
UNIT – 8 JUST IN TIME

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8.1 INTRODUCTION

It is well known fact that, effective control of components and materials in production and assembly lines play a key role for effective production of goods. Basically, in optimal supply chain, the materials are received in time which leads to a precise production process. Precise production refers to producing a product in a proper time and place with minimal cost. In the recent decades, several attempts have been made to enhance the production operation outcome to obtain optimal supply chain, among which Just In Time (JIT) is one of them. JIT production system has got more attention in the recent years in the world industrial organizations. It was first adopted by Toyota manufacturing plants by Taiichi Ohno. Just In Time (JIT) production system can be treated as a efficiency-

increasing outcome in the production processes and as an approach to an optimized supply chain. In this chapter, the concept of JIT along with significance, objectives, and characteristics has been discussed.

Objective

- After studying this unit you should be able to
- Understand the philosophy and meaning of JIT
- State the objectives and prerequisites of JIT inventory
- Describe the characteristics and inventory techniques of JIT
- Explain the outcome and benefits of JIT

8.2 INVENTORY IS WASTE: THE JIT PHILOSOPHY

The philosophy of JIT in simplest words is:

INVENTORY IS WASTE.

We know pretty well that “a rupee saved is a rupee earned.” In fact, in inventory management a rupee saved is considered to be worth two rupees earned (*how?*). Extravagances, spoilage, obsolescence, and damage are few areas that eat away the profits. If we identify and control or avoid such waste elements or costs, this profit can be realized which otherwise would have been lost. Though it does not look like, one such area in inventory management which eats away the profits is “carrying cost.”

In earlier days, stocking of inventory was considered as safeguarding the production run and preventing shortages or stock-outs. But today stocking of inventory is treated as “graveyard” for industry because this not only occupies space but also blocks the money and forestalls the interest that could have otherwise been earned. Therefore, if we can get the material directly whenever required without stocking, this can save the carrying costs and the associated wastes. This idea raised the curtain for just-in-time (JIT) inventory concept.

Thus, just in time is an inventory strategy employed to enhance return on investment (ROI) by reducing in-process inventory and associated carrying costs. To meet the objectives of JIT, a process uses kanban between different points in the process which direct production to make the next part or operation. Kanban generally uses “tickets”; however, it can be simple visual signals also, such as the presence or absence of a part on a shelf. JIT, if implemented correctly, can certainly enhance manufacturing firm’s productivity, ROI, quality, efficiency, and effectiveness.

Quick notice of stock depletion needs personnel to order new stock, which is critical to the inventory reduction at the center of JIT. This obviously, saves

warehouse space and costs. However, the philosophy and complete mechanism for making this work are often misunderstood.

8.2.1 The Journey of JIT

JIT is a Japanese production management philosophy which has been applied in practice since the early 1970s in many Japanese manufacturing organizations. JIT inventory system exposes hidden causes of keeping inventory, and so is not so simple solution for a company to adopt. The company must follow a sequence of new techniques to manage the consequences of the change. These techniques may be derived from various disciplines, such as statistics, industrial engineering, production management, and behavioral science. Finally, whatsoever the discipline is, JIT inventory philosophy advises how inventory is viewed and how it relates to management.

8.2.2 Contributions of Taiichi Ohno – The Father of JIT

There are strong cultural aspects associated with the evolution of JIT in Japan. The “work ethics” emerged after World War II were seen as an integral part of Japanese economic success. With constraints, the Japanese strived to find the ways and means for attaining the optimal cost–quality relationship in their manufacturing processes.

At this juncture, the thought of Taiichi Ohno’s JIT laid a roadmap for obtaining the maximum utilization out of limited resources available. It focused on reducing waste and utilizing materials and resources in the most efficient manner possible. Thus, JIT philosophy was developed as a means to reduce waste. (Anything that does not contribute to value is considered as a waste, including scrap and rework.) This is further extended 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 key elements of JIT philosophy. Further, Japanese firms emphasized on enhancing long-term competitiveness instead realizing short-term profits. This is not a one-day job or a onetime activity but requires a strategic and disciplined commitment and culture that has to be inculcated at every level or corner of the industry. Thus, JIT management has a high degree of cultural aspects embedded in its development. The credit of first development and implementation goes to Toyota manufacturing plants where Taiichi Ohno (often referred to as the father of JIT) proposed JIT as a means of meeting consumer demands with minimum delays.

