

PITFALLS IN JUST-IN-TIME PRACTICES AFFECTING SUPPLY CHAIN

Santhirasegaran.Nadarajan
School of Technology Management & Logistics
Universiti Utara Malaysia
Sintok, Kedah.
Malaysia
e-mail: santhirasegaran@uum.edu.my

Sitraselvi.Chandren
School of Accounting
Universiti Utara Malaysia
Sintok, Kedah.
Malaysia
e-mail: sitraselvi@uum.edu.my

Adam Mohd Saifudin
School of Technology Management & Logistics
Universiti Utara Malaysia
Sintok, Kedah.
Malaysia
e-mail: msadam@uum.edu.my

ABSTRACTS

Just-in-time (JIT) is part and parcel of lean operating system and much to say on reducing operating costs and waste. Despite of being an efficient method on controlling inventory but seems that there are some limitations or pitfalls in engaging this lean tool. It is a very interesting topic to be discussed and debated as such tool does have pitfalls along the way especially concerning vendors and manufacturer in just in time practices. There appear to be problems in promoting and deploying the concept of JIT to manufacturing. Base on the main author two decades of experiences at Japanese semi-conductor manufacturing handling materials reveals the originality ideas and practices in handling semi-conductor materials and the pitfalls on JIT practices. The pitfalls surrounding the limitation especially on small order retrieval, sudden jerk on demand, vendor capacity, the inefficient flow of information between vendor-buyer, the sudden change in new materials supply and constant revision of scheduling further dampened the lean system. However, these pitfalls have to be carried out on a case-by-case basis as each manufacturing system has different context.

Keywords : Just-In-Time, vendor , semi-conductor manufacturing, pitfalls

1.0 INTRODUCTION

The intensification of global competition and the crisis that has affected firms in many sectors have forced manufacturing companies to explore all available opportunities for reducing their costs, without compromising customer satisfaction. As a consequence, there has recently been renewed attention towards Lean Manufacturing, and in particular, just-in-time (JIT) practices, that are usually considered a powerful tool to reduce waste and inefficiency, speed up production processes, and increase delivery performance. Just-in-time (JIT) is part & parcel of lean operating system towards managing waste reduction and to put it simple manner to produce and consume only what is needed. This concept ultimately receives overwhelming respond by the practitioners' especially automotive industry and started to spread to various industries too. Many firms do face global competition with ever changing needs of customers and in order to survive in a saturated market and maintaining profitability, to look for alternative through enhancing productivity, reducing operating cost, shorter lead-time, continuous improvement, breakthrough innovation, effective managing stocks (inventories), reduce scraps. The normal practices of just in time basically feeding to production on daily basis. Such practice requires proper coordination and efficient flow between vendor-buyer by exchanging information related to demand forecast, capacity planning and production scheduling. Manufacturer do engage in cutting cost especially when comes to operating cost such as having low inventory and optimize the current resources such as space of storage. Space concern must be effectively arranging base on the classification of parts. Some parts fall under the category of bulky, semi-bulky and small parts. Just in time parts normally will focus more on two types of classification; bulky and semi-bulky. For manufacturer concern these types of parts require more space for storage and finding alternative to control the stock. Just in time could be the remedy but along the way there are some hiccups or constraint in fully implementing just in time. This paper will address those pitfalls that actually hinder the operating process of just in time.

2.0 LITERATURE REVIEW

2.1 JIT Practices

In the effort and pioneering in defining and measuring the central constructs underlying JIT has been prominently and extensively studied by researchers (Sakakibara et al., 1993; Mehra and Inman, 1992). JIT has been defined as a managerial or manufacturing philosophy (Upton, 1998), while some researchers tends to operationalize it in terms of practices and techniques that both implement and support lean operating system (Narasimhan et al.,2006; Flynn et al., 1995). Production flows streamlining has been aimed by JIT practices and researchers called them as JIT production (Mehra and Inman, 1992) or Internal JIT (Furlan et al., 2010). JIT production practices commonly include set-up time reduction, small lot size, daily schedule adherence, kanban-based pull systems, U-shaped cell layout and heijunka boxes (Mackelprang and Nair, 2010; Motwani, 2003). However, as JIT production started gaining widespread acceptance in practice, scholars began to emphasize the relevance of JIT in other contexts such as purchasing and inbound logistics (Mistry, 2005; Kaynak, 2002). JIT deliveries from supplier (Sakakibara et al., 1993) or JIT supply (Koh et al., 2007; Lamming, 1993) include practices such as vendor-kanban for raw materials and outsourced components and pull systems for inbound logistics.

