

**SUPPLY CHAIN DYNAMICS, AGILITY
AND RELATIONSHIP MANAGEMENT:
BSS 421**



**WEEK THREE :JUST IN TIME AND LEAN
PRODUCTION
BY**

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RECAP OF LAST WEEK'S TOPIC



We discussed;

1. Craft production and supply chain dynamics
2. Mass Production and supply chain dynamics

Note: of importance is to appreciate local dynamics that affect these forms of production and supply chain strategies that can make them add value and increase profitability.

TASK for Last Week



1. Why do you think governments of developing nations continue to fund mass production?
2. How should mass producers minimize supply chain risks?
3. What are examples of mass producing industries in your country?
4. What is the source of local dynamics that affect mass production supply chains in your area?

Possible Solutions to last Week's Task



1. **Governments of developing nations continue to fund mass production to create employment, make goods cheaper, fulfil promises to electorates etc.**
2. **How should mass producers minimize supply chain risks?**

Cross border trade, modify systems, innovate products

3. **What are examples of mass producing industries in your country?** Bread, grain milling, clothing

4. **What is the source of local dynamics that affect mass production supply chains in your area?**

Objectives of Topic Three



1. Describe characteristics of just in time Manufacturing / business system.
2. Derive Supply chain dynamics of JIT and associated implication
3. Describe characteristics of Lean Manufacturing / business system.
4. Derive Supply chain dynamics of Lean associate implication

Just –in –time manufacturing System



1. Sakichi Toyoda, invented a machine that use to prevent the breaking of thread-(automation with human manufacturing)
2. His sons: Kiichiro Toyoda and Eiji Toyoda visited US 19 10 and 19 50 and borrowed the production system ideas of Ford
3. Taiichi Ohno introduced in pull production system borrowed from American super markets in 1950
4. Success of JIT was only realized after 1973 when Toyota was able to produce cars that customers needed. Dekier , (2012)
pg. 2

Just –in –time manufacturing System



1. JIT production is based on making what the customer want, when it is needed and, in the quantity, minimum resources.
2. It combines the aspects of production scheduling, inventory control and aspects of total quality management.
3. Foundation of these principles was laid by Henry Ford in the early 1920s.

Objectives of JIT Production



Asiabi & Asiabi (2012) pg 1222-2124. observes : JIT emphasizes the technical aspects of manufacturing such as production lines. Objectives are ; therefore

1. Zero product defects and they should meet the quality above the customers' expectations.
2. Zero set up time leading to shorter production times, shorter production cycles and smaller inventory.
3. Zero inventory of inbound supplies, work –in- progress, finished products and semi-processed goods.

Objectives of JIT Production Cont'd



4. Zero handling of inventory which involves the elimination of the non-value adding activities.
5. Zero lead time. This is impossible to attain but it requires flexibility and production in small batches of components or assemblies determined by order.
6. Lot size of one. This aims at reduction of inventory by manufacturing only what is needed.

Requirements of JIT



1. Uniform master production schedules that use KANBAN system. These were visual indicators to track progress of work by indicating amount of input required at every station of a production line. Once there was empty bin an alarm was raised.
2. Was developed by Taiichi Ohno which he referred to as Pull Production System where production began only when there was an order.
3. Good buyer- supplier relationships.

Requirements of JIT



The KANBAN system led to high levels of automation from the 70s to date

- 4• Reliable delivery system.
- 5• Short distances between customer and supplier.
- 6• Consistent quality with zero defects.
- 7• Standardization of the components and methods
- 8• Efficient material flow system.

Advantages of JIT



1. Lowers cost because of low scrap.
2. Quality goods because of fast detection and correction of defects quality and quality inputs.
3. Fast response to design change by the engineering department.

Advantages of JIT Cont'd



- 4 .Fewer suppliers, minimal order expediting and release as well as simplified communication that results to administrative efficiency.
- 5 .There is higher productivity because of reduced rework, reduced inspection and reduced part related delays.
6. Better management of capital that would be tied in inventories in form of raw materials work- in- progress and finished goods.

Challenges of JIT



Some organizations experience problems with JIT because of the following.

1. In accurate forecast of the response by the suppliers when a need arises I.e. suppliers may not be aligned to the just in time deliveries with the buyer.
2. There is a requirement of good integration of communication between the buyer and the supplier through electronic data interchange (EDI).
3. An organization without safety stocks is highly vulnerable.

Challenges of JIT Cont'd



4. Stock less buying is not possible because bottle neck goods can result in failure of production.

5. Adoption of JIT can lead to change in a system for an existing manufacturer because JIT is not suitable to batch production but flow production.

6. JIT requires cross team cooperation which means that the organization needs to invest in organizational development.

Asiabi H. P & Asiabi H.P(2012). JIT) production and supply chain management ;
International Iron & Steel Symposium, , Karabük, Türkiye , PG 1222-1226

Supply Chain Dynamics for JIT



JIT can work effectively in developed countries because;

1. Predictable systems like policies.
2. Advanced infrastructure : Transport infrastructure , electricity, water and internet.
3. Human capital : Knowledge based skills and competences are available
4. There is population with high purchasing power
5. Companies with strategic industry entry barriers.

Supply Chain Dynamics for JIT Cont'd



In developing countries JIT faces challenges such as ;

1. Poor physical infrastructure
2. Most countries have institutional and government policies that are bureaucratic
3. Lack of appropriate supply chain members with the same JIT approach to business
4. Local purchasing power is low for most countries

Note : Some service industries work on a JIT system e.g. hotels, consultancy service in hospitals and other services.