It has been widely reported that proper use of JIT manufacturing has resulted in increase in quality, productivity, and efficiency; improved communication; and decrease in cost and wastes.

8.2.3 Definitions and Meaning of JIT

Just-in-time production is defined as

“A philosophy that focuses attention on eliminating waste by purchasing or manufacturing just enough of the right items just in time.”

It is a Japanese management philosophy applied to manufacturing and materials management, which involves getting the right items of the right quality and quantity in the right place and at the RIGHT TIME. The right time here is more specifically to mean, not too early and not too late, right on time.

Some observers have called JIT as ‘hand-to-mouth approach’ to production. It aims at having the right part at precisely the right time and in the right quantity to go into the assembly.

According to APICS (American Production and Inventory Control Society),

“JIT is a philosophy of manufacturing based on planned elimination of all waste and continuous improvement of productivity.”

It encompasses the successful execution of all manufacturing activities required to produce a final product, from engineering to delivery, including all stages of conversion from raw materials onward.

Uncompromisingly, JIT assumes inventory as cost incurring or waste, instead of value addition and storing value, which is contrary to traditional inventory practices. Therefore, it encourages a business to eliminate inventory that does not compensate manufacturing process issues and promotes to constantly improve those processes to require less inventory. Moreover, it does not permit any stock habituation. It assumes “stock keeping” as indication of hiding production problems and inefficient supply chain management, such as

- machine unreliability,
- process variability,
- lack of flexibility of employees and equipment,
- inadequate capacity,
- insufficient and untimely supplies, and
- inefficient workforce.

8.2.4 Significance of JIT Concept

The identification and correction of the obstacles in the production process is a primary concern of JIT. The hidden problems of inventory can be traced out through JIT. The main intention of JIT is to enhance the inventory turnover and decrease the all connected and holding cost.

Just In Time model prevents an organization from utilizing excess inventory and smoothens production operations if a particular task takes more than expected or a defective part is found in the system. This is the important reason why organizations invest in preventive maintenance, when a component/part breaks down, the complete process stops.

JIT concept was made applicable again by Japanese industries, placing an order for an item/material, the same day of the production. This approach eliminates the necessary requirement to carry huge inventories and experience heavy carrying other related costs to the manufacturer.

In order to help the JIT benefits, an optimum synchronization is necessary between the delivery of the material and manufacturing cycle. JIT needs a proper understanding of the manufacturer and supplier in terms of delivery and quantity of the material. In case of any misunderstanding between the supplier and manufacturer of the material, the complete production process may stop.

Car manufacturer is one of the examples of JIT in which a car manufacturer operates with bare minimum inventory levels, as there is huge dependence on the supply chain to deliver components/parts necessary to manufacture cars. The parts necessary in car manufacturing process do not arrive prior or after they are required, rather, they arrive only when they are necessary.

The successful implementation of JIT relies on how manufacturer manages their suppliers. Lot of pressure is exerted on them, as the need arises the supplier of materials has to be ready with ample quality products/materials.

SAQ-8.1

- a) “Inventory is waste” Do you agree? Justify your answer.
- b) How the concept of JIT has been evolved?
- c) Brief out the contribution of Taichi Ohno towards the implementation of JIT
- d) Define Just In Time. Explain its meaning
- e) Explain the significance of JIT Concept.
- f) How JIT increases the efficiency of production process?

ACTIVITY – 8.1

In the organization where you are working or the one with which you are familiar, identify the areas and the materials for which you can implement JIT inventory policy.

8.3 OBJECTIVES OF JIT

The following goals are the objectives of JIT to assist management in obtaining a competitive advantage-

- To minimize the associate cost of production.

