worker more freedom to perform 'vertical tasks' which constitute administrative tasks or team

- Loss of team autonomy is a possible result of reducing or eliminating buffer inventories. This serves to reduce the flexibility of workers to discuss possible solutions to problems. This is a function of quality circles, which are an important part of JIT. Reduced buffer inventories and workers flexibility contradict the other aspects of JIT concerning quality circles.
- Loss of autonomy over methods involves the idea that, under JIT, employees must adhere to strict methods of production in order to maintain the system. This idea diminishes the 'entrepreneurial spirit' which many workers may have previously enjoyed prior to JIT implementation.
- JIT success may be 'industry specific', i.e. craft-oriented businesses are considered to be better candidates for a JIT program than organizations producing commodity-type products.
- Resistance to change may be experienced since JIT involves an organizational level of change, which will affect almost every member of the organization. Employees may resist the change based on two different levels: emotional and rational resistance. Rational resistance occurs when an individual is deficient of the necessary information and facts pertaining to the degree to which the change will affect them. Emotional resistance refers to the psychological processes of fear, anxiety and suspicion which arise which arise from inducing change and cause resistance.

#### **4. LITERATURE REVIEW**

Singhvi (1992) has presented the experience of implementing the JIT in an Indian automobile company. The study has found the 'employee involvement' as a critical element for implementing the JIT, while large investments are not found essential. At last, it is concluded that implementation of JIT is not so difficult in India. Its implementation could be a great opportunity for Indian industries due to its wide range of benefits.

Padukone and Subba Rao (1993) have stated that India might provide an excellent case study to determine, if JIT practices implemented in Indian industries. But JIT implementation without understanding the conceptual framework cannot result in long lasting improvements. In addition, this study suggested that JIT should be implemented in two stages. First stage of JIT implementation includes setup reduction, lot size reduction, small machines, quality, layout, buffer stock reduction and flexible workforce. These techniques are essential for full JIT to work because these focus on four main elements of JIT that can be achieved in short term. These are: simplicity, flow quality, and fast setup and lays the foundation for moving on the more difficult techniques like Kanban, JIT purchasing, Buffer stock removal, multifunctional worker, pull scheduling, enforced improvement and visibility.

Vrat and Mittal (1993) have conducted a Delphi study to assess the applicability or difficulty of implementing JIT elements in Indian context. The results have shown that quality circles and good communication are not very difficult to implement having a rating of 30 and above on a 40 point scale. Top management attitude, multifunctional workers, long-term relationship with vendor and support from labour union have high rating, which indicates that JIT implementation in India is not an impossible task. The study has also stressed on focusing more on poke-yoke, reduced set up time, Kanban system, and quality of incoming material.

Garg, Vrat and Kanda (1994) have explored the specific cultural changes required in JIT environment and also reported their presence in Indian industries. They have stated that trust, locality, responsibility, development, motivation, authority, long-term relationship and respect for human beings mark work culture required in JIT environment. It is critical for industries to make conscious and deliberate efforts to change the work culture for successful implementation of JIT. These changes require top management commitment and worker participation in decision making, and massive education and training to the people concerned.

Deshmukh (1996) has attempted review on the state of the art of JIT and its possible ramifications in the purchasing and manufacturing system. It has been pointed out that JIT from a systems perspective requires that suppliers and manufacturing functions must be in concert with design, planning, control. JIT must be viewed as a binding force coupling all the activities, from incoming raw material to the finished goods

Garg and Deshmukh (1996) have conducted a survey of 31 Indian industries to analyze the importance of the attributes pertaining to JIT purchasing and supplier evaluation criteria. The surveyed companies have given great importance to some attributes such as, high quality, mutual trust, cooperated relationship, on time deliveries supplier evaluation, stable production schedule, reliable network of suppliers, reduced delivery time, long-term contract and continuous improvement. The study has also indicated the scope of JIT as 70 on-scale (0-100), which is predicted better compared to earlier studies.

Roy and Guin (1996) have exposed the applicability of JIT in Indian industries. They have also reviewed the literature related to applications of JIT in different sectors of manufacturing and identify the various requirements need to be fulfilled include: leveled and stable final assembly schedule, change in layout, multi-skilled workforce and training for workers.

Kaujalggi and Lingaraj (1997) have provided an overview of changes implemented in apring manufacturing department. These changes were made as part of a continuing implementation of a JIT manufacturing system. This study has shown how manufacturing order and control systems change in order to create a system which can react immediately according to change in customer's needs.

Mahadvan (1997) has conducted survey of 43 Indian industries and suggested that TQM and vendor development efforts must pre-cede the launch of major JIT programs. It has been found that automobile industry in India has made significant improvements in areas such as, multi-skilling of workforce, total preventive maintenance (TPM) and JIT purchasing. These factors constitute the basic requirements for successful JIT implementation in any firm. Supplier development, employee involvement, and top management commitment are prominently listed as critical success factors. Training, task force formation, re-layout, and pilot study are indicated as among the first five steps taken in JIT implementation.

