Just-In-Time Inventory Management Strategy
Overview of Just-in-Time Inventory Management

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Just-in-time is a movement and idea that has gained wide acceptance in the business community over the past decade. As companies became more and more competitive and the pressures from Japan's continuous improvement culture, other firms were forced to find innovative ways to cut costs and compete. The idea behind JIT, or lean manufacturing, is to have the supplies a firm needs at the exact moment that they are needed. In order to accomplish this goal a firm must constantly be seeking ways to reduce waste and enhance value. A recent survey of senior manufacturing executives showed that 71% used some form of JIT in their processes (Pragman). This simple statistic illustrates that JIT is here to stay and also that firms must constantly be searching for ways to cut costs and achieve an advantage. JIT is one way to achieve that end.

In order to understand how JIT works a common vocabulary needs to be established from which to further discuss the topic and gain insight into why so many firms have adopted it. As previously stated, one of the key components of JIT is to reduce waste and add value. There are several activities that a company must monitor as targets for reducing waste. Among these are, excessive waste times, inflated inventories, unneeded people or material movement, unnecessary processing steps, numerous variabilities throughout a firm's activities and any other non-value adding activity. A key example of this is a new plant that Caterpillar is bringing on-line in the near future. By reducing the number of times a bucket had to be repositioned while it was being welded, Caterpillar was able to reduce the time the bucket spent in the welding line, reduce labor costs by limiting idle time at the welding station and increase the efficiency of the entire manufacturing process.

The layout and inventories that are part of a JIT strategy may seem the most logical steps to reduce waste and increase value. By simply redeveloping the layout of certain facilities a firm can reduce the time it takes for supplies to get to the next step in process and cut costs associated with that movement. One way to do this is to have work-in-progress close to the next station in the manufacturing chain. Couple this with lowering inventories and a powerful combination is formed to reduce costs. In lowering inventories a firm can reap numerous benefits; batch sizes, set-up times and safety stock are all reduced, ergo costs are trimmed and value is added. But in order to achieve these things a firm must be willing to accept the problems that these actions can either uncover or create. Dell Computers participates in both of these activities and they are now the industry leader. Dell has warehouse space at their manufacturing facilities in which suppliers keep parts directly on-site which is the quintessential JIT layout.

In addition, Dell is constantly working to achieve “JIT” inventories of only four days and in doing so are constantly uncovering and solving supply chain problems.

Going hand-in-hand with maintaining Just In Time inventory levels is JIT scheduling. By working to reduce inventory to the lowest possible working levels, a firm must constantly be adjusting its schedule of ordering and delivering. In doing so, communication both up and down the supply chain is critical. Frequent orders are placed for supplies and small production runs are constantly being initiated. In order to achieve this breakneck pace of order/production schedule, a firm must constantly be making small changes to orders/production and recognize that kanbans are of incredible importance.

Possibly the one piece of JIT that has the most relevance to a study of supply chain management is the partnerships that are essential to making JIT truly work. A firm cannot implement a JIT system by itself; it must have the complete cooperation of its entire supply chain. The sheer amount of information that is needed for a JIT system to operate well demands partnerships to be formed and nurtured, almost to the point at which an entire supply chain operates as one firm. Examples of these kinds of partnerships are everywhere in today’s business world. XYZ-Company allows its key suppliers to work directly at their manufacturing sites and place orders as needed for the parts that that supplier supplies. By example Dell has its suppliers store raw materials directly at the manufacturing plants.

Other concepts of Just In Time also need to be introduced in order to have a discussion about what truly makes Just In Time a worthy endeavor. By the 1980s the Japanese had achieved manufacturing greatness by practicing continuous improvement, in that a firm is constantly working to improve in every facet of its business functions. To do this a firm must always increase quality, look for innovative ways to solve problems and increase focus on the quality of its suppliers. All of these are cornerstones of a modern JIT system. Lastly, getting the workforce to buy into a JIT lean manufacturing system is important because without the dedication of the workforce, any endeavor is sure to fail. There are several ways to achieve workforce commitment. A simple way is to cross train the workforce members outside of their normal business function and help increase an employee’s problem solving ability. In doing so a firm is empowering its workforce to think about their function in a new way while looking for ways to improve and giving them an overall view of the entire firm, not just their single job. When this is coupled with the support of management, an increase in resources to solve problems, and an increase in employee roles and responsibility, a workforce will feel empowered and work to make JIT a success.

Strengths of JIT

There is much strength to incorporating JIT lean manufacturing in a company. JIT makes production operations more efficient, cost effective and customer responsive. JIT allows manufacturers to purchase and receive components just before they're needed on the assembly line, thus relieving manufacturers of the cost and burden of housing and managing idle parts. In that respect, company spokesman for Dell Venancio Figueroa, says "With our pull-to-order system, we've been able to eliminate warehouses in our factories and have improved factory output by double by adding production lines where warehouses used to be" (Songini, 2000). The benefit of carrying smaller amounts of inbound, in-process, and finished goods inventory exists regardless of the firm's operating context (size, production technology, etc…). Just In Time appeals to many companies because it helps prevent manufacturers from being stuck with inventory that may become obsolete. JIT was initially developed and justified based on cost reduction and quality improvement dimensions. Now, companies view JIT as providing an approach to achieving excellence in the elimination of waste (thought of as all things that do not add value to the product), as well as making the company more responsive to short-term customer demand patterns.