- To integrate suppliers and the manufacturer, and to optimize the material and time by reducing unproductive operations and resources.
- To improve continuously the process and systems.
- To reduce the cost of products and satisfy consumer needs.
- To increase the degree of efficiency within the production process.
- To reduce waste in materials, time, and effort involved in the production process.
- To obtain the optimal quality–cost relationship.

8.4 PREREQUISITES FOR SUCCESSFUL JIT INVENTORY

Following are the prerequisites for the successful functioning of the JIT system:

1. Reliable vendors

Vendors should be reliable in terms of their commitment to consistent supply of the required materials at predetermined quality at the desired time.

For better results, firms develop close and long-term relationships with a few vendors/suppliers. Many organizations allow reliable vendors access to their inventory systems so that the vendors keep regular track of material requirements and plan their supplies at the right time accordingly.

2. Minimal set-up time

The set-up time of machines must be reduced to minimum so that production can be taken up in the required quantities.

3. Multi-skilled workmen

It is also rewarding in the long-run to train each key worker in more than one skill and train them to perform more than one operation. If multi-skilled workmen are available, JIT implementation becomes very simple.

4. Elimination of bottlenecks

All other bottlenecks must be eliminated to prevent production breakdowns/holdups.

5. Teamwork

The use of teamwork becomes critically important to the development of JIT as JIT requires a highly coordinated system.

6. Commitment

There must be commitment from everyone involved in the organization and willingness to adopt change. JIT success depends upon the degree to which employees are motivated and committed in making the process work as a coordinated system.

7. Flexibility

Under JIT production, the plant layout is arranged for maximum work flexibility. For example, a U-shaped layout enables each operator to handle more than one machine. Similarly, JIT calls for the flexibility of selection of equipment, people, product mix, decisions on volume of production, etc.

8.5 THE JIT ENVIRONMENT

JIT can be observed mainly in the following four environments

1. Production Systems (both manufacturing and Assembly)
2. Inventory
3. Services
4. Information

8.5.1 JIT Production System

So far, we have discussed the concept of JIT applied to materials management as to purchase the needed material *just in time*. The same concept can also be extended to the whole production system including manufacturing and assembly in the following manner:

1. Purchased materials *just in time* to be transformed into fabricated parts.
2. Fabricated parts *just in time* to go into subassemblies.
3. Subassemblies *just in time* to be assembled into finished goods.
4. Manufacture and deliver finished goods *just in time* to be sold.

Thus, JIT stands for producing the *required units* in the *required quantities* at the *required time*. The ultimate objective of JIT is to focus on lotlessness, repetitive manufacturing, with only one unit of work in process and no stock of finished goods inventories.

8.5.2 JIT Inventory

In the same lines as that of JIT Production environment, the JIT inventory environment comprises of purchasing materials *just in time* to be used or consumed, and employs the principles or ‘make to order’ or ‘assemble to order’. This process works out in the following procedure:

1. Identify the reliable supplier
2. Determine the lead times both internal and external lead times
3. Prepare the Bill of Materials (BOM) and Master Production Schedule (MPS) and map with time
4. Order the items Just in time to fit in the lead times
5. Drive material directly to production shop or subassembly –main assembly shop.
6. Manufacture or Assemble as per schedules
7. Deliver the finished goods as per plan
8. Maintain a temporary sub-store if required

Here, in this environment, the store or warehouse is totally removed, which obviously eliminates the carrying cost and the associated problems and risks.

8.5.3 JIT Services

In this JIT service environment, the JIT inventory environment comprises of service activities *just in time* using ‘assemble to order’ or ‘service to order’ principle and works out in the following procedure:

1. Identify the reliable service men and train them
2. Determine the probable service times for each activity
3. Schedule the orders using the sequencing technique or predetermined method
4. Execute the schedules

8.5.4 JIT Information

In this environment, the necessary information is kept ready and a dump is stored the computer system. If the data is large it may be coded and retrieved as and when required.

