Just-In-Time concept

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Key words: value chain, logistics network, Just-In-Time concept, JIT implementation

Agenda:

1. Introduction............................................................................................................. 2
2. Value chain and Logistics network (Supply chain).................................................. 2
3. About Just-In-Time (JIT) concept ........................................................................... 3
4. History and Philosophy.......................................................................................... 4
5. Benefits and problems............................................................................................ 5
6. Implementation of JIT concept................................................................................ 6
7. Conclusion............................................................................................................. 9
8. References............................................................................................................. 9
1. Introduction

In my opinion, the primary goal for the company is customer's satisfaction and if company can not reach perfection in this area then all the processes are worthless. All parts of the value chain and everything in the enterprise must be healthy for realization of competitive business processes. If the company wants strong and long-lasting value chain all the links within the chain must be prepared to overpass all existing problems.

One of the most important links inside that value chain is definitely logistics. Logistics is concerned with the physical distribution and storage of products and services. During the 20th century several approaches of implementation of logistics were developed. Surely, one the most famous and most important logistics concept is the Just-In-Time concept. The following text will help readers to understand basics of JIT, at least I hope so.

2. Value chain and Logistics network (Supply chain)

The value chain was described and popularized by Michael Porter (1985) in his bestseller, Competitive Advantage: Creating and Sustaining Superior Performance.

The value chain describes the full range of activities that are required to bring a product from its conception to its end use. These generic value-adding activities are divided in two major groups. The "primary activities" include: inbound logistics, operations (production), outbound logistics, sales and marketing, and service (maintenance). The "support activities" include: administrative infrastructure management, human resources management, R&D, and procurement. The goal of these activities is to offer the customer a level of value that exceeds the cost of the activities, thereby resulting in the profit margin. The costs and value drivers are identified for each value activity. The value chain framework quickly made its way to the forefront of management thought as a powerful analysis tool for strategic planning.

The concept has been extended beyond individual organizations. It can apply to whole supply chains (logistics networks). The delivery of a mix of products and services to the end customer will mobilize different economic actors, each managing its own value chain. The industry-wide synchronized interactions of those local value chains create an extended value chain, sometimes global in extent.

Logistics network, supply chain or supply network is a coordinated system of organizations, people, activities, information and resources involved in moving a product or service in physical or virtual manner from supplier to customer. The entities of a supply chain (Figure 1) typically consist of manufacturers, service providers, distributors, sales channels (e.g. retail, ecommerce) and consumers (end customers).

Supply chain activities transform raw materials and components into a finished product that is delivered to the end customer. There is a variety of models of supply
chain, addressing the upstream and downstream sides. The primary objective of supply chain management is to fulfil customer demands through the most efficient use of resources, including distribution capacity, inventory and labour.

Logistics network has a far wider meaning than just goods delivery and channel distribution system. It is the total flow of materials, information and cash, from the suppliers’ suppliers, right through an enterprise to the customers' customers. The flows of materials and cash are opposite, but information needs be visible throughout to give control over what is happening in the chain.

Logistics forms a specific part of the supply chain. Logistics can be considered as a tool for getting resources, like products, services, and people, where they are needed and when they are desired. It is difficult to accomplish any marketing or manufacturing without logistical support, almost impossible. It involves the integration of information, transportation, inventory, warehousing, material handling, and packaging. The operating responsibility of logistics is the geographical repositioning of raw materials, work in process, and finished inventories where required at the lowest cost possible. Simply definition of logistics can be: "The time-related positioning of resources".

3. About Just-In-Time (JIT) concept

What is the Just-In-Time concept? Since the emergence of this term it was difficult for sciences and business people to define it. Even today many companies think that

1 Wikipedia
they are using JIT concept, but actually, they are not realizing that JIT must be integrated in company philosophy and no just dead letters.

Just in Time (JIT) production is a manufacturing philosophy which eliminates waste associated with time, labour, and storage space. Basics of the concept are that the company produces only what is needed, when it is needed and in the quantity that is needed. The company produces only what the customer requests, to actual orders, not to forecast. JIT can also be defined as producing the necessary units, with the required quality, in the necessary quantities, at the last safe moment. It means that company can manage with their own resources and allocate them very easily. Figure 2 shows a drawing of the JIT concept.

![JIT concept](image)

**Figure 2: JIT concept**

4. **History and Philosophy**

Problems before JIT system were that companies can not properly calculate their material flows. Also, there were problems with warehouses because there were situations that in one moment warehouses are full with stocks, and in other they are almost empty. Because of these problems it was really difficult for engineers and managers to deal with logistics.

JIT, however, is not new. The technique was first used by the Ford Motor Company during 1920s, but the technique was subsequently adopted and publicised by Toyota Motor Corporation of Japan as part of its Toyota production System (TPS). In 1954 Japanese giant Toyota implemented this concept in order to reduce wasteful overstocking in car production.

Just-in-time (JIT) inventory systems are not just a simple method that a company has to buy in to; it has a whole philosophy that the company must follow. The ideas in this philosophy come from many different disciplines including; statistics, industrial engineering, production management and behavioural science. In the JIT inventory philosophy there are views with respect to how inventory is looked upon, what it says about the management within the company, and the main principle behind JIT.

