Darpan International Research Analysis
ISSN: 2321-3094
https://dirajournal.com

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International Publications

Original Article	Refereed & Peer Reviewed	Vol. 12, Issue: 01 | Jan – Mar 2024

JIT Production and Supply Chain Management

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Abstract

The Just In Time (JIT) manufacturing system is examined in this study as a crucial instrument for boosting production process efficiency and improving supply chain performance. Furthermore, the function of Just-In-Time (JIT) and optimal implementation within the supply chain are examined. From then on, this approach is widely used, particularly in industrialised nations where it has been shown to yield production that is both prolific and of a high calibre. To ascertain additional aspects of this method's acceptability, more investigation is necessary. A comparison of Just-in-time (JIT) and non-JIT planning approaches in the areas of production/demand, resource discovery/shipping, and transportation/logistics has been conducted in order to examine the benefits of this system. The article's main topics include improving process flexibility, JIT production systems, and identifying key resources to enable JIT.

Keywords: Supply Chain, Just in Time (JIT), Production Planning

Introduction

The phrase supply chain encompasses all of the steps that go into purchasing a product, including design, ordering, material preparation, marketing, production, shipping, customer service, upfront payment, and so on. A supply chain component is any action that has an impact on the product's cost, quality, or information sharing, as well as how it is acquired and distributed to consumers. The regulation of material and component flow in the production and assembly lines is a basic component of efficient manufacturing. In a perfect supply chain, all the materials and components required for accurate production are supplied on time. The process of producing a product that is affordable, efficient, and safe at the appropriate time and place is known as accurate manufacturing. Recently, there have been some achievements in enhancing the effectiveness of manufacturing processes and developing the perfect supply chain, with the Just In Time Production system acting as the cornerstone. The just in time production approach, one of the newest developments in industry management and engineering, has attracted considerably more attention in the previous ten years in global industrial societies, even if it is still considered a fresh idea in this field. This perspective is not new; however, despite the fact that many organisations globally—auto manufacturers and other similar businesses, in particular—have adopted this system and successfully implemented its guidelines and practices in all aspects of their business, such as dealing, production, and so on, many other industrial organisations and institutions across numerous nations lack knowledge of this phenomenon among their owners, managers, specialists, and staff. This article carries on its in-depth analysis of the supply chain implications of the just-in-time production system.

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Time-based production

Taiichi Ohno brought just-in-time production to a Japanese auto-assembling company in the beginning of the 1970s. Many people have proposed the concept of a just-in-time production system in various ways. In other articles, it has been defined using different terms. One thing unites all of these interpretations: they fail to adequately address the problems. Numerous books and articles claim that this strategy is a form of inventory control and is comparable to zero or null inventory. Some regard it as a fresh way to production, while others identify it as a particular kind of technique. For some exporters, this system is suggestive of a particular style of thinking and philosophy; for others, it is a technique. Nonetheless, others continue to insist that it comprises something more than any of the concepts mentioned above. Just-in-time manufacturing is a notion that encompasses not just certain types of organisations but also all of its constituent parts and units. There is more to a just-in-time manufacturing system than merely managing inventory and delivering supplies. It is an approach to thinking that aims to completely eradicate waste and discourages the use of surplus resources in any kind of activity. Just-in-time (JIT) manufacturing aims to achieve continuous quality, increase output, decrease waste, and eliminate dangerous aspects of the production process.

By preparing materials ahead of time, a just-in-time (JIT) production approach guarantees that all essential commodities are obtained on schedule; in reality, JIT is an organisational idea for manufacturers. By preparing all major materials and components exactly when needed during the production process, this strategy eliminates waste. The adoption of this system will only be successful if it has the support of upper management, is able to identify the main production problems, involves employees in decision-making, and is used in conjunction with an appropriate inventory system and production flow. Completing these organisational components is contingent upon several contextual elements, such as connections, culture, the political and economic atmosphere of a country, and the interactions between supporters and customers. However, because this method calls for the timely and correct fabrication of safe, functional parts for the work station and/or manufacturing line, it necessitates exceptionally precise labour. JIT aims to decrease inventory while trying to offer customers quick service. The JIT mindset is based on reducing waste via regulating the flow of materials with an emphasis on preventive maintenance to remove or decrease surplus inventory, optimising the use of supplies, optimising the production process, and reducing preparation time.

