

Just in Time (JIT): A Tool to Decrease Cost and to Improve Profitability

¹Anand Poojary, ²Dr. R. Satish Kumar

¹Research Scholar, Jain University, India

³Professor – Marketing Area, IFIM Business School, India

Abstract

Today's technology plays an important role in the determination of management control systems in the inventory management. JIT system represents a fundamental exit from the traditional approach to managing production in modern technology driven approach. The present days business environment is characterised by tough global competition and it is growing not only from the point of price but also on quality, product flexibility and response time. Competition has further adding pressure on organisations to focus on the various manufacturing functions as being of strategic importance, giving an essential source of competitive advantage. For many firms, this has led to the adoption of Just-in-Time systems. Just In Time is not a material control system, it is not just another manufacturing technique; it is a philosophy of management which is dedicated towards the perpetual elimination of waste in every form in every area of the organisation. JIT system is mainly to reduce buffer stocks, reduce costs, increase the flexibility and to enhance the profitability.

Keywords

Supply Chain Management, Just-in-time, Liberalisation, Globalisation, Privatisation, efficiency, quality, flexibility, TQM, TPM, Pull Production.

I. Introduction

Business today is in a global environment. This global environment pushes organisation, regardless of place or primary market base, to consider the rest of the world in their competitive approach analysis. Firms cannot separate themselves from outside factors such as financial trends, competitive situations or knowledge innovation in other countries, when some of their rivals are challenging in those countries. Companies are going truly global with regards to logistics and inventory management. A company can develop a product in the Europe, manufacture in India and sell in Australia. Organizations have changed the ways in which they deal their operations and logistics and material management activities. Changes in business, the spread and transformation of logistics, supply chain, transport infrastructures and the rise of competition have elevated the importance of flow management to next levels.

II. Need For the Study

LPG (Liberalization, Privatization and Globalization) has increased the competitiveness among business. Lot of factors have shown the way to the increasing globalization of the world economy. As a result the competitive situation faced by the corporate has changed dramatically since the last decade. Decreasing tariffs, improved technology, better transportation, logistics, communications, global manufacturing of products and availability of services across markets are the major forces driving the globalization. These changes have enabled the global competitors to manufacture the products and services made available to customers all over the world, results have been a proliferation of choices for consumers and a need for the business to offer variety of better quality products

and service at much lower price in order to remain competitive. These competitive pressures have led to an increased importance on reengineering internal business processes and working more collaboratively with the customers to better integrate planning and operations throughout the supply chain as a means to reduce price and better improve the services. Technology improvement and product going global have also resulted in increasingly vibrant markets and uncertain customer demand. Consumers have greater access to most of the goods and services, introduce of new products is occurring at a faster pace. Hence an organizations competitive place depends upon its ability to understand changes in customer demands and respond suitably with goods and services that will meet those demands. JIT is a technique which allows an organization to react to these environmental changes.

III. Scope of the Study

The pharmaceutical industry faces some unique challenges - increasingly stringent safety and quality regulations, combined with the effect of innovations in medical science and healthcare, and a complex and costly design-to-market process (from product concept and development to market delivery). The industry is also going through turbulent times as it has to cope with the challenges common to many other industries – how to deal with increasing competition, hold down costs, and expand market opportunities. Indian Pharmaceutical industry has shown an extraordinary growth in last few years through the value of the drugs it produces. Indian pharmaceutical majors are also being acquisitioned by foreign companies. One of the aspects to grow out of this corner is to put in place JIT and also to develop quality as a competitive advantage over others.

Indian pharmaceutical industry has shown a remarkable growth from in terms of turnover within a short period of two decades. Driven by the education, knowledge, low cost and expertise, India is today one of the important global players in the field of pharmaceuticals. But today's perception in the international market about the role of the Indian pharmaceutical industry is as a provider of good quality, low cost generic bulk pharmaceuticals and formulation. In terms of volume it accounts for a low 8% of the global sales and in terms of value a mere 1 %. Moreover Indian 'Ordinance on Patents (Third) Amendment' after being a signatory to the WTO resolution on TRIPS Agreement has recognized product and process patents. Before to the introduction of this product patent in India it was not a judicious decision for the international pharmaceuticals companies to invest here even with an increased FDI cap of 100% in 2001 from 74%. This has lead to a growth in mergers and acquisitions of Indian companies by foreign drug industries. Ranbaxy Laboratories a market leader in India terms of revenues was acquired by Japan's Daiichi Sankyo in 2008 for a whopping \$4.6 billion and Piramal Healthcare by US-based 'Abbot' for \$3.7 billion. Thus it becomes imperative for Indian pharmaceutical industry to search for new competitive advantages to remain in competition and business. One of the strategies that differentiate a company from its competitors is quality. JIT is one such approach that seeks to improve quality,

reduce costs, improve profitability and performance which will meet or exceed customer expectations. This can be achieved by integrating all functions and processes throughout the company