To support this environment, managements often invest in trending technology or update existing solutions that will link the system with stakeholders to

- coordinate as and when needed
- provide necessary inputs
- know the status
- evaluate the outputs

However, the information has to be updated time to time. The software reliability and the accuracy of information are critical in this environment.

8.5.5 Stability of JIT Environment

The JIT environment proposes three stabilities, i.e., price, quality, and demand.

1. Price stability situations

JIT implicitly assumes a level of input price stability that obviates the need to buy parts in advance of price rises. Where input prices are expected to rise, storing inventory may be desirable.

2. Quality stability situations

JIT implicitly assumes that input parts quality remains constant over time. If not, firms may hoard high-quality inputs. As with price volatility, a solution is to work with the selected suppliers to help them improve their processes to reduce variation and costs. Longer term price agreements can then be negotiated and agreed-upon quality standards made the responsibility of the supplier.

3. Demand stability situations

When demand is fluctuating, it is very difficult to implement the JIT inventory system. When demand is high, the firm experiences shortages while if demand is low, the inventory of finished goods piles up. Both the situations finally blame the JIT concept. Karmarker (1989) emphasizes the significance of demand stability,

which can assure efficient capital utilization rates. Karmarker contends that without significant stability of demand, JIT becomes unsustainable in capital-intensive production.



SAQ-8.2

- a) List out the objectives of JIT
- b) What are the prerequisites for successful JIT inventory? Explain
- c) Explain the role of the following elements for success of JIT inventory
 - i. Reliable vendors
 - ii. Teamwork
 - iii. Minimal set-up time
- d) Explain the four environments in which JIT is observed.
- e) Write a short note on the following in the backdrop of JIT
 - i. Production Systems
 - ii. Inventory
 - iii. Services
 - iv. Information
- f) What do you understand by the stability of JIT environment? Explain.
- g) Discuss the effects of the stability of price, quality and demand on the JIT environments.

ACTIVITY – 8.2

In the organization where you are working or the one with which you are familiar, identify the following environments and design a system for which you can implement JIT inventory and JIT services.

a) JIT Inventory

b) JIT Services

8.6 JIT INVENTORY MANAGEMENT SYSTEM: A MEANS, NOT AN END

JIT management has a high degree of Japanese cultural aspects in its development. JIT inventory management is treated as a means but not an end for the improvement. Here are some distinguishable characteristics of JIT management.

8.6.1 Characteristics of JIT Inventory

As said above, JIT-IMS is ‘a means, not an end’ to improve the performance of the system. Just-in-time operation leaves suppliers and downstream consumers

open to supply shocks and large supply or demand changes. However, JIT inventory system can be characterized by the following aspects.

1. Reduced/No Inventory-Waste

A just-in-time strategy reduces overproduction when the supply of an item in the market reaches above the demand and may lead to an accumulation of unsalable inventories. The unsalable products/items turn into inventory dead stock, which enhances waste and consumes inventory space. In a just-in-time system the management orders only what is required, so there will not be any risk of accumulating unusable inventory.

2. Decreased/No Warehouse Holding Cost

JIT management strongly believes in the concept that 'Warehousing is costly, and too much/over inventory can double the holding costs'. In a just-in-time system, the warehouse holding costs are kept to minimum. Because it works only when customer places an order, and the product is already sold or virtually sold before it reaches the management which practices the JIT. So, it is not required to store the items for long. Companies that follow the just-in-time inventory model will be able to decrease the number of items in their warehouses or eliminate warehouses altogether.

3. More Control at the Manufacturer

In a JIT methodology, the manufacturer has overall control over the manufacturing process, which works on a demand-pull basis. They can respond to customers' requirements by rapidly increasing the production for an in-demand product and decreasing the production for slow-moving items. This makes the JIT model flexible and able to cater to ever-changing market needs. For example, Toyota doesn't purchase raw materials until an order is received from customers. This has allowed the company to keep minimal inventory, thereby decreasing its costs and enabling it to quickly adapt to changes in demand without having to worry existing inventory.