JIT's effects in developed nations:

Application costs

Most scholars believe that high level management is essential for long-term success in JIT implementation. The complete acceptance of the system by high-level management is necessary to remove the barriers stopping mid-level managers from using this approach to achieve full supplier coordination. It is true that high level managers in developed countries find it difficult to support Just-In-Time (JIT) because the system requires the adoption of new technologies, preventive maintenance, quality systems, and educational/training initiatives that

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raise business expenses significantly without improving their competitiveness. Two of the main factors impacting company investments are high bank loan interest rates and the high cost of new equipment and technology as a result of the industrialised world's reliance on technology.

Tech and maintenance costs

One of the pillars of the scraps elimination approach of the JIT system is declining preparation time. Longer preparation durations lead to higher inventory levels and worse equipment efficiency. Furthermore, proactive maintenance lowers inventory. Preventative maintenance is not profitable in affluent nations due to the high cost of maintaining machinery. Just-in-time production systems support the notion that maintenance should be performed by internal staff members and machinery operators by removing the problem of excessive maintenance costs.

Cost and workers efficiency

Production flow is a pull system that reduces worker waste time, according to the JIT system's null/zero inventory concept. Put another way, worker waste time may be reduced by engaging in multipurpose tasks. Workers carry out tasks include changing out machines, doing preventative maintenance, tuning up equipment, and preparing it. Worker efficiency is increased by multipurpose skills, which are attained via appropriate training. However, given that labour prices are relatively cheap and training expenses are quite expensive at this moment, it is not reasonable to justify all types of advancements in worker efficiency for developed country enterprises through training.

Supply and inflation

Production without defective goods requires the elimination of processes that provide no value to the final product. The high rate of inflation, which is viewed as a major problem when implementing the Just-In-Time (JIT) approach, is the primary cause of inventory hoarding in industrialised nations. There is a chance for inflation excitement when just-in-time (JIT) procurement is used, for example, if suppliers try to hike prices because they are running out on raw materials. Maintaining inventory also helps to avoid manufacturing delays, which can be brought on by problems with the production lines and the supply chain. Production schedule and supplier inventories must be synchronised for this strategy to be used effectively. As a result, complaints about product quality and inventory reliability will be given more weight when suppliers provide outstanding services.

Demand condition

Supply and demand must remain stable in order for JIT to be effective. Relationships with clients are just as important as long-term partnerships with suppliers for the stability and quality of the supply. Government restrictions have a big influence on how stable the demand is, and having several independent dealers in a country instead of just one or two limited customers would foster an environment that is more creative. Customers drive companies to meet more

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stringent standards for improving the quality of their products, therefore the more expectations they place on them, the more businesses will need to use their competitive edge.

JIT use

accurately JIT's foundational components—time decline, preparation, low production volume, media use, production level timetabling, and preventative maintenance—were covered in the early studies on the topic. Numerous studies have been conducted on a variety of topics pertaining to the deployment of JIT, such as the interactions between JIT and other manufacturing processes, clients or salespeople, etc. "The JIT system's perspective within a productive system is depicted in Figure. First of all, it's important to understand that successfully implementing a JIT system extends beyond inventory control and/or logistics. Rather, JIT is an occupational approach that calls for a mid-functional team to collaborate harmoniously in order to achieve a single, well-defined goal. This can initially appear to be quite simple. To clarify the matter, JIT is contrasted with production planning systems/demand, resource finding/dealing, and transportation/logistics.