3.0 REVIEW ON PITFALLS IN JIT PRACTICES

3.1 Forecasting Demand Information Inaccuracy

In order to smooth up the JIT delivery, proper and accurate informations are vital for vendors to plan day to day execution of materials supply to manufacturer (buyer). As for the vendor capacity allocation and planning their raw materials is very much crucial without delaying and ahead of schedule dependent so much on the accountability on demand forecasting from buyer. Inaccurate information on demand forecasting will lead to distortion of delivery of JIT parts to manufacturer. For instance, actual order versus forecasting demand quantity which has vast difference in term of order placement quantity to vendors, therefore the vendor plan for their capacity allocation and delivery

could be distorted due to discrepancy of the information received from buyer.

3.2 Improper Capacity Allocation by Vendors

Vendors normally excited to receive more orders from buyers and willing to proceed for production without realizing tight capacity experienced by them. Buyers in normal norm will continue to dispatch more orders to vendors without further checking the vendor's capacity that might distort the smooth delivery of JIT materials for buyers. Despite of experiencing overcapacity, vendor will still continue to absorb the new order without informing the buyer on the problem arises. Such an occasion will lead to a poor performance of delivery to buyer and the vendor commitment on promising exact quantity delivery will fail against the plan quantity given by buyer.

3.3 Drastic Design Change with Short lead time

Sudden change in materials design will cause disruption in production planning especially concerning JIT vendors. They the vendors solely depend on forecast demand for purchasing raw materials ahead of schedule and if sudden change most likely the vendors unable to produce the materials wanted on time and eventually will cause delay for JIT delivery to buyer. Manufacturer continues to design new models through research and development (R&D), continuous improvement and innovation breakthrough to survive in the market. Designing a product involve many processes for instance new parts development, features and functionality. As concerning to JIT parts, when there is a design change taken place, vendor might find insecure due to shorter lead time and vendor unable to commit the delivery smoothly. Parts with shorter lead-time basically cannot be fulfilled due to tight capacity and resources. Buyers do face lot of manufacturing defects and spoilage that immediately require for replacement. But such cases vendors unable to commit for delivery for those items fall under such category eventually this could slow down the replacement to buyers. Such action require rescheduling that could apprehend but not all will follow to the new changes due to tight capacity for other buyers which has been preplanned earlier. Moreover when looking at fixed order system through built to order approach vendors find very much difficulty since they are running production on small lot that been affected by shorter lead time.

3.4 Poor Quality Materials

Quality matters most for many manufacturer basically a good quality materials will definitely produce good quality product exceptional case when refer to human error. But for the just in time parts solely depend on buyers information will get disrupted if frequent complains comes from buyer whom insisted for better quality from vendors. Supposing overcapacity do take place and vendors could be in rushing to support buyer's production might ended up delivering poor JIT materials. JIT materials basically been produce on a frequent planning on a smaller batches and such process could even lead to poor quality outcome. The frequent production that breaks into smaller batches normally ending up low inventory for vendors but due to over capacity resulting a poor quality outcome. For instance changing chemical compound colors from dark to white for a plastic product or fiber type would cause serious contaminated with black dot on the surface if of said JIT parts it is not properly wash or clean. The continual changes in production process for various parts could even lead poor quality eventually when this JIT parts delivered to the buyer on hourly basis feeding to production leads to line affect because of poor quality parts.

3.5 Frequent Changes in Production Scheduling With Small Lot Size

Changing schedules for some reasons to upkeep the production operations flow smoothly will gauge to affect the poor delivery of JIT materials from vendors. Once again the vendors have already allocated the capacity to buyers promptly and may experience overcapacity deliberately lose faith on buyers on continual changing production schedules that actually slow down process of operation. Such an occurrence will disrupt the JIT planning and delivery. Constant revision will also be a nuisance for JIT vendor to plan effectively. With this sudden jerk on planning will cause the raw materials delivery to JIT vendor affected with noticing to tier 2 suppliers on a shorter lead time to purchase their own raw materials. Just in time delivery receive forecast order from manufacturer (buyer) that the information is crucial for them to plan their raw materials accordingly. JIT vendors do receive the delivery schedule which actually breakdown to smaller lot. For instance, for a day production at manufacturing plant require eight hundred sets to be produced. If the current practice at the manufacturer set at hourly feeding means that JIT vendor to have delivery 100 units (small lot) of the JIT materials to be supplied for every one hour that might take several movement of transportation to manufacturer. Such an operation actually benefit most to buyer rather than JIT vendors because they could maintain low inventory at all time but the operating cost could be more for JIT vendor as they have to run production into smaller lot.