4. Local Sourcing

Just-in-time is essential to start manufacturing only when an order is received. Obviously, it necessitates sourcing the raw materials in a hand reach locally as it should be delivered to the manufacturing unit much earlier. Also, local sourcing decreases the transportation cost and time which is involved. This in turn provides the need for many complementary businesses to run in parallel thereby increasing the employment rates in that particular demographic.

5. Smaller Investments

In a JIT model, only required stocks are obtained and therefore less working capital is required for finance procurement. Therefore, because of the less amounts of stock are held in the inventory, the organization's return on investment would

be high. The Just-in-time models uses the “right first time” concept whose meaning is to carry out the activities right the first time when it’s done, thereby decreasing inspection and rework costs. This needs less amount of investment for the company, less money reinvested for correcting errors and more profit generated out of selling an item/product.

8.6.2 Effects of JIT Inventory Management System

Planning is necessary for the entire supply chain and utilization of software in order to carry out the complete process till delivery, which enhances efficiency and eliminates the scope for error as each and every process is being monitored. The below are the important effects of a just-in-time inventory management system:

- It allows an organization to meet consumer demand (internal and external) regardless of the level of demand through the use of a pull system of production.
- It reduces time lapse between material arrivals, processing, and assembly of the final product for consumers.
- It allows a reduction in raw materials, work-in-process, and finished goods inventories to free up a greater amount of space and time between operations within plants.
- It uses containers for holding parts to allow easy identification and monitoring of inventory levels.
- It needs a plant to be clean, i.e., there should be no wastes present which may hinder production.
- It involves the use of visible signals to display the status of machinery.

8.6.3 JIT Inventory Techniques

The JIT inventory methodology uses a variety of techniques for smooth operations. The lean method focuses on optimizing organization, paying attention to detail, having small lot sizes, increasing transparency, fostering cell manufacturing and using a pull (rather than push) approach. The following are commonly used techniques by the JIT Inventory Management System.

- **Reduce Setup Time:** Create flexible changeover approaches when setups need to adjust to meet customer demand.
- **Small Lot Size:** In JIT, one is the ideal lot size. The small size reduces in-process inventory, carrying costs, storage space, and makes for easier inspection and rework.
- **Timely Orders:** Maintain a high level of physical and organizational discipline.
- **Focus on Better Quality:** Eliminate defects through attention to detail and continuous improvements.

- **Load Uniformity:** Leveling is a control mechanism that achieves a stable, level daily schedule.
- **Flow Balance:** Flow scheduling organizes throughput for even distribution of energy and labor.
- **Diversified Skills:** Cross-trained workers can be deployed to different areas to keep production moving.
- **Visibility for Control:** Using communication tools, like those found in Kan-ban, keeps the entire team informed of inventory levels.
- **Ongoing Maintenance:** Ongoing oversight and focus on detail, including the machinery and tools the business uses every day, helps maintain a low defect, low problem environment.
- **Use Fitness:** JIT spaces designed to fit each process speeds up production. One workstation pulls output from the one before it, as needed, based on a master schedule or customer demand.
- **Logical Plant Layout:** Product-oriented design makes assembly easier and more efficient.
- **Strong Supplier Network:** Strong relationships with vendors make JIT inventory most effective.
- **Worker Immersion:** Every team member should be dedicated to the process and colleagues to achieve JIT goals.
- **Cell Manufacturing:** Create an environment where groups can work as quickly as possible to make as many products as they can and limit the waste they create.
- **Pull System:** The process of only replacing products once they've been used in production.

SAQ-8.3

- a) Name few characteristics of JIT inventory management.
- b) Discuss the effects of JIT Inventory Management System
- c) List out some commonly used JIT Inventory techniques
- d) Explain the characteristics of JIT inventory management.
- e) Describe the following as JIT inventory management techniques
 - i. Flow Balance
 - ii. Pull System
 - iii. Timely Orders

ACTIVITY – 8.3

Do you think, implementation of JIT is possible in the Indian production units? Give reasons why you can/can't implement.