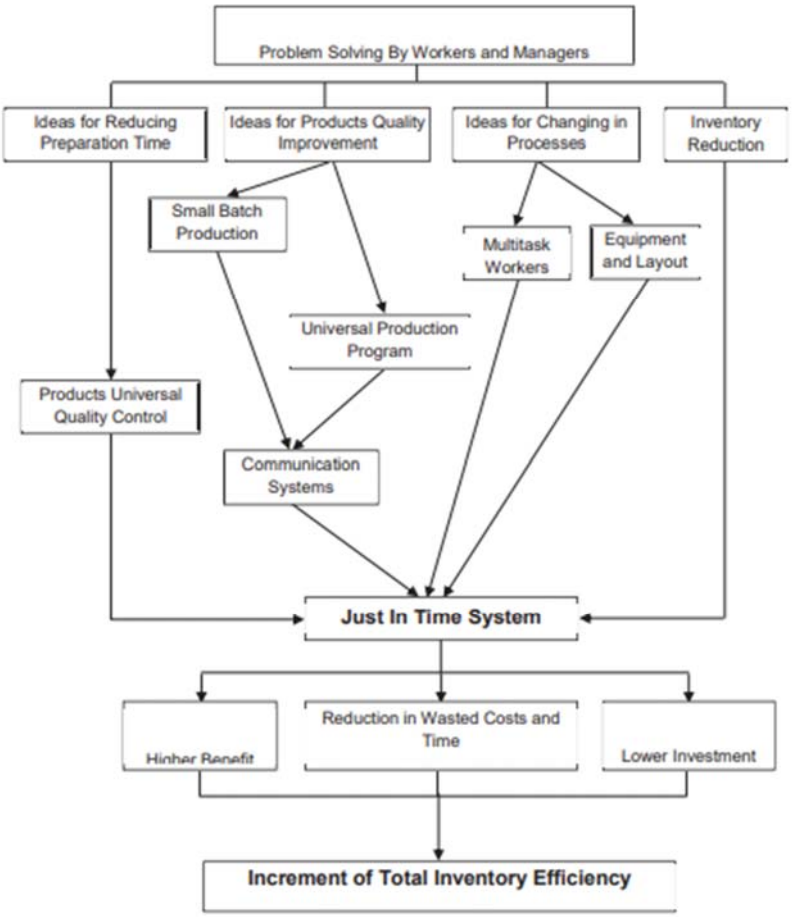

Fig. Just In Time system location in production system

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Non-JIT operation

Production/demand programmers strive to maximise output while also addressing additional goals including equipment utilisation, worker performance, system uptime, and operational capacity. A production programmer must employ several batch productions or those that depend on large raw material inventories in order to do this. This results in the optimisation of worker performance, operational capacity, and equipment application. However, what about the end product's inventory level? What should be done if a consumer requests a different product? It is obvious that production managers and programmers need to focus on operations rather than general frame expenses, such just-in-time (JIT) applications, since JIT application is required for batch goods in small quantities with standard machinery to obtain much more benefits. Purchasing and resource acquisition managers aim to use those strategies that lower overall costs for their organisation. The suppliers who propose reduced costs for items in bulk dealing are the strategists around which these managers base their expenses. Managers negotiate transformation costs and their impact on product purchase price based on the objectives of the organisation. Transportation and logistics managers search for ways to optimise the distribution network while also attempting to incorporate raw materials into the production process and extract the finished product. These managers prioritised low costs and great dependability when it came to logistics and transportation solutions. When the dealing team negotiates the cost of the packs that the suppliers will supply, this is a fantastic concept since it indicates that prices will go down because the supplier will be in charge of the transportation's functionality and dependability in this scenario.