JIT manufacturing can be a real money-saver for a company. Companies are not only more responsive to their customers, but they also have less capital tied up in raw materials and finished goods inventory, allowing companies to optimize their transportation and logistics operations (UPS, 2003).

Overall, JIT manufacturing results in lower total system costs and improved product quality. With JIT, some plants have reduced inventory more than fifty-percent and lead time more than eighty-percent (Droge, 1998). JIT is lowering costs and inventory, reducing waste, and raising the quality of products.

Weaknesses of JIT

Just as JIT has many strong points, there are weaknesses as well. "In just-in-time, everything is very interdependent. Everyone relies on everybody else" (Greenberg, 2002). Because of this strong interdependence with JIT, a weakness in the supply chain caused by a JIT weakness can be very costly to all linked in the chain. JIT processes can be risky to certain businesses and vulnerable to the supply chain in situations such as labor strikes, interrupted supply lines, market demand fluctuations, stock outs, lack of communication upstream and downstream in the supply chain and unforeseen production interruptions.

Labor strikes, stock outs, and port lockouts can quickly disrupt an entire supply chain while JIT processes are in place. "Adhering to the just-in-time concept can be expensive in times of emergency such as at ports" (Greenburg, 2002). When a ship arriving from Asia full of supplies cannot make it to shore, the company using JIT generally has very little inventory to compensate for the emergency. This lack of inventory is exactly what makes JIT so great to companies in

reducing costs, yet making it risky as well by in some cases not having enough buffer inventories to react and keep the supply chain moving.

Every year markets experience seasonal demand fluctuations as well as fluctuations due to demand from disasters or other unforeseen events. “Just-in-time delivery leaves retailers and manufacturers with little inventory as the holiday season approaches” (Greenberg, 2002). Relying solely on JIT systems would leave supply chains in shock due to the overwhelming seasonal market demand at different times of the year for seasonal products. Not all products should be produced with JIT systems in place. Custom made items will not work very well with JIT as JIT systems respond best to mass produced and highly automated production items.

Communication is king in a JIT rich supply chain. There is a risk involved with JIT when there is a communication breakdown and the company cannot get the right amount of supplies needed to keep the just-in-time system running smoothly. Technology is playing a big role in JIT number, however, the reliance on technology can lead to breakdowns in the IT systems that can be costly to work around and go back to the ‘pencil and paper’ methods of doing supply/inventory demand calculations. Companies should always have backup systems in place to help thwart the possibility of technology or communication breakdown.

Weaknesses in JIT systems are very important to recognize. “From Cisco routers to Dell computers to the Gap’s leather pants, companies have found their just-in-time manufacturing systems have let them down” (Johnson, 2001). Companies must strongly evaluate the pros and cons of implementing JIT systems. The effects and risk to their supply chain must also be heavily considered. Although JIT has its weaknesses, in most cases, the benefits outweigh the risks to the JIT enabled company. Planning for and recognizing when things may go wrong with the JIT system are vital for the success of JIT implementation across all areas of supply chains.

JIT in Practice

Just in time has an overall strategic focus to provide companies with an exceptional amount of savings. There is a large variety of companies and industries that have experienced these cost savings. For our research we will feature Dell and Toyota as two examples to illuminate the cost saving effects that just in time offers.

To begin our discussion, Dell, which participates in the computer technology industry, is the only company within its industry that effectively utilizes just in time. They have “revolutionized the selling of personal computers, using a direct-

business model whose fundamental tenets include taking custom orders directly from customers, thereby reducing inventory and streamlining distribution" (DI D RECT, 2001). After Dell has received a customer order, they then begin production of the product that the customer desires. This exemplifies a pull system within the supply chain. A pull system is reactive whereby production is executed in response to a customer order. This unique supply chain provides Dell with a competitive advantage within its industry allowing them to become the market leader over Compaq in 2001 (DI D RECT, 2001).

Dell's position within its industry is a result of their strategic focus to reduce inventory and streamline distribution. This strategy has allowed them to keep only five days of inventory on hand (DI D RECT, 2001). This is the smallest amount of inventory of any company within this industry, according to Mike Gray, Supply Chain Evangelist for Dell. He stated that most companies within the computer industry currently hold between 20 and 30 days worth of inventory (Personal Communication March 10, 2005).

The limited amount of inventory held by Dell has "created value for their customers. The value created for their customers is a function of integrating the entire value chain: invention, development, design, manufacturing, logistics, service, delivery and sales" (DI D RECT, 2001). Integrating the entire value chain creates visibility and provides stronger relationships between Dell and their customers and suppliers. This visibility allows them to only "invest in what their customers want, rather than trying to guess what they might want" (DI D RECT, 2001). In addition Dell has a philosophy to "only manufacture what their customers ask them to make, when they ask them" (DI D RECT, 2001).

