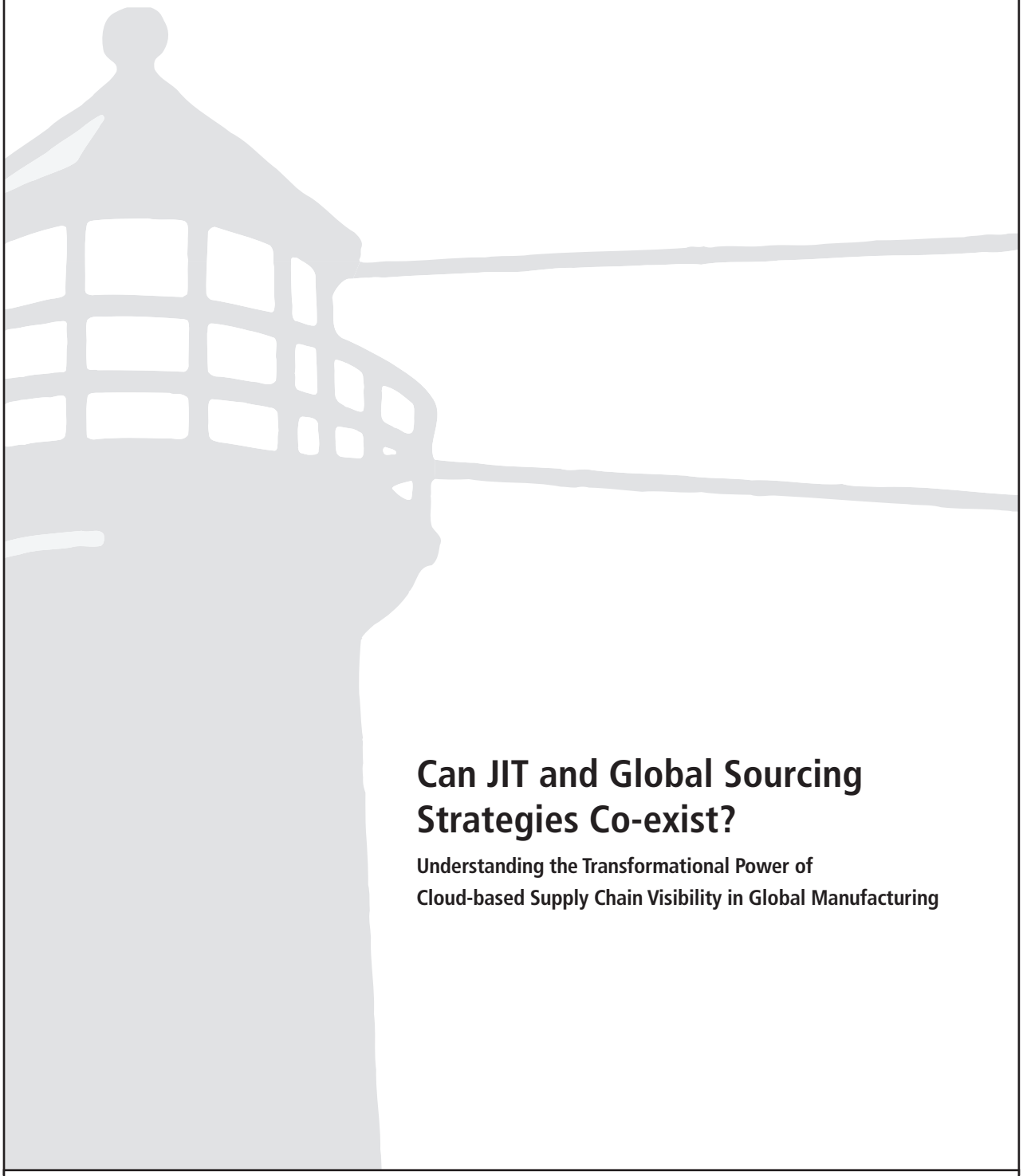


Can JIT and Global Sourcing Strategies Co-exist?