JIT operation

Like in the previous example, demand planners and managers focus on operational functional indicators such as worker performance, operational capacity, facility and equipment utilisation, and system active time. This emphasis is not entirely exclusive; rather, a few other equally significant objectives underpin JIT operations. These consist of the number of machines in each shift, the amount of time it takes for a machine to change status, and the development of new indices for the flexibility of the process and end product inventories that support and regulate the short-term demands of the customer. In JIT-based operations, daily activities are coordinated with the continuous customer demand for final product inventories. The application of manpower, manufacturing investments, and even the reordering of raw materials from suppliers or stocking and distribution procedures are all driven by these objectives in the production programme. In reality, just-in-time (JIT) production necessitates a direct reliance on the clients' short-term demand patterns. The lowest feasible cost combined with a wide definition is also necessary for managers who are in charge of allocating resources. Putting JIT aside, the optimum pricing comes from purchasing and delivering supplies in their full. While it might not be difficult to use JIT techniques in this case, there will be other unforeseen outcomes. First and foremost, it is expensive to carry and store such a large quantity of fresh goods. It also calls for a lot more staff and supplies. Second, using subpar materials requires a

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lot more time, thus solving the time problem would probably take several weeks or perhaps months. In Just-In-Time (JIT) processes, the least general cost will be the basis for purchasing decisions. This price includes all related costs, such as transportation, stocking, and the price of one unit of raw materials. When all of these elements are taken into account, purchasing in a just-in-time (JIT) setting requires a variety of agreements and relationships with suppliers; they are not only reliant on the price per unit and the quality of the supplier. Logistics managers still place a high value on pricing and reliability even if JIT changes various components of logistics management, such as the removal of public transit or its rare use. However, as a single pack is rarely utilised in its whole during Just-In-Time (JIT) delivery, logistics managers need to familiarise themselves with the process of transporting several packs. It's critical that managers know how to transfer partially filled packets. They also need to know about pack division and integration. This method allows for the transportation of small packs for the same cost as large ones, while also reducing the costs related to storing and shipping large packs.

Production JIT programming

Because there is little room for mistake, production programming in a just-in-time (JIT) setting necessitates a range of activities. Programmers need to be aware of the machine's capabilities at the time of a status change, machine templates (which can help with conversion issues), and the amount of time wasted producing different types of products in order to ensure accurate insight into the true demand pattern for a given product. There are only a few key components needed to create the production schedule in a just-in-time (JIT) environment. In a just-in-time (JIT) environment, a consultant can design a productive manufacturing plan by applying empirical methodologies to identify and explain acceptable parameters.

Process flexibility enhancement

The flexible manufacturing techniques produce large quantities of one product before switching to another". The daily quantity required for each product manufactured using a Just-In-Time (JIT) system. The system has to be able to switch between items with ease in order to perform this function effectively.

Strategic JIT resource identification

Choosing supply partners in a just-in-time (JIT) environment necessitates a different strategy. Having suppliers that provide products or materials at the best costs and quality standards wouldn't be enough. These vendors should offer services in other ways as well in JIT. Friendly cooperation between the producer and his or her suppliers may be exemplified by keeping track of the given packets and adjusting the exit processes when supplies are kept for subsequent usage. Choosing suppliers based on shared locations is another example of strategic resource discovery; in this scenario, supplies are delivered to the producer through an efficient logistical system. Before choosing the providers, it is critical to go over the procedures for evaluating the suppliers and adding the developmental demands to the goods in order to improve the JIT

setting. Establishing the conditions and restrictions of a single, powerful JIT source is also important.

Conclusion

The greatest approach to accomplish accurate production—that is, to produce a useful product at the appropriate time and location while spending the fewest amount of money—in the supply chain is to use just-in-time (JIT) manufacturing. When just-in-time (JIT) supply chain management is applied, product flexibility and productivity may be increased while meeting consumer demands. The production system will help the manufacturer more the more times it tests with Just-In-Time (JIT). firms that integrate JIT into their production system have a higher level of competitive strength than other firms because it produces positive results, an efficient manufacturing process, and customer satisfaction.

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