IV. Objectives

1. To understand the role of JIT in Pharma Industry
2. To know the JIT performance
3. To assess the relationship between JIT and Profitability
4. To evaluate the JIT-practices used in Pharma Industries

V. Meaning of JIT

Just in Time (JIT) is to ensure that the company has an integrated manufacturing system that aims at continuously reducing all forms of waste, specially by reducing inventory and unnecessary delays in flow time, simultaneously increasing flexibility and service-levels. The main objective of JIT is the reduction of working capital by simultaneously increasing service-levels

JIT-System

- Set-up time reduction
- Pull production
- Layout-optimization
- Planning adherence

VI. Linking JIT to JIT-Performance

While undertaking plant visits in the pharmaceutical industry, we observed that companies tended to be over-stocked compared to other industries that we have experience of. Previously the limited productivity of the working capital employed came from high safety stocks, as companies were eager not to lose a single sale due to the high gross margins attached to each product. However, at the same time gross margins, especially in the generics industry, tend to be much lower, and the cost-to-volume ratio of drugs is much higher than in most other industries, it is interesting to explore whether JIT (Just-in-Time) practices could help to eliminate waste and thus lower manufacturing costs. Furthermore, a comprehensive JIT-program can help to deal with increasing complications brought about from heterogeneous customer requirements and smaller average lot sizes that will expose pharmaceutical plants in the future. While checking the level of implementation and the impact of Just In Time practices by linking 4 basic principles to anticipated performance measures; such as inventory turnover. Whilst pull production helps in reducing overproduction, and thus inventory, set-up time reductions can help to reduce the average lot size and enables an improved material flow throughout the manufacturing processes. Furthermore, process stock will be reduced by implementing a pull production philosophy. It should be noted that a planning process with a high planning adherence is becoming a crucial element when implementing JIT-programs. Apart from waste caused by over production and excess inventory, an integrated Just In Time program also work toward to reduce all kind of excessive movement caused by excess material and handling movement. Hence, lay-out optimization is a further basic principle of JIT implementation. We expect plants with a low level of implementation of Just In Time practices to have long set-up times, high cycle times, low inventory turns and a moderately low planning adherence.

Table 1:

Practices of JIT	JIT Performance measure
Pull-production	Set-up times, Cycle times, Finished goods inventory
Set-up time reduction	stock turn over, Work in Process stock turn over
Planning adherence	(WIP), Raw material turn over, production-against schedule,
Lay-out-optimization	volume flexibility

The outcomes: In terms of JIT implementation the pharmaceutical industry seems to be lagging behind other industries. The average level of implementation of JIT practice (57%) is the lowest score among all four major categories. Especially in terms of pull production, there seems to be a low level of implementation. However, on the performance side, there are companies in the sample that are having high stock turns even when compared to other industries. While the top 10%, in terms of stock-turns, has in average raw-material turns of 35 and finished goods inventories of about 13, these measures do not give the total picture. However, there are several interesting outcomes if viewed from a less aggregated level. Companies that performed well, in terms of high stock turn-over, had also worked intensively on reducing their set-up times. They had previously implemented a philosophy of flow production; and in particular their work-in-progress stocks were much lower than those of their peer group.

The main leverage for reducing stocks, while simultaneously sustaining high service levels, are similar to those of other industries. They understood that flexibility for most of the pharmaceutical plants is determined by adaptability at their packaging line; and thus have extensively worked at reducing set-up times in this area. They typically have set-up times in their packaging center of some 40 minutes on average. Based on their high flexibility they have very short freezing periods (between 2-3 days) and thus a very high planning adherence of around 98-99%. By managing to reduce their set-up times, and having optimized their machine layout, they could reduce their cycle times to between 15 days (Liquids) and 25 days (solids). While moving their stocks quickly through the manufacturing process with reduced Work-in-Process (WIP) and stock turns of about 35. The result indicates that there is a very high correlation between the average set-up time at the packaging line and the average WIP and raw material turns in the manufacturing process.