Understanding the Transformational Power of Cloud-based Supply Chain Visibility in Global Manufacturing

GT NEXUS™

A GT Nexus White Paper

Executive Summary

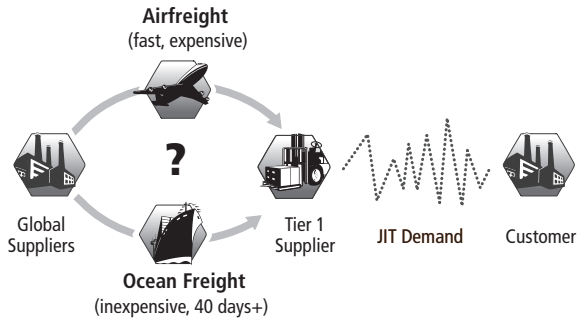
There is an ugly, high-speed collision happening between the lean production, just-in-time (JIT) inventory strategies companies have been working hard to perfect over the last twenty years and the overpowering imperatives of globalization.

On one hand, maximizing efficiency requires minimizing inventory costs — by shortening supply lines, reducing order quantities, depending upon pull-based replenishment, and developing close customer-supplier relationships capable of responding quickly to demand changes. On the other hand, the overwhelming labor and material cost advantages of overseas sourcing come at the price of slow bulk shipments, push-based orders, and an inflexible, committed in-transit inventory pipeline. How can companies reconcile these critical, but apparently mutually exclusive, initiatives?

The environment in which JIT evolved has been fundamentally altered by increasing globalization. Many manufacturing companies — automotive suppliers, for example — have increasingly turned to global sourcing of materials and components in order to cut costs. However, extending the supply chain from across the country to across the world introduces an order of magnitude increase in complexity and risk.

This increased complexity frequently leads to two unfortunate outcomes: First, expected cost savings can be eroded —or even reversed — by increased supply chain costs hidden in a longer, more complicated value chain. Second, the increase in transportation time can make responding efficiently to volatile demand signals almost impossible. With the cost of failure very high (from fines for shutting down a production line to outright loss of a customer), companies default to "just-in-case" airfreight whenever there is the potential of a stock-out.

FIGURE 1: The tradeoff: How best to balance fast, but expensive, airfreight with cheaper, but slow, ocean freight in the face of volatile demand?



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How can companies obtain the cost savings promised by global sourcing without losing the efficiencies gained by JIT inventory strategies or having to rely upon expensive airfreight to meet customer service levels? The key lies in having full visibility into each link of the supply chain. Full and accurate in-transit visibility — into partners' systems, as well as the enterprise's own systems — shows costs in real time, as they build, and not in the rearview mirror of after-the-fact financial reports.

Full visibility also extends the JIT supply line in both space and time. Because an effective in-transit visibility solution enlarges the definition of inventory on hand to include inventory near-at-hand, an inventory warehouse expands to include cargo containers that will be delivered in time to meet customers' needs. The solution to minimizing the transportation costs of global sourcing while maintaining required customer service levels is to pack as much product as possible onto canon ships in order to buy down the average transportation cost and putting the minimum amount needed to maintain service levels on airplanes. Therefore, a company with greater visibility will have much less need for just-in-case airfreight to maintain JIT performance. This high visibility also provides the option to redirect shipments on the fly from where they are to where they are needed, expanding the range of possible lower-cost solutions to potential stock-out situations.

Systems that provide these capabilities are available today. Fortune 100 companies are already using web-based cloud platforms, built on an interconnected network of suppliers, shippers, 3PLs, trade banks, and others, with applications capable of maximizing the value of the information these partners provide. This information can be used to precisely assess the true landed costs of globally sourced products while allowing for increased responsiveness to volatile demand signals.

With solid in-transit visibility information — and the technology infrastructure needed to provide and make use of it — JIT strategies can adapt to survive in the new environment of a globally sourced world.

> "Our OEM customers demand just-in-time service. Shipping airfreight for all our products from Asia is not an option. The trick is to ship most of our material by ocean freight to minimize our overall transportation cost, while shipping only the products that require a shorter lead time by air. To accommodate our changing customer requirements and control cost, part-level visibility across over a dozen global transportation providers is essential."
>
> Dawn Boike
> Senior Manager, Logistics Operations
> Yazaki North America, Inc.