Lean Manufacturing/ Business System



1. Lean is also referred to as big JIT. It first and foremost embraces JIT principles.
2. Focus of Lean is on cost and waste while JIT focuses on efficient physical systems.
3. Lean was also developed from JIT by Japanese businesses.
4. JIT and lean are blended in modern manufacturing system

Development of Lean Manufacturing



- Dekier (2012) explains that Toyoda family initiated the Lean manufacturing by modifying the system used by mass production. It took 20 years to actualize the system in Toyota manufacturing system.
- Demand of cars had reduced and Toyota needed to initiate ways of selling more cars.
- Taiichi Ohno introduced the perspective of pull system where manufacturing was seen from the perspective of the customer.

Dekier, L. (2012) . The Origins and Evolution of Lean Management System.
Journal of International Studies,
Vol. 5, No 1, pp. 46-51.

Development of Lean Manufacturing



Chauhan, et al (2015) Explains origin of term lean :

- Womack, Daniel Jones & Daniel Roos (1991) of MIT published a book “The Machine That Changed the World” and ‘Lean Thinking: Banish Waste and Create Wealth in Your Corporation’
- Describes vividly the lean philosophy as envisioned in the pull production system of Toyota that had evolved into a great manufacturing system.

Chauhan, N. D, Qureshi , M.N & Desai , T.N,(2015)./ An applications of lean manufacturing principles, tools and techniques in industry *Proceeding of the National Conference on – Recent Advances in CAD/CAM/CAE NCRACCC.*

Development of Lean Manufacturing



More reference

Dave, P.Y (2020), The History of Lean Manufacturing by the view of Toyota-Ford .International Journal of Scientific & Engineering Research Vol 11, (8) pp 1598-1602

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Principles of Lean Production



1. Specify value as seen from the customers perspectives by engaging the customers to understand what they want and how their perception differs from that of the organization.
2. I identify all the steps that add value. These are referred to as value stream when all the wastes have been removed.

Read on supply chain value chains and value chain analysis

Principles of Lean Production Cont'd



3. Align the production actions that create value flow. When the value adding activities are identified the linkages must be established to ensure that there is smooth flow of the activities

4. There should be continuous improvement. Lean strive for perfection by continually removing wastes. Continuous improvement means an on -going basis to make better what has already been done.

Concept of Waste in Lean



In Lean, waste has different meaning from the ordinary perception of waste.

Dekier (2012) Describes waste as;

- 1.Overs production** : Means manufacturing an item before it is required. Over production is a waste. It creates inventory which incurs costs.

Concept of Waste in Lean Cont'd



2. Waiting- Wastes occur when goods are not moving or are being processed in the processing line. For mass manufacturing products take a lot of time being processed. In a lean production waiting is reduced by linking processes internally and within the supply chain so that one process feeds directly into the next one without delay.

Concept of Waste in Lean Cont'd



3. Transportation : Transportation does not add value because of risks such as damage, cost and time are wastages. However since it has to be done conscious thought in route scheduling and identification of all possible risks within a supply can reduce transportation lean supply chain.

Concept of Waste in Lean Cont'd



- 4. Inappropriate processing.** Consideration of right equipment and the right process for the goods being made is necessary.
- A very advanced equipment being used to produce simple items increases set-up time and unit costs.
 - Equipment may not be advanced and this causes quality problems when the specifications are not met..
 - To reduce the waste, a flexible equipment that can allow high utilization of the assets. i.e. a n adjustable equipment should be used.
 - A process also that does not add value to customer should be avoided.

Concept of Waste in Lean Cont'd



4. Stock/ inventory.

- Work- in- progress or buffer stock is a waste because it is linked to over production and waiting.
- Finished goods should also not be put in the a warehouse but they should be transported to the buyer.
- When the goods are kept as buffer they use floor and productive space.
- Stock also increases lead time in un loading and loading to the processing line.

Concept of Waste in Lean Cont'd



- **5. unnecessary or excessive motion.**
 - It is related to organization ergonomics and is seen where human beings bend stretch, walk lift and reach for the items. It also refers to the health of the employees.
 - Products and processes must be designed to eliminate unnecessary motion.
 - Lean organizations use automation to bring the work to the person rather than the person having to get up and collect the work.

Concept of Waste in Lean Cont'd



6. Making defective products.

- Defects result in the need to rework and scrap items become a real burden to producers.
- To cover for the defects, it becomes necessary to hold more stock and have additional process to rework or inspect the item.
- Can also cause production to be rescheduled.

Concept of Waste in Lean Cont'd



7. Unsafe practices.

Lean organizations try to create safe environments for its workers because failure results in -:

- Litigations and the related costs
- More absenteeism and less productive days.

The consequences of unsafe practices create costs and wastes.

Concept of Waste in Lean Cont'd



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Concept of Waste in Lean Cont'd



Dekier (2012) Further provides nature of lean management

1. Good atmosphere in the workplace
2. Setting the objectives
3. Communication –
4. Communication
5. Proper motivation
6. Wasting human potential
7. Development of employees
8. Leadership

Supply Chain Dynamics of lean



1. just like JIT it is suitable for developed economies.
2. It is for specialized sort of goods.
3. Supply chains are complex .
4. Other forms of supply chains cannot compete with supply chains of JIT and Lean.

Summary



1. JIT and Lean are closely related concepts
2. JIT came into existed first
3. Associated with Japanese manufacturing

Task for Next Week



- Describe the factors that enable developed countries to use JIT and lean production.
- Do you think that JIT and Lean are practical manufacturing orientations developing countries
- Give examples of organizations that you think practice some form of JIT or Lean in your country
- What kind of relationships do you think that buyers and suppliers should adopt to make JIT and Lean production a success?

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THANK YOU ALL
SEE YOU IN THE NEXT
CLASS