Firstly, inventory is seen as incurring costs instead of adding value, contrary to traditional thinking. Under the philosophy, businesses are encouraged to eliminate
inventory that doesn’t add value to the product. Secondly, it sees inventory as a sign of poor management as it is simply there to hide problems within the production system. These problems include backlogs at work centres, lack of flexibility for employees and equipment, and inadequate capacity among other things. In short, the just-in-time inventory system is all about having “the right material, at the right time, at the right place, and in the exact amount.”

5. Benefits and problems

Benefits that JIT concept can provide to the company are huge and very diverse. The main benefits of JIT are listed below:

1. *Reduced set up times in warehouse* - the company in this case can focuses on other processes that might need improvement;
2. *Improved flows of goods in/through/out warehouse* - employees will be able to process goods faster;
3. *Employees who possess multi-skills are utilized more efficiently* - the company can use workers in situations when they are needed, when there is a shortage of workers and a high demand for a particular product;
4. *Better consistency of scheduling and consistency of employee work hours* - if there is no demand for a product at the time, workers don’t have to be working. This can save the company money by not having to pay workers for a job not completed or could have them focus on other jobs around the warehouse that would not necessarily be done on a normal day;
5. *Increased emphasis on supplier relationships* - having a trusting supplier relationship is important for the company because it is possible to rely on goods being there when they are needed;
6. *Supplies continue around the clock keeping workers productive and businesses focused on turnover* - employees will work hard to meet the company goals.

Also, the benefits of JIT include: better quality products, higher productivity and lower production costs. For better understanding of JIT benefits, figure 3 shows comparing between flexible systems (based on Just-In-Time systems) and buffered/rigid systems.

It is certainly that JIT concept can improve business performance and efficiency. Employee morale is likely increased and that is one most important benefit that comes from using the foregoing concept. Of course, we must not forget that now the company is allowed to remain competitive.
Figure 3: Flexible systems vs. Rigid systems

There are several problems which are connected within JIT concept. Maybe the major problem with JIT operation is that it leaves the supplier and downstream consumers open to supply shocks. With shipments coming in sometimes several times per day, the company is especially susceptible to an interruption in the flow. For that reason, some companies are careful to use two or more suppliers for most of theirs assemblies. The hidden costs are present and they include labour union leverage, problems with flexible manufacturing systems (FMS), problems developing for the flexible workforce, difficulties with supplying commodities using JIT, increased expenses for suppliers.

6. Implementation of JIT concept

We can observe implementation of the JIT concept as a process which must be taken seriously. How a company will implement the JIT concept depends on many factors. For example, if a company has more than 100,000 workers and production in different places, then the implementation of JIT needs to be done in interaction with all departments. It is obvious that for large companies more time will be spent. On the other hand, smaller companies have the opportunity to implement the JIT concept much faster because their organization structure is not so complicated. But it does not mean that smaller companies are better in JIT implementation.

There are several general guideline steps for easier JIT implementation. The following algorithm shows what the company has to do if it wants to implement the JIT concept.
First of all, top management must accept idea of the JIT. Without their permission it is not possible to move on with the whole process. They are responsible for ensuring financial resources for the project. Perhaps the most difficult thing for engineers is to convince managers that the company under consideration really needs implementation of the JIT concept in order to improve business processes.

Convincing managers to allow evaluation of JIT is not only a problem that comes from human. Second step for a company is success which is connected with the fact that employees also have to understand significance of the new concept. Very important in this step is to explain to workers that JIT is not some kind of bad monster and not something unimportant for their work. It is desirable to hold a series of training sessions to familiarize employees with the fundamentals of the JIT concept.

When we succeed once to explain to our human resources the importance of the new concept and if they become cognizant about it, now it is possible to continue. The third step would be the setup of ERP (Enterprise Resource Planning). ERP is a system which integrates all data and processes of an organization into a single unified system. It is impossible nowadays to run successful production without strong support of an information system. So, it means that ERP requests the software and hardware systems with a secure and huge data base which is able to collect all information about resources. With a centralized data base it is much easier to manage all enterprise resources. It is especially important for logistics because, as
we mentioned before, logistics can be considered as a tool for getting resources, like products, services, and people, where they are needed and when they are desired.

If the ERP system is well established, the next step would be to test our own system. Now all preconditions of the JIT implementation are considered and we are trying to figure out: are there any difficulties to start with implementation. In this step one question comes up: "Is the system ready for JIT implementation?". When the answer is NO, it is recommendable to go back and do changes. If the answer is YES, everything is prepared for the implementation process.

Apropos the technical and physical parts of the implementation, maybe the most important thing which is worth of mentioning is that during the process the organization must not rush.

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 sway from the right direction. Of course, feedback loops also exist and they are very important for the whole process.
7. Conclusion

After all, I think that if the company wants to have a JIT concept it does not mean that everything must be done very fast. The most important thing for the company is to have good organized resource allocation. Also, the management and employees must have on their mind that this concept can help the organization to solve many problems in logistics.

It is true that implementation and development of JIT is a long-lasting and expensive process, but if the company can manage with these difficulties it is possible to achieve high levels of workflow.

The JIT concept is only one part in the value chain that brings the satisfaction to the customers. It means that the JIT concept cannot must solve existing problems in other organization processes. Everything in enterprises is needed to be healthy, through the hierarchy of employees and all workflow processes. Synergy is the only thing that can improve business results. And in the bottom line, the JIT concept is just one link in the whole chain, but very important.

8. References

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