8.7 THE OUTCOMES AND BENEFITS OF JIT INVENTORY

We understood that getting materials *just in time* obviously reduces the burden of storing and managing the inventory. But then there several other advantages associated with JIT. We shall now throw some light on these

8.7.1 Benefits of JIT

The benefits of the JIT inventory system are listed as follows:

- 1. Improved flow of goods from warehouse to shelves:** Small lot size reduces lot delay inventories, which in turn eases the inventory flow and its management.
- 2. Waste Reduction:** Over ordering can be abolished by implementing JIT inventory management.
- 3. Reduced Obsolete Inventory and Dead Stock:** Maintaining low inventory will minimize the unsold risk factors and also eliminates warehouse obsolete.
- 4. Optimum use of working capital:** Lower stock levels require less working capital.
- 5. Competitive edge:** It enhances the competitive edge of an organization by keeping the stock handling costs low.
- 6. Increased emphasis on supplier relationships:** A company does not want to have any problem such as shortage with the supply system, particularly if it does not maintain stock. This makes supplier relationships extremely important and hence strong.
- 7. No need for storage facility and space or cost:** Supplies come in at regular intervals throughout the production day (or appropriate period), synchronized with production demand, and the optimal amount of inventory is at hand at any time. Since parts move directly from the truck to the point of assembly, there is no need for storage facilities, and hence the associated cost is reduced.
- 8. Raise Inventory Turnover Ratios:** Greater efficiency leads to higher turnover of the inventory.
- 9. Minimal Inventory Obsolescence:** The high turnover rate can keeps stock outdated by sitting too long in the warehouses.

10. Minimize Raw Materials on Hand: The elimination of raw materials is possible by receiving deliveries in the required amount or receiving multiple times a day.

11. Local Sourcing: To deliver stocks on time, the suppliers should be located near to the company. On-time, reliable delivery of goods reduces the need for safety stock.

12. Synchronization of production scheduling and performance with demand: When there is no demand for a product, it is not manufactured. This obviously saves the money, human efforts, and material in several ways, such as

- cost on overtime,
 - cost on training,
 - shifting workers to other works,
 - maintenance or protection or storage cost on value-added materials (finished goods), and
 - using materials for other models
-
- **Lower Costs:** Inventory costs can be decreased by receiving products whenever required.
 - **Reduce Working Capital:** The low inventory levels that come with JIT limit the amount of working capital needed.
 - **Lower Holding Costs:** Due to less utilization of space, the holding costs of inventory are minimized.
 - **Lower Cash Investment:** JIT doesn't require over stock, it makes the organizations to invest lesser cash in inventory.
 - **Reduced Large Raw Material Spends:** With the help of JIT, organizations order only the required raw materials so that cash may be available for other purposes which may more valuable to the organization.

8.7.2 The Outcomes of JIT

JIT helps in lowering the carrying costs, reducing waste and enhancing efficiency there by boosting up the company's ROI.

1. **Efficient utilization of multi-skilled employees:** Having employees trained to work on different parts of the process allows firms to move workers where they are required.
2. **Reduced bottlenecks:** The bottlenecks in production can directly be addressed.
3. **Reduced set-up time:** Curtailing set-up time allows a firm to reduce or eliminate inventory for "changeover" time.