Garg, Kaul and Deshmukh (1998) have conducted a case study in JIT implementation of an Indian tractor assembly Industry. Records of company have indicated that significant benefits are achieved by improvement in quality and productivity, and reduction in inventory, material movement, space, manpower, work-in-process, and lead-time. The key steps in JIT implementation were extensive training of employees on pull concepts; identification of key performance parameters; new layout based on U-shaped cells; standardization of operations; a maintenance plan for each machine, housekeeping, visual control, and multi-skill training.

Vikas, Dixit and Mehta (2004), have conducted a survey on JIT practices in India, 34 manufacturing firms were included in survey. The result of this survey supported the notion that JIT has the potential to increase the operational efficiency, quality and organizational effectiveness of Indian industries while some basic elements are slightly difficult to implement existing production system of industries.

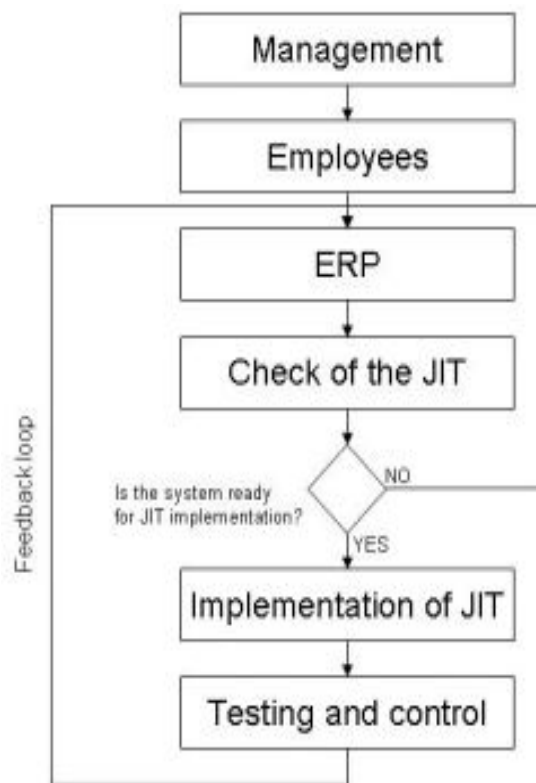
Having reviewed the earlier studies on JIP approach, the industries are highly benefitted with this concept by way of eliminating excessive investment on inventory, timely supply of required inputs, reduced wastage, reduced idle time of workers, etc. Therefore, to gain the benefits of JIT, Indian industries must be willing to modify their philosophy of management, operational procedures and systems. To reap these gains the following are the steps to be taken by the Indian business organizations during the days to come.

## **5. IMPLEMENTATION OF JIT IN INDIAN INDUSTRIES**

Implementation of JIT is not new to the present scenario of industrialization. This technology is not limited to any particular country but due to its large potential of benefit it has a widespread application through the world. Many industries have adopted it and others are going to implement it for their survival in the fast competition at each stage in each area. The implementation of the JIT in companies will depend on many factors. The implementation of JIT needs to be done in interaction with all departments.

Top management must accept idea of the JIT.

- Employees should understand significance of the JIT concept.
- The third step is set up of the ERP (Enterprise Resource Planning). ERP is a system, which integrates all data and processes of an organization into a single unified system.
- The next step is test the system after implementing JIT
- The last step is testing and control for successful existence and developing of the JIT system there must be continuous control. Without control, things can away from the right direction.
- The feedback loops also exist and they are very important for the whole process.



## 6. CONCLUSION

Just-in-time manufacturing is a philosophy that has been successfully implemented in many manufacturing organizations. It has changed the way manufacturing organizations do things. Some of the JIT concepts are completely opposite to traditional ways of thinking. To gain the benefits of JIT, Indian industries must be willing to modify their procedures and operations. The training of employees in order to create an organizational culture, establishment of new procedures for dealing with suppliers, analysis of operations to identify the areas of standardization, simplification and automation and reengineering of operational processes and procedures are some important issues, which should be examined prior to the implementation



of JIT. JIT implementation is mostly successful by positive coordination of top management to all level of employee

By implementing the JIT in Indian industries, an enormous saving can be generated and a new productivity ethics can be created that may be helpful to strengthen the Indian economy. In addition, JIT practices can help the Indian industries to become more competitive by enhancing their export in world market. But, it is observed that social, cultural and political matters have a significant impact on JIT practices in different parts of world. In India, suppliers of several raw materials (imported and domestic) are subjected under government control through supply agencies, which translates into high concepts.

Government control prices of key resources and taxation rates; all creates obstructions in way of implementing the JIT.

Further, Indian labor is usually uneducated, lacking in motivation and more concerned with monetary benefits and job security than carrier progress and development of their potential. Labor unions and their reluctances are also unfavorable for implementing the JIT. Therefore, specific cultural changes are required for successfully implementing the JIT. Training can play a decisive role in this direction. On this issue, some researchers stated that Japanese training models are not very successful in India. Therefore, some specific time bound training programs should be organized for Indian workforce after carefully studying their behavior patterns, personal traits, attitudes and social values. This becomes another area for research.

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