

A Just-In-Time Supply Chain?

Achieving Just-In-Time operational objectives requires the coordination of Production Planning, Sourcing and Logistics



UPS Supply Chain SolutionsSM

Our Insight.

A UPS Supply Chain Solutions
White Paper

Linking seemingly disparate business functions like demand planning, sourcing and logistics can often yield very positive results by reducing costs and improving performance in supply chain operations.

The closer you get to operating in a true JIT situation, the more responsive you are to your customers.

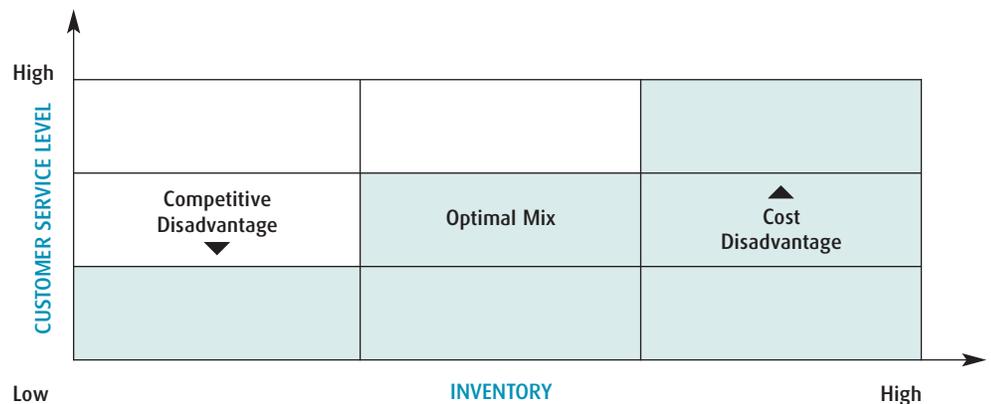
Many times, looking at these business functions in concert and getting them to work together is the only way to solve complex supply chain problems. This is true whether your supply chain extends across the state, the nation or the globe.

The widespread adoption of just-in-time (JIT) inventory principles undoubtedly makes production operations more efficient, cost effective and customer responsive. Companies effectively implementing JIT principles have substantial competitive advantages over competitors that have not. The trick is figuring out how to apply JIT principles to gain competitive advantages in your specific industry and business situation.

The basic premise of JIT is to have just the right amount of inventory, whether raw materials or finished goods, available to meet the demands of your production process and the demands of your end customers. No more, nor less.

The closer you get to operating in a true JIT situation, the more responsive you are to your customers – and the less capital you have tied up in raw materials and finished goods inventory. The less you spend to store and carry inventory, the less obsolescence you have to write off, and the better you can optimize your transportation and logistics operations. Ultimately, this all translates into saving your company real money.

The downside of JIT is that it is a continuum; the closer you get to it, the more beneficial it is to your business. But go too far and reduce inventories too far, the less beneficial it is for your business. Too much or too little inventory leaves you at a competitive (or cost) disadvantage to your competitors. But if you can do it right, JIT can be a strategic source of competitive advantage.



So how to do it right? First, understand that it is not just the logistics or inventory manager's job to implement and succeed at JIT. If you get beyond thinking JIT belongs to one business function, then you are already halfway there. JIT is a business strategy that requires a cross-functional team working in a coordinated fashion with common and overlapping goals and objectives. Sounds simple, but it's not.

To underscore why it's not easy, let's contrast how the demand/production planning, sourcing/purchasing and logistics/transportation business functions work in operations that are not JIT based versus those that are.

When operations are not just-in-time based

The demand/production planner strives to optimize production-oriented goals and objectives such as equipment utilization, labor efficiency, throughput and uptime. Optimizing these goals often leads production planners to run large batch sizes or to run batch sizes that are dependent on the availability of raw material lot sizes. This optimizes equipment and labor utilization and throughput, but what does it do to finished goods inventory levels? And what if the customer wants a different product? Clearly, production planners and managers must be focused on the operations, but not at the expense of the bigger picture: JIT. While running smaller batch sizes with more frequent changeovers disrupts the production process, it is critical to implementing the JIT principles to benefit the business.