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Adding Complexity and Risk When Failure is Not an Option

Global sourcing has become an essential tool manufacturers use to reduce the cost of producing and delivering their products. Yet, extending supply lines overseas brings complex new commercial and operational challenges. These challenges are particularly acute in an age of JIT production and lean manufacturing, creating the need to fine-tune inventory strategies to deal with the realities and potential pitfalls of extended global supply chains. By addressing the challenges of a more complex transport system, longer supply chains, and intricate regulatory and cultural environments, companies can reduce hidden costs become more responsive.

Companies sourcing across continents will have much more complex transport systems, in which the length of physical distance from supplier to distribution point creates more potential for disruptions due to unexpected changes in demand. A longer supply chain can become less responsive as it grows, putting a massive dent in the quality of customer service an enterprise can provide.

FIGURE 2: Going global cuts first costs, but adds many complications and sources of risk.

Variables	Domestic Supply Chain	Global Supply Chain
Cycle Time	Days	Weeks
3rd Party Touchpoints	1-2	5-10
Time Zones	1-3	8+
Transport Modes	1	3-5
Transport Costs	Low	High
Languages & Currencies	1	Multiple
Document Requirements	Low	Significant

"With so many organizations relying on contract manufacturing or low-cost country sourcing, a lot more detailed data about as-built quality and product genealogy, as is available capacity and capability needs to be crossing enterprise boundaries. This need for "supply sensing" adds to the data transparency requirements, but challenges such as disparate systems, time zones, languages, cultures, and priorities add to the complexity."

Jane Barrett & Stephen Hochman, AMR Research
Industrial Manufacturers—How To Improve Supply Chain Agility

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The stakes are particularly high for companies like top-tier automotive suppliers: The catastrophic cost of a supplier-induced assembly-line shutdown dictates extensive use of expensive "just-in-case" airfreight in any case of doubt about the sufficiency of inventory levels to support JIT levels of service.

Of course, the last thing a supplier wants is to become an air transport company. But in the absence of accurate, complete information about the extent of the intercompany supply chain, enterprises can be rocked back on their heels by the collision of volatile demand signals with a supply-side informational black hole. In this case, the chartered 747 becomes the supply chain insurance policy of last resort.

The inflexibility caused by increased transportation times can be exacerbated by differences in language and time zone, as well as additional documentary and regulatory requirements. The amount of data needed to smoothly manage the supply chain balloons, while the visibility levels stay the same.

These challenges present some daunting questions:

- How can the hidden costs of global sourcing be minimized (or at least correctly estimated)?
- How can the risks to service levels created by the collision of volatile demand with long lead-time ocean shipping be reduced?
- How can delays in the supply chain be detected early enough to take corrective action and avoid disastrous cost or customer dissatisfaction consequences?

In short, how can just-in-time, lean production methods work in a world where suppliers are 40 days and thousands of miles away, rather than across the road or even across the country?

...how can just-in-time, lean production methods work in a world where your suppliers are 40 days and thousands of miles away?

The answer, in each case, is to have the right information at the right time at each link in the supply chain. In a global sourcing environment, this means having information from each of a company's partners — and having that information synchronized so that each data element has the same meaning for every participant in the supply chain. High quality data, collected from the full range of trade and logistics partners and synchronized to ensure semantic parity across the board, plays a particularly crucial role in enabling a JIT capable global supply chain.

Creating this partner network is much more complex than the already difficult task of synchronizing information within the four walls of the enterprise. However, such inter-enterprise networks are already in operation today and the benevolent economics of network-based systems mean that costs to individual participants decrease as the network grows. These systems provide the infrastructure and data needed avoid the hidden costs of global commerce and reap the financial benefits of lean inventory strategies.