As the packing line seems to be a bottleneck for most pharmaceutical plants, a reduction in setup times would have the highest impact on WIP and raw material turns; and would also improve the average cycle times of the pharmaceutical plant. Interestingly, even among the top 10%, companies did not make extensive use of common pull-practices such as Kanban or other standardized demand-triggered replenishment signals. Successful companies appeared to have put greater emphasis on set-up time reduction and layout optimization. The question arises, whether a pull system is an

approach that can be transferred to the pharmaceutical industry with its specific demands and sourcing patterns. Obviously, within the inventory management field, there is no “one-size-fits all” approach that can be applied for every pharmaceutical company. Today, pharmaceutical products are not as customized as automobiles. Furthermore, many drugs do have very stable demand patterns and there are certain “best-selling pack sizes” where it can be useful to build up inventory in “campaigns” to free-up productive capacities during times of peak demand. However, things are changing. Some 83% of all respondents expects an increase in heterogeneity of customer preferences. The more that drugs will be manufactured with different packaging sizes, forms or “flavours”, then the more traditional push approach will not be suitable for sustaining current service levels while not having huge inventories.

VII. Linking JIT to Profitability

While applying the Operational Excellence model we concentrated on internal operational performance measures, and attempted to discover how certain practices affect stock turns, scrap rates or other performance indicators that measure the efficiency of pharmaceutical plants. Though it is interesting to know whether a plant is doing things right, it is at least as important to find out whether a pharmaceutical company is effectively using its operations to gain competitive advantage. We measured effectiveness of plants on two levels. Initially we took an overall operational performance measure that comprised internal productivity measures, the dependability, the flexibility and the quality of a plant. While we mainly focused on the Total Quality Management section for internal quality measures, the external quality measure was based upon the complaint rate, as this measure provides insightful information of the quality of the final product as perceived by the consumer.

Moreover service level is addressed as this provides an answer to issues of dependability of a pharmaceutical plant. In addition, quality, cost, and delivery, the flexibility of a plant plays a major role when assessing its capability to react to changes in the market. More and more demanding and uneven markets require manufacturing processes that can respond to the need for a variety of customized features. As flexibility is hard to measure by using quantitative data, we recoded plant manager’s opinion of volumes, product mix- and product flexibility. These perceptions were aggregated to give an ‘overall flexibility measure’. Just In Time and Total Quality Management practices have the biggest impact on overall operational performance measures. Companies that have implemented Just In Time principles, and are consequently reducing their set-up times and have optimized their plant layout to enhance short cycle times, and are now attempting to level capacity with current demand. These companies have significant higher service-levels and higher flexibility. Interestingly TPM practices seem to have an even higher impact on quality performance measures than Total Quality Management practices.

Although Total Quality Management has a considerable impact on quality performance, a much higher variance of quality performance is explained by the implementation of TPM-practices. Clearly stable running machines and equipment ensure better predictable quality and simultaneously help to increase service-levels due to the lower levels of unplanned maintenance. Beside the implementation of JIT practices, Total Quality Management does have an effect on flexibility. While Just In Time practices

mainly affect volume and product mix flexibility, the highest impact on new product flexibility comes from implementing Total Quality Management practices. Analyzing the main Operational Excellence leverages, the statistical data provides evidence that Operational Excellence can explain around 20% of variance in return on sales improvement rates of pharmaceutical companies. Companies that have a high level of implementation of Just In Time, TPM, Total Quality Management principles, at the same time also have an effective management system, performed much better in terms of return on sales growth than their industry peers. Furthermore, those companies could also significantly gain market share in their industry. Obviously, excellent operations do directly affect business performance of pharmaceutical companies.

VIII. Success Parameters

There are chains of actions and environment that can predict success for any JIT program. Again these actions alone will not guarantee success, but will definitely improve the chances of JIT gaining acceptance in the work place. The first thing a company has to realize is that JIT is a two-way opportunity. A company has to involve the supplier in the process. A company cannot expect to go with zero inventories and expect the supplier to hold all for them. Improvements should be attained mutually among all parties involved otherwise the enthusiasm to continue the project diminishes and is soon forgotten. Organization must initiate a supplier accreditation program to support the supplier’s products to bypass inspection. The association between the supplier and the customer must be of respect, trust, and open and honest communication.