The sourcing/purchasing manager gravitates toward principles that reduce the company's spend overall. This manager consolidates the spend on strategic suppliers offering products or materials at the lowest per-unit costs through volume buys. They may even negotiate landed costs, meaning they get the shipping and freight costs included in the purchase price. Is that a bad thing? Maybe, maybe not. It depends on the goals. But, for the most part, purchasing managers are focused on getting the best price, supplier performance and reliability notwithstanding.

The logistics/transportation manager is tasked with getting raw materials in and finished goods out of the production process and seeks to optimize the transportation and distribution network. This manager focuses on the lowest cost and reliability of the logistics and transportation solutions. Since reliability is a requirement, lowest cost is the focus. It's fine if the purchasing team negotiates a delivered cost package deal with a supplier because it means lower cost, and the supplier is responsible for the reliability and performance of the carriers or transporters, at least in theory.

When operations are just-in-time based

This time, the demand planners and manager still focus on the same operational performance measures mentioned above – equipment utilization, labor efficiency, throughput and uptime – but not exclusively; there are other equally important goals that support JIT operations. These include: changeover times, changeovers per shift, establishing other measures of process flexibility and finished goods inventory targets that support short-term customer demand and managing to them.

In the JIT-based operation, day-to-day activities are driven by continuously replenishing the customer-demand-driven finished goods inventory targets. These targets “pull” or drive the production plan, the use of production assets, labor and even the reordering of raw materials from suppliers or warehousing/distribution operations. In essence, JIT requires production to be tied more directly to short-term customer demand patterns.

The sourcing manager remains focused on the lowest cost, too, but in the context of the bigger picture. In the absence of JIT, the best price may result in buying materials in bulk quantities and taking delivery all at once. This may not be a problem in terms of implementing JIT principles, but it causes big potential pitfalls.

First, bulk quantities of raw materials must be handled and stored. This can tie up a great deal of capital, in addition to devouring assets and labor. Second, what happens if there is a problem with the material? The long lead time means you cannot get more for weeks or months, leaving you with a large quantity of suspect materials.

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In a JIT-based operation, purchasing focuses on the lowest total cost. This includes not only the unit cost of materials, but also transportation, storage and other related costs. When all of these are considered together, purchasing in a JIT environment requires different types of contracts and relationships with suppliers – ones that are not based solely on unit cost and supplier quality.

The logistics manager still focuses on cost and reliability, but JIT will change many things. First, the days of exclusively using bulk carriers and shipments are over – or at least numbered. Instead, logistics managers need to become familiar with shipping smaller lots or quantities of material. Because full truckloads or shiploads are seldom used in JIT, these managers need to become well versed in how to transport smaller lots sizes using less-than-truckload carriers, 3PLs to share and integrate loads, and freight forwarders and consolidators for international and cross-border shipments. These methods allow smaller lots to be moved at the same cost per unit as larger loads while reducing the costs associated with storing and handling bulk shipments.

Getting There from Here

Taking a not-so-JIT company to a JIT operation is not easy. Companies frequently have outside consultants aid in the design and implementation of JIT business models suited specifically for their industry, markets and operational capabilities.

Following are some guidelines UPS Supply Chain Solutions has used to help companies transform and coordinate business functions into more JIT-based operations.

Production Planning

Lean/Flow-based Production

A key enabler of JIT manufacturing is a production process that minimizes the amount of time it takes for product to flow through the production process from start to finish. A lean production process is one where the actual flow-through time is nearly equal to the actual value-added processing or manufacturing time. This means material spends a minimal amount of time in work-in-process inventory queues and stockrooms.

Here is a simple test. Look around the production operations. Your process could be leaner if substantial amounts of work-in-process inventory is between work centers or processing steps; in this case, the flow-through time of the operation is substantially longer than the value-added processing time. Simply by having an expert assess your production process and identify key areas where lean/flow methods could help reduce lead times, and then allowing the expert to roll up this or her sleeves and help you implement those improvements, you could be much closer to a JIT operation.

JIT Production Planning

Production planning in a lean JIT environment means doing things differently. Since there is less margin for error, the planner needs to be very familiar with the process capability in terms of changeover times, changeover patterns (the relative difficulty of switching from one specific product to another) and the true lead times of each product. Having a good handle on the actual demand patterns for products is essential.

These are just some of the key inputs to developing the production plan in a JIT environment. By using empirical methods to better understand and define acceptable parameters, a consulting expert can develop effective production plans that support a JIT environment.