4. **Reduced Defective Product Loss:** The inventory items which are defective are easier to identify and resolve when production levels are less, which decreases scrap costs. Thus the mistakes in the production process can be corrected and identified quickly which may lead to lesser defects.
5. **Improved Efficiency:** The costs that arise with extra raw materials, product storage and unneeded inventory can be eliminated by implementing JIT.
6. **Greater Productivity:** With implementation of JIT, the resources and time utilized for the manufacturing processes can be reduced which may also enhance the productivity.
7. **Faster Product Turnaround:** Manufacturers may produce products in short time duration.
8. **Shorter Production Runs:** The production runs, lowering investment in the finished goods can be decreased by fast equipment setup times. With implementation of JIT, manufacturers may deliver the new products easily and faster in time.
9. **Simplify Change Orders:** Having less raw material stock to draw down before product changes makes it easier to implement engineering change orders to existing products.
10. **Smoother Production Flow:** The delays and bottlenecks in the complete production process can be eliminated by implementing JIT.
11. **Shorter Production Cycles:** The manufacturing time can be reduce with the help of JIT which may reduce the lead times for the customers.
12. **More Functional Production Cells:** Employees walk individual parts through the processing steps in a work cell, which reduces scrap levels. Cell models also eliminate work-in-process queues that build up at more specialized workstations.
13. **Compressed Operations:** The time for progressing inventory work between cells may be limited by arranging the production work cells near to each other.
14. **Reduced Labor Costs:** As the number of persons per hour necessary are lesser than complete production time which may lead to lower labor expenses.
15. **Certified Input Quality:** Suppliers assure the quality in advance. So, deliveries go directly to production areas instead of being held in receiving to await inspection.
16. **Improved Output Quality:** A flexible and multi-skilled workforce can focus on developing quality products with lesser defect rates. The better outcomes enhances customer satisfaction and decreases the cash outlay for production.

17. Reduce Work-in-Progress Goods: Lesser number of items moving on the shop floor can allow teams to focus on developing higher quality products.

18. Less Damage: Since required inventory is on hand, storage-related accidents may decrease.

8.8 BARRIERS, CHALLENGES AND DRAWBACKS OF JIT

JIT journey is not like going on a highway road, but like sailing in a boat in a agitated ocean. So it is important to understand the main barriers and hurdles in different environments of JIT network. The following figure 8.1 depicts the main barriers for different JIT environments.

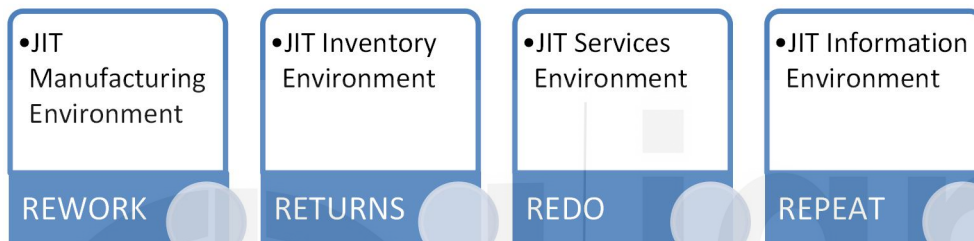


Figure 8.1 Barriers in JIT Environments

8.8.1 The Barriers

Avoid the 4R's (Rework, Return, Redo and Repeat) viz. Rework in the case of JIT Production environment, Returns in the case of JIT inventory environment, Redo in the case of JIT services environment, and Repeat in case of JIT Information environment are considered to be the biggest barriers to the implementation of JIT systems. Lowering inventory compels each shop floor to improve its own quality, i.e., eliminate the cause of interruption in the downstream flow. A key to removing these variations is leveling production and intelligent materials management.

Thus, just-in-time (JIT) system is described as taking the task of manufacturing by procuring material stocks in staggered quantities whenever needed. The main focus here is to maintain the lowest possible stocks at any point of time. As the main objective of the JIT system is low inventory, timely supply of materials is paramount. This does not mean the stock at hand is zero but minimal to take care of contingencies such as poor-quality materials or workmanship. In fact, where JIT is practiced, such type of contingencies gets almost eliminated.

8.8.2 The Challenges

The concept of JIT is getting defeated because of lack of integrity in the supply chain. Even though the purpose of JIT is to reduce the blockage of working capital and to minimize waste at various levels of supply chains, it is unfortunate that

most of the manufacturing industries adopt JIT for the sake of industry or for the first supplier due to lack of integrity in the supply chain.

Passing stock to suppliers by the manufacturers is not the philosophy of JIT. It is about considering the complete supply chain as a single system to become efficient by decreasing the inventory blockages.

The main objective of JIT is to enhance efficiency of supply chain but one may argue that may decrease the efficiency of the complete production system by enhancing the risk of products out of either raw materials or finished goods. In both the above situations it leads to customer satisfaction.