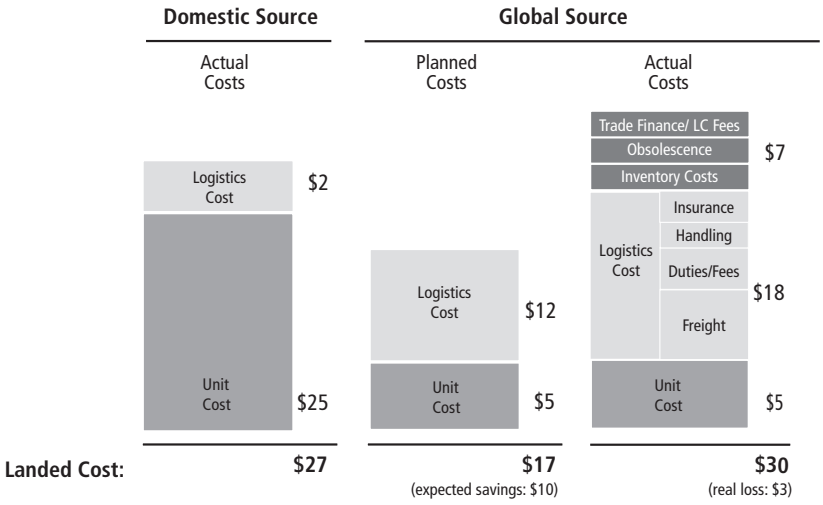
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The Hidden Costs of Global Sourcing

Global sourcing can offer both tremendous opportunities and invitations to disaster. Careful management is vital to obtaining projected cost savings and avoiding being sideswiped by the many costs that the more complex global supply chain can conceal. Ignorance of true costs — or a failure to incorporate all of the costs required to source products globally — can lead to a serious erosion of the expected benefits of global sourcing or even, in extreme cases, outright losses.

Unexpected (or poorly characterized) costs can include handling, insurance, customs duties, inventory cost of capital, and trade finance fees. In addition, unexpected modal changes and sub-optimal freight allocation can significantly increase base transportation costs. The role these costs can play in turning planned savings into delivered losses is demonstrated graphically here:

FIGURE 3: Expected savings from global sourcing can be eroded — or even reversed — by hidden costs that don't become known until inventory is in motion.



The swing from planned savings to delivered losses is a function of lack of visibility into the extended global supply chain and all of the ancillary processes and costs needed to support it. Therefore, avoiding surprise losses is primarily a matter of having complete and accurate information about each link in the supply chain —which costs are present and what each of them entails. The truth may be out there, but it can be very hard to collect all of the data needed to paint the larger supply chain picture.

How do organizations avoid being sideswiped by unexpected or poorly-estimated costs? How can JIT service levels live side-by-side with a supply chain that extends across the world, rather than across the street?

Again, information — from every participant in the extended supply chain — is the key.

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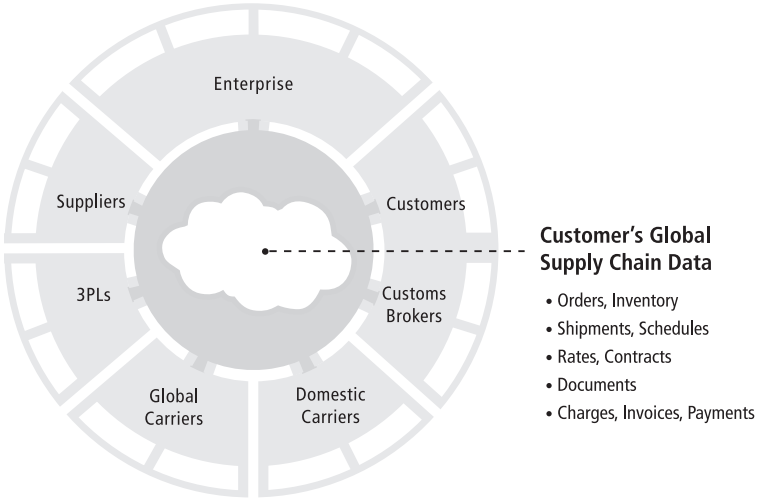
Managing the Unexpected

Fortunately, the same kind of cloud-based, cross-enterprise information system needed to expose the costs hidden in the global supply chain can be used to control those costs — and also to mitigate the risks created by the longer lead-times inherent in global sourcing.

Having accurate, timely data from each link in the chain allows companies to correctly monitor costs as they build up, both ensuring better management and control of the sourcing process and providing superior data for subsequent forecasts. A network-based, cross-enterprise system that links a company with all of its suppliers and service providers and harmonizes data so that it can be exchanged easily, with full semantic content intact, allows real — and real-time — visibility into the extended supply chain. This visibility prevents after the-fact cost surprises and provides sufficient warning to take corrective action on inventory cost level issues before it is too late[1].