Improving Process Flexibility

Inherently inflexible production processes often run large batches of one product before switching to another product. In a lean JIT environment, a cross-section of all products is made every day. Doing this effectively requires a production process that is flexible enough to change readily from one product to another.

Unfortunately, experience in achieving this level of flexibility requires a company to put as much focus, analysis and effort into changing over its processes as designing the work process being completed. Evaluating and assessing the flexibility of your production process and developing specific methods and processes for improving changeover capability can be difficult and time consuming when looking from the inside. This type of expertise usually does not exist in most companies.

Demand-based Material Pull Systems

In JIT systems – often referred to as demand-pull systems – a demand signal is the trigger for material to move or be reordered. Pull systems should be deployed throughout the plant to manage both material flow and work-in-process inventory levels. Pull systems also are used to manage the flow of raw materials into the process from outside plants and suppliers. Implementing a pull system designed for your specific application requires extensive experience in Kanban systems and other demand-based methods and technologies.

Sourcing

Strategic Sourcing to Support JIT Objectives

Selecting supplier partners in a JIT environment requires a different mindset. Suppliers that can supply lowest-cost, acceptable-quality products and materials may not be sufficient. JIT requires your supplier partners to support you in other ways as well. Arrangements such as consignment inventory and setting up pull systems between you and your supplier where materials are replenished as you use them are examples of more JIT-friendly supplier partnerships.

Selecting suppliers based on common geography so materials can be pooled to effectively leverage logistics spending is another example of strategic sourcing. Before deciding on suppliers, you'll need to define the parameters and qualifications of a JIT-capable supply base. You'll need to know how to evaluate your current suppliers and the enhancements needed for them to serve your operation in converting to a JIT environment.

Understanding the true cost of purchased materials will often change the equation used to make your sourcing decisions.

Total Cost of Material Analysis

Understanding what you spend for your raw materials is not simply the purchase price plus the transportation cost. To achieve the true landed cost of materials, you need to consider all of the cost implications of ordering, transporting, handling and storing materials as well as implications such as obsolescence, spoilage, loss, etc.

Understanding the true cost of purchased materials will often change the equation used to make your sourcing decisions. Knowing how to analyze and assess these figures can help develop a more robust total cost picture of the raw materials and products you buy.

Logistics

Bundled Versus Unbundled Transportation Services

Traditionally, buying materials in bulk quantities and buying logistics services as bundled solutions for delivering this material was the way to go. But the movement toward JIT, where smaller quantities of material need to move more frequently, changes the equation.

In transportation and logistics, scale is – and always has been – the key to cost effectiveness. So how do you get the cost benefits of scale when following JIT principles of buying in smaller lots? Increasingly, the answer is to unbundle the transportation solution using the myriad of third-party logistics providers, freight forwarders and consolidators.

Their raison d'être is to take the smaller loads of many customers and combine them to achieve economies of scale. Understanding the marketplace for unbundled transportation solutions and designing a logistics supply chain that meets both your JIT and transportation cost objectives is no easy task. Often the best solution is a combination of both bundled and unbundled solutions.

Transportation Network Optimization

Before buying the logistics solution and services to support a JIT environment, a thorough, fact-based assessment of your transportation network should be completed. This is especially true for companies with a base of owned or leased assets for transportation, warehousing, etc.

Performing such an assessment is a complex, data-intensive affair and requires substantial expertise and mathematical modeling skills to complete. The good news is there are a number of software tools that enable this complex analysis to be completed quickly and relative inexpensively – without buying any software. Such assessments and models allow you to determine the optimal locations for warehouses and DCs, what the optimal stocking strategies are for each and what combination of transportation routings and modes are optimal to achieve your cost and service-level objects.

The key, however, is to develop the models and perform the analysis that enables you to optimize the logistics, transportation and manufacturing networks.

Conclusion

Evolving from a non-JIT to a JIT production process requires tremendous commitments from many different company departments, as well as a number of employees.

Change can be uncomfortable. However, measurable improvements in production, productivity, cost savings and even customer satisfaction are well worth the short-term discomfort.

Change can be uncomfortable. However, the long-term gain of the collaboration and the demonstrable and measurable improvements in production, productivity, cost savings and even customer satisfaction are well worth the short-term discomfort.

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