

The logo of Galgotias University is a stylized circular emblem with three curved, overlapping bands in shades of yellow, blue, and red, creating a sense of motion or a globe.

Just in Time Manufacturing
Objective of JIT
Basic elements in JIT

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Objective of Session

- To understand the concept of JIT philosophy
- To familiarize the various objectives of JIT
- To study and understand the basic building block of JIT

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History of JIT

Developed by TOYOTA MOTOR COMPANY
(BTaiichi Ohno)

- Japan crowded country with fewer natural resources.
- Japanese were sensitive to waste & inefficiency.
- Japanese treated scrap and reworks are waste.
- They considered excess inventory is an evil.

(These ideas operational when Henry Ford's attempt to practice it in his industrial complex.)

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JIT- Definition

- Produce something when it is required
- A system that can operate with **minimal inventory, closely with suppliers** so that parts and materials arrive just as they are needed.
- A continuous work flow using minimal resources , producing only what is needed and when it is needed.

A Philosophy

- ✓ Optimum utilization of resources.
- ✓ Minimum inventory (Reduction in both WIP inventory & finished goods inventory)
- ✓ Reduction of waste
- ✓ No idle waiting time of parts, equipment, workers. (Precise timing of parts and materials and timing of the services)
- ✓ Small Bathes (Reduction in operating cost)
- ✓ Fewer Defects

Objective / Goals of JIT

1. **Elimination of waste** (waste is an unproductive resources- free up this resources.)
2. **Efficient Inventory management** (inventory is an idle resources-taking space and adding cost)
3. **Elimination of Engineering Disruptions** (Engineering changes will bring disruption in the production system)
4. **Ensuring the flexibility in production** (flexibility enables organization to respond quickly to customer demand)
5. **Ensuring Quality** (Poor quality creates disruption in the flow of production)
6. **Ensure speed and simplicity in production** (reduce the cost and complexity of production process)

Building block / Basic elements of JIT

Basic elements provide foundation for accomplishing the **goals/objectives**. The foundation is made up of **FOUR** building blocks.

1. Product Design
2. Process Design
3. Personnel/Organizational elements
4. Manufacturing planning & Control

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1. Product Design

Four elements of product design are important in JIT

1. Standard parts
2. Modular design
3. Highly capable production system
4. Concurrent engineering

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Standard parts:

- Workers have fewer parts to deal with
- Standardization results to reducing the number of parts contained in the BOM

Modular Design:

- Modules are clusters of parts treated as a single unit.
- It simplifies assembly, purchasing, handling and training .

Highly capable production System:

- Continuous improvement
- Zero defects

Concurrent Engineering:

- An approach which bringing design , manufacturing and engineering people together in the early design phase.
- It reduces the disruptions in production due to engineering changes.

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2. Process Design

The following aspects are important in process design

- i. Small lot size**
- ii. Setup time reduction**
- iii. Production flexibility**
- iv. Cellular layout**
- v. Continuous Quality Improvement**
- vi. Minimize inventory storage**

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(i) Small lot size & Flexibility

In JIT, ideal lot size is one unit (unrealistic & practically not possible). Nevertheless the goal is to still reduce the lot size as much as possible

Benefits of small lot size

- Flexibility
- Less in process inventory
- Reduction in carrying cost & less utilization of space
- Less quality issues.

Traditional system has long production (large lot size)/Covering production in two or more days.

Eg: AAAAAAAAAA BBBB BBBB CCCCCC

(JIT frequently shift in producing A to B to C to A.

(ii) This enables the flexibility of the system)

AA BBB C BB CC AAA C B

(iii) Setup time reduction

Small lot size and changes in production mix require frequent setup which results in long setup time (though it is inexpensive and quick).

But in JIT it is achieved through

1. Training of the workers to reduce the setup time
2. Sophisticated programs & software

Long Setup time results

- ✓ Holding more inventory
- ✓ More production cost
- ✓ Violate the objective of speed & simplicity, & inventory.

(iv) Cellular layout

- ✓ Less movement of material
- ✓ Small batches, Less change over time
- ✓ Ownership is for the product
- ✓ Better quality, Better control

(v) Continuous Quality Improvement

- ✓ Quality at source
- ✓ PDCA
- ✓ Benchmarking
- ✓ Jidoka (Automatic detection of defects)

(vi) Minimum inventory storage

- ✓ Less carrying cost, Less operating cost
- ✓ Less space utilization

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3. Personnel/Organizational elements

The following aspects should be considered

1. Workers as assets

2. Cross trained workers

Worker are trained to perform several parts of the process & operate variety of machine

3. Cost accounting

In some JIT , features to allocate overheads

4. Leadership

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4. Manufacturing planning & Control

Six elements of manufacturing planning & control is important in JIT

1. Level loading
2. Pull system
3. Visual system
4. Close vendor relationship
5. Reduced transaction processing
6. Preventive Maintenance & House keeping

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