This strategy provides Dell with a time-to-market advantage. "They can get their customers the freshest, latest, greatest Pentium 4 and all associated operating systems 85 days faster than HP. This is true in regards to research that shows Hewlett Packard has 63 days of inventory and a distribution channel with 25 to 30 days of inventory as well. Collectively, HP has about 90 days of inventory compared to Dell's five. The minimal amount of inventory held by Dell provides them with an economic advantage, because the value of components and manufacturing materials declines about one per cent per week. The five day inventory also minimizes a customer's ability to change their wants before they receive their computer. For example, if an individual tells a manufacturer what they want today but they do not hear the request for 90 days, chances are by this time the customer wants something else" (DI D RECT, 2001).

Dell's use of just in time results in cost savings, superior customer satisfaction, limited waste, and the ability to provide their suppliers with more information. In the end these benefits all result in a cost savings for Dell and higher revenue. Since Dell holds minimal inventory, they do not have to fund raw materials, work in process or finished goods inventory.

Toyota Motor Corporation is another company that effectively uses just in time. They are known as the “master and pioneer” of just in time and are currently entering the market to provide customized vehicles to customers with a minimal wait. “Toyota has spent the last six years revamping its ordering, manufacturing and distribution to make it easier for dealers and customers to make changes right before production” (Fahey, 2004). “Their goal is to reduce the average time between dealer order and delivery from Toyota’s North American factories from 70 days to 14” (Fahey, 2004). This goal accomplishment “would not only make customers happier but also cut dealer inventory costs and the need for Toyota to spend on rebates for slow-selling vehicles” (Fahey, 2004).

In order to seek the benefits of providing customized orders and reducing the average delivery time, Toyota has developed its own software that connects dealers to factories and factories to suppliers. The integration of the value chain creates visibility for all members of Toyota’s supply chain. When a request from a dealer is received by Toyota their “software is able to figure out the availability of parts nearby, the time to resequence the assembly line and whether the change would unbalance the line by scheduling, for example, too many models loaded with time-consuming options one right after the other” (Fahey, 2004).

Toyota has also adjusted their distribution process to effectively provide customized vehicles in a just in time process. “Toyota now sends finished vehicles to sorting docks where they can be grouped by region. This new process cuts delivery by two days. And in assembling cars, Toyota now considers destination, so that it may, for instance, make vehicles headed to Seattle at the same time” (Fahey, 2004). This process adjustment has provided Toyota with a cost savings in result.

Dell and Toyota are two model companies of just in time. They effectively get the right products to their customers when they need it. Both companies have achieved a competitive advantage within their industries due to utilizing the just in time process and allowing visibility between them and other members of the value chain.

JIT and Beyond

Just-In-Time inventory systems have come a long way through out the years improving the efficiency of purchasing in many companies. But as with most things there is always room for improvement and growth. JIT inventory systems have evolved over the years with many new and exciting twists. Competition in the business world is shifting from being between company and company to supply chain and supply chain. This is why JIT is evolving in many different ways. JIT II is one such evolution of the efficiency of JIT.

JIT II is a way to improve the customer-supplier relationship. JIT II uses “systems integration” which allows, “sharing of information so that the relationship is more

like a partnership" (Pragman). Essentially this equals more and more visibility throughout the supply chain, which equals better responsiveness and lower costs, the two main goals of supply chain management.

"JIT II, a customer-supplier partnership concept pioneered at Bose Corporation and now practiced by major companies and their suppliers, can aid in cutting both design and response lead time" (Pragman). This is accomplished through systems integration, which seeks ways to improve coordination between different functional areas, as well as bridges the gap between customer and supplier.

With JIT II the suppliers have a person within the customer's organization full time acting as a purchasing department employee for the customer firm. JIT II has really impacted the following areas: "the administration of the purchasing function, logistics, concurrent engineering and value analysis and material stores and support services. In each of these areas the lead time reductions are greater with JIT II than with conventional JIT" (Pragman).

The administrative benefits of JIT II are due to the fact that the supplier is constantly available in-house. JIT II reduces administrative costs for both the customer and supplier because the purchasing costs are not all on the customer and the supplier gets all the business from that specific customer as it wants as long as things go well. Because the supplier is always present "JIT II permits concurrent engineering and value analysis to take place on an ongoing basis, not just during sporadic sales calls" (Pragman).

JIT II is not the end of the evolution of just in time systems it is actually just the beginning. ERP is another result that spawns from the premise behind JIT II. The main difference between the two is that JIT II is not computer system based and ERP is based on a computer system that helps ensure the visibility of all functional areas within a company as well as within its supply chain.

"ERP helps organizations reduce supply chain inventories due to the added visibility throughout the entire supply chain" (Wisner, Leong, Tan). A major advantage of an ERP system is that it allows managers to make better more informed decisions that effect the entire supply chain. As ecommerce and global operations continue to grow a need for visibility and data exchange between suppliers, customers and foreign offices has emerged. Thus driving ERP more to the forefront but with ERP comes decreased inventories as well as responsiveness that is the major idea of JIT systems.

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