In addition, operational procedures and policies must be understood and practiced on a daily basis by all employees. The data in the procedures must be constantly monitored to ensure that there is no wastage. Enough training must be given to ensure that the procedures and concepts become a way of life for all employees. All employees play an important role in the Just In Time process. Each and every employee becomes an operator as well inspector who is fully responsible for the preventative maintenance on the machine. The employees must not be operators with the mindset of manufacturing only. They need to be in a position to improve the process and the function of the machinery. This concept requires management to exhibit a tone from the top of encouraging initiative and risk taking with employee. Workers should be encouraged to become more educated with regard to the total manufacturing cycle. They also need to participate in discussions with relates to quality improvement techniques, in order to promote ownership, accountability, and the inner feeling of being part of the team. Reducing the supplier base is another important activity in Just In Time. For eg, a unit of Xerox in its move toward Just In Time purchasing has reduced its number of suppliers from 5,000 to 300. Moreover, long-term contracts with suppliers will create mutual benefits both for the company as well to the suppliers. Benefits will come not only through pricing but also by sharing scientific data. A thorough knowledge of the process by the supplier and the customer will help the process to be adjusted to improve profits and encourage the development of cross functional teams to reduce costs while continually enhancing quality. In the initial discussions, suppliers are made aware of the premium placed to the timely delivery of high quality goods in the exact quantity ordered. Organizations which implement Just In Time purchasing choose their suppliers very carefully. Price is not the only criteria in vendor evaluation, the relevant costs of quality and also the costs of rejections, no delivery or late

delivery are considered. For eg, Wal-Mart penalizes suppliers for the delayed deliveries and incomplete orders. If the vendors know that they are the single source or only one supplier for a particular product to the customer, this will encourage them to go to great lengths to ensure that quality requirements are met if they want to keep the customer. It is prudent for an organization using Just In Time to involve the freight forwarder in the process. Stocks are expensive and if the delivery is delayed then it can have a negative impact on production schedules and customer service. Cost of transportation can be reduced through partnerships and expedited deliveries in smaller lots. This will support the JIT process through inventory reduction. Inventory in smaller lot sizes mean there will be greater movement from one work center to another. Products can no longer be partially assembled. Products must arrive on a pull system. This kind of method produces quantities which is necessary to fulfill the demands of the next operation. The quantity is pulled when it is needed, where it is needed, and in the exact quantity which is needed. The organization will also need to keep in mind that the process has adequate response time to maintain a constant schedule. Companies can show great improvements in going with Just In Time by reducing setup and changeover times for machinery. Just-in-time idea recognizes that any motion which does not add value to a product increases the no value added cost of the product. Set up time reduces and changeover time reduces the no value added costs attached to a product. One of the most important aspects of the JIT process is collaboration. JIT thrives on open, honest communication and trust among all people involved in the process. Workers must work together to improve the product and the process and they must be given incentives to do so. Management must be open minded and willing to help in the change. JIT is a philosophy that stresses training, cooperation and preparedness to eliminate waste. When undertaking this philosophy, organizations need to look internally to improve themselves. Once their internal work is executed to an acceptable level one can look to their suppliers support. Quality is the most important part of any product. If a product is of poor quality, it will have a short life cycle. The cost of rejection or inferior quality can be defined as the sum of all costs that would disappear if there were no quality problems. Examples of inferior quality costs includes scrap and rework, supplier corrective action, downgraded end product, warranty costs, loss of future sales, recall costs, and returned costs. JIT often is wrongly thought of as a way to decrease inventories alone. Whereas the inventory reduction is a major benefit of the Just In Time process, the increased product quality is the major benefit. This occurs as the result of the philosophy of JIT.

IX. Conclusion

With increasing market rivalry and lower growth rates, there will be an increasing cost pressure on pharmaceutical companies. In the pharmaceutical industry, world-wide sales have grown at an average annual rate of 11.1% from 1970 to 2002, today, these double-digit growth rates are strictly incorporated into the industry's overall growth expectations. An operations improvement program that solely concentrates on one aspect – e.g. inventory reductions – will not yield significant operational improvements. To give an example: one of the best predictors for a high level of continuous improvement (measured as the number/quality of suggestions per employee) was the level of implementation of JIT-practices of a pharmaceutical plant. At first sight, this looks like a coincidental correlation between two independent factors. However, both factors are highly interrelated. As soon as companies can capitalize on

stable running equipment, stable running manufacturing processes and reliable and integrated suppliers, a JIT-program could help to reduce buffer stocks, reduce costs, increase the flexibility and to enhance the profitability.

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