3.6 Multi JIT vendors

At manufacturing more resources require to monitor progress or performance delivery of multi JIT vendors, in term of personnel, information technology, equipment and facilities. Despite the continuous monitoring still do face lot of issues on problem arising from quality, planning, delivery and capacity. The constraint need to be address such as the consistency delivery from various vendors in their commitment to buyers due to the issues that were discussed initially. Some vendors being ignorance on the requirement set by buyers for a single part that such specifications are very important to fulfill rather than looking for other non-relevant issues.

4. DISCUSSION

This paper intends to contribute to the debate and address the pitfalls on JIT practices towards supply chain performance. It is clearly shows there are several constraints of just-in-time practices that need to be address immediately. There are no clear cut answers to the issues that initially raised. Firms try to control and cut-down inventories in order to maintain profitability and it accounts for almost more than 50 percent of total manufacturing cost. Just in time could be remedy to improve inventories by limiting stocking of materials and components and deliver as when it is require by production. JIT is not a distinct concept, but rather a continuous transformation from traditional materials planning to an ever improved new form of buffer-free and sequence-bound supply. This paper clearly pointed out the constraints that will be faced by electrical & electronics manufacturers. One extremely important aspect to look into is the flow of information within the system. Accurate and accountability data is crucial for both parties' vendors and buyers to work on hand to hand to avoid any poor delivery from vendors or affecting planning to certain extend.

REFERENCES

- Flynn, B.B., Sakakibara, S. and Schroeder, R.G. (1995), "Relationship between JIT and TQM: practices and performance", *Academy of Management Journal*, Vol. 38 No. 5, pp. 1325-60.
- Furlan, A., Dal Pont, G. and Vinelli, A. (2010), "On the complementarity between internal and external just-in-time bundles to build and sustain high performance manufacturing", *International Journal of Production Economics*, Vol. 133 No. 2, pp. 489-495
- Kaynak, H. (2002), "The relationship between just-in-time purchasing techniques and firm performance", *IEEE Transactions on Engineering Management*, Vol. 49 No. 3, pp. 205-17.
- Koh, S.C.L., Demirbag, M., Bayraktar, E., Tatoglu, E. and Zaim, S. (2007), "The impact of supply chain management practices on performance of SMEs", *Industrial Management & Data Systems*, Vol. 107 No. 1, pp. 103-24.
- Lamming, R. (1993), *Beyond Partnership – Strategies for Innovation and Lean Supply*, Prentice-Hall, Hemel Hempstead.
- Mehra, S. and Inman, A.R. (1992), "Determining the critical elements of just-in-time implementation", *Decision Sciences*, Vol. 23 No. 1, pp. 160-74.
- Mackelprang, A.W. and Nair, A. (2010), "Relationship between just-in-time manufacturing practices and performance: a meta-analytic investigation", *Journal of Operations Management*, Vol. 28, pp. 283-302.
- Mistry, J.J. (2005), "Origins of profitability through JIT processes in the supply chain", *Industrial Management & Data Systems*, Vol. 105 No. 6, pp. 752-68.
- Motwani, J. (2003), "A business process change framework for examining lean manufacturing: a case study", *Industrial Management & Data Systems*, Vol. 103 No. 5, pp. 339-46.
- Narasimhan, R., Swink, M. and Kim, S.W. (2006), "Disentangling leanness and agility: an empirical investigation", *Journal of Operations Management*, Vol. 24 No. 5, pp. 440-57.
- Sakakibara, S., Flynn, B.B. and Schroeder, R.G. (1993), "A framework and measurement instrument for just-in-time manufacturing", *Production & Operations Management*, Vol. 2 No. 3, pp. 177-94.
- Upton, D. (1998), "Just-in-time and performance measurement systems", *International Journal of Operations & Production Management*, Vol. 18 No. 11, pp. 1101-10.