

Application of the "Just in Time" approach in Indian industries

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ABSTRACT

The manufacturing system's objective in today's cutthroat, international commercial climate is long-term survival. In recent years, managing inventory has been a constant struggle for all organisations. This is due in large part to the high costs associated with keeping inventory on hand, but it also has a lot to do with how an organisation produces its goods. Many experts and practitioners have described and highlighted the JIT system as being essential to world-class manufacturing throughout the world. In the current environment of rapid expansion and growth of industrialization, this system has the capacity to compete. JIT production techniques are currently used frequently across a variety of industries.

The aim of the production system is long-term survival in the cutthroat global commercial climate of today. Inventory management has become a constant concern for all organisations in recent years, not only because of the high costs of keeping inventory on hand, but also because it has a significant impact on how an organisation produces its goods. JIT system has been defined and recognised by numerous scholars and practitioners for world-class manufacturing on a global scale. This system has the capacity to compete in the current environment of fast industrialization and development. In several industries nowadays, JIT production techniques are used often. This essay discusses the history, advantages, and literature evaluation of JIT in developing nations like India.

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 where the business begins producing or buying the product as soon as the client places an order, essentially creating zero inventory. In a JIT setting, materials are therefore created and purchased just as and when they are required. The phrase "deliver the items just in time as promised when the customer places the order" is the foundation of the entire concept. The JIC (Just in case) system, which produces goods for inventory with the goal of keeping goods on hand just in case a customer places an immediate order, is the reverse of JIT production.

The JIT production system reduces production waste, identifies the root causes of the value chain's problems, and boosts overall productivity (Sales-Raw Material Cost).

Through the use of push vs. pull production methods, the JIT production model is distinguished from conventional production systems. No matter if additional time or resources are required at the subsequent level of production, the push method of production pushes materials there regardless, resulting in large stockpiles at each stage of the production flow. Production for inventory and work-in-progress is done using a push system, which is used by traditional manufacturing firms. With the pull system of production, the materials are only pulled by the next level of production when it signals or demands them.

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 initial JIT implementation sites were the Toyota manufacturing facilities. The 1973 oil embargo saw widespread support for it, and many other groups also adopted it. JIT was widely adopted as a result of the oil embargo and the growing scarcity of other natural resources, which was considered as a primary driving force. Toyota was able to address the growing obstacles of survival by using a management style that was distinct from what was typical at the time. This strategy put people, plants, and systems front and centre.

Toyota came to the conclusion that JIT would only be successful if every employee in the business participated in it, if the facilities and processes were configured for maximum output and efficiency, and if the quality and production schedules were exactly timed to meet demand. JIT started off as a way to lower inventory levels in Japanese shipyards. Today, JIT has developed into a management philosophy that encompasses a wide range of manufacturing ideas and methods as well as a body of knowledge. When correctly fitted to the organisation, JIT manufacturing has the potential to significantly increase the organization's competitiveness in the market by decreasing wastes and enhancing product quality and production efficiency..

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.

JIT also became popular as a way to maximise the use of the little resources that were available. When faced with limitations, the Japanese strived to achieve the best cost/quality ratio in their manufacturing procedures. This entails minimising waste and making the most use of available materials and resources. The foundation of continuous improvement is the input of consistent effort over an extended period of time.

This is accomplished by concentrating on a steady stream of tiny changes known as "kaizen" in

Japan, which has been acknowledged as one of the most important aspects of the JIT methodology. 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



4. 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 mentioned as a potential JIT restriction. There are various cultural factors that could be directly related to the success of JIT. These are issues that may be challenging to solve or get past without a shift in worker attitudes and philosophy.
- Due to these characteristics, it could be challenging to gauge the extent of their impact. 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 advantages of enhanced employee participation and involvement brought about by the implementation of quality circles may be readily apparent in Japanese firms. Western conceptions of participation, however, place a strong emphasis on "empower[ing]" the workforce in terms of decision-making. This shows that the degree of employee participation required to satisfy western workers is incompatible with the level of involvement established within Japanese firms utilising JIT.

The advantages of JIT might be somewhat specific to the Japanese setting and culturally constrained. 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.

5. 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.

According to Padukone and Subba Rao (1993), India might make a great case study for figuring out whether JIT approaches are used in Indian industry. However, JIT implementation cannot

produce long-lasting improvements if the conceptual underpinning is not understood. This study also recommended that JIT be introduced in two phases. Small machines, quality, layout, a flexible workforce, and setup and lot size reduction are all included in the first stage of JIT implementation. These methods are necessary for full JIT to function since they concentrate on the four key JIT components that may be accomplished quickly.

It creates the groundwork for using more challenging approaches like Kanban, JIT purchasing, buffer stock reduction, and multifunctional workers by emphasising simplicity, flow quality, and quick setup. 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.

Kaujalg and Lingaraj (1997) have provided an overview of changes implemented in a spring 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.

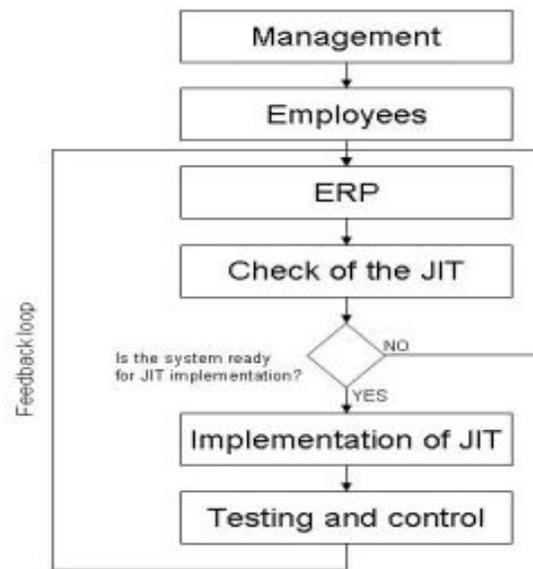
Having reviewed the earlier studies on JIP approach, the industries are highly benefitted with this concept by way of eliminating excessive investment on inventory, timely supply of required inputs, reduced wastage, reduced idle time of workers, etc. Therefore, to gain the benefits of JIT, Indian industries 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.

6. 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.



7. CONCLUSION

According to Padukone and Subba Rao (1993), if JIT principles are implemented in Indian companies, India might provide for a great case study. However, JIT implementation cannot produce long-lasting gains without knowing the conceptual underpinning. Additionally, this study recommended that JIT be introduced in two phases. Small machines, quality, layout, reducing buffer stock, and a flexible workforce are all part of the first stage of JIT deployment. Because they concentrate on the four primary JIT components that may be accomplished quickly, these strategies are necessary for full JIT to function.

These three qualities—simplicity, flow quality, and quick setup—lay the groundwork for more challenging procedures like Kanban, JIT purchasing, buffer stock elimination, and multifunctional workers. 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. Additionally, Indian labour is frequently illiterate, unmotivated, and more focused on financial rewards and work stability than on professional advancement and the realisation of their potential. The JIT is also negatively impacted by labour unions and their resistance. As a result, special cultural adjustments are necessary for the JIT to be implemented successfully. Training may be quite important in this regard. Some researches claimed that Indian training models based on Japanese ones are not very effective in this regard. Therefore, after carefully examining their behaviour patterns, personal features, attitudes, and social values,

certain special time-bound training programmes should be designed for the Indian workforce. This opens up even another field for study.

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