The bull whip effect may become two-fold by implementing JIT which may lead to distortion in the information flow and thus may end up with stock out.

8.8.3 The Drawbacks

Lot of costs for industries can be saved by implementing JIT. Even though it has some drawbacks:

1. Reworking on orders is tedious through JIT, as the stock/inventory is kept to a bare minimum and only based on the original requirements of the customers.
2. JIT model relies on the timeliness and performance of suppliers, which are difficult to ensure. Apart from it, the manufacturer needs to cover any sudden enhancement in the price of raw materials, as they cannot wait to order during desired pricing.
3. As JIT model needs lot of shipping back and forth between customer, supplier and manufacturer, it may have detrimental effects on environment due to packaging and over consumption of fossil fuels.
4. In case of disturbances, JIT can have a huge impact on the organizations. Sales may halt if there is no excess stock to fall back on.
5. JIT requires proper tracking and organizing, which will be difficult if you are doing it manually. Soft-wares should be considered as it makes the complete process more manageable. A proper Even though a proper software help you it may be a bit difficult/costly to adopt a new software system and train your employees accordingly to utilize the same.

Therefore, JIT saves lot of costs which may otherwise be tied up as inventory holding costs. JIT should be implemented carefully so that organizations do not face loss because of unpredictable cases.

8.8.4 JIT System is a Feature – Not a Bug

Ohno finds JIT as a feature rather than a bug. He says that lowering or removing inventory can clearly depict how production flow is interrupted, just like how lowering the water level in a river can expose the rocks that interrupt the water flow. If barriers are exposed, one can think of their removal. As long as they are in dark, no one sees or thinks or puts any effort to eliminate them.



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SAQ-8.4

- a) What do you understand by “waste reduction” in JIT inventory system?
- b) Explain how JIT reduces defective product loss.
- c) What are the outcomes of JIT Manufacturing System? Explain them.
- d) List out the benefits of the JIT inventory system
- e) What are the obstacles encountered in implementing JIT?
- f) Briefly explain the challenges and drawback of JIT.

ACTIVITY – 8.4

Visit an organization (such as an automobile) where JIT is implemented and practicing. Record the advantages/outcomes and demerits/hurdles that the organization is facing. Suggest some remedial actions.

a) Outcomes

b) Hurdles

8.8 SUMMARY

JIT is a Japanese production management philosophy which has been applied in practice since the early 1970s in many Japanese manufacturing organizations. It assumes inventory as cost incurring or waste, instead of value addition and storing value. Just In Time model prevents an organization from utilizing excess inventory and smoothens production operations. Obtaining the optimal quality–cost relationship, minimizing the associate cost of production and reducing the cost of products are some of the objectives of JIT. A just-in-time strategy reduces overproduction when the supply of an item in the market reaches above the demand. Companies that follow the just-in-time inventory model will be able to decrease the number of items in their warehouses or eliminate warehouses altogether. JIT also reduces waste, improves competitive edge & output quality, and reduces obsolete inventory & dead stock. The JIT inventory methodology uses a variety of techniques viz., small lot size, timely orders, flow balance, use fitness etc.

8.9 KEYWORDS

Supply Chain: It is a network between a company and its suppliers to produce and distribute a specific product to the final buyer.

Just In Time: JIT philosophy focuses attention on eliminating waste by purchasing or manufacturing just enough of the right items just in time.”

Kanban: It is a lean method to manage and improve work across production and inventory systems.

Productivity: It is a ratio between the output volume and the volume of inputs.

Return on investment (ROI): It is a performance measure used to evaluate the efficiency or profitability of an investment

Warehouse: It is building which stores bulk products or goods for commercial purposes

Holding Cost: Holding costs are costs associated with storing unsold inventory

Pull system: It is a lean manufacturing strategy used to reduce waste in the production process.

Carrying cost: These are the various costs a business pays for holding inventory in stock

Kaizen: It is a Japanese term meaning "change for the better" or "continuous improvement."

APICS: American Production and Inventory Control Society

8.10 FURTHER READINGS

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