The ideal configuration of such a system is through cloud-based collaboration. Companies just joining will find that many of their partners are already integrated into the system, allowing the costs of setting up additional connections — as is the investment in the existing connections — are spread over the entire network, greatly improving the economics of the system. The network approach also allows semantic harmonization of the data feeds from all of the participants in the network. The ability to access information over an online network dramatically accelerates time-to-benefit and allows for lower financial and technical risk than do traditional purchase-and-install software or in-house development. The emerging technology model blends a pre-wired network with data management services and software — then delivers the whole thing as a dynamic cloud supply chain platform.

FIGURE 4: It takes a network: Effective management of a global supply chain requires information from many parties — and that information must be mutually comprehensible.



1 For a more thorough discussion of this point in a retail setting, please see the GT Nexus White Paper entitled, "Global Sourcing: Elusive Profits, Expensive Mistakes."

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Once the cloud supply chain platform makes data from all relevant parties available in a quality-controlled, semantically-standardized form, the web-based network can be used to host the applications needed to manage the global supply chain. Platform capabilities will ideally include:

- Supply chain visibility — to link inventory, documents, shipments, costs, and orders
- Dynamic ETAs — to project delivery dates based on most recent supply chain events
- Exception Management — to detect and manage supply chain delay
- Landed Cost Monitoring — to determine total supply chain cost per unit of sourced product

With these capabilities in hand, companies have insight into the true landed costs of globally-sourced products. They can also obtain the visibility into the supply chain needed to minimize transportation costs while still maintaining responsiveness.

Companies not only have insight into the true landed costs...but they also can...minimize transportation costs while still maintaining responsiveness.

For example, suppose an unexpected OEM demand increase puts pressure on a supplier to provide more material than previously planned for. Without visibility into in-transit inventory, the material would be flown in, in order to maintain necessary service levels. With in-transit visibility, the supplier can find previously "invisible" material that is already inland, whether at the port of entry about to be loaded on rail, at the destination rail yard, or even already at the supplier's own yard, awaiting unloading. In any of these cases, the material can be re-routed at little to no additional cost to the supplier, avoiding the expense of airfreight while still meeting customer needs. Material that is still on the water can be re-directed or flagged for expediting, thus maintaining service levels at a far lower cost than that of airfreighting an emergency shipment.

Improved visibility effectively increases the timeliness of slow, but cheap, ocean transport; dynamic ETA capabilities (and the ability to redirect cargoes on the fly) allow on-the-water shipments to be factored into inventory level calculations, so suppliers can avoid unneeded panic over potential shortages.

The total cost of freight may be considered as the sum of fully laden landed costs (as described above) and the costs associated with any degradation of service levels caused by the extended supply chain. A simplified model of the total cost, depicted graphically below, trades responsive (but expensive) airfreight for slow and inflexible (but cheaper) ocean freight. This tradeoff is shown both with and without the benefit of visibility technology that captures and analyzes data from all of the supply chain partners.

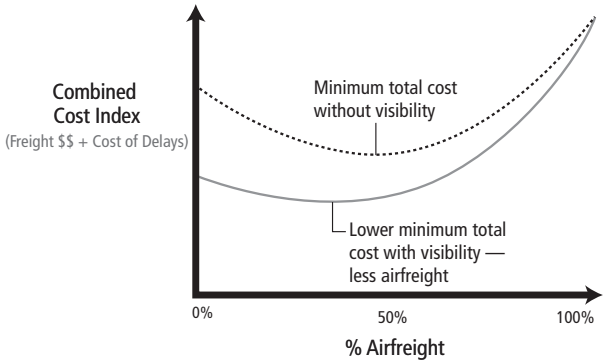


FIGURE 5: Visibility technology lowers total costs and reduces the need for airfreight by effectively making in-transit inventory more accessible.

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Increased visibility allows companies to achieve both a lower total cost and a lower airfreight percentage — it helps minimize the cost of delays that was inherent in ocean shipping in the blind, pre-visibility era, while still maintaining high service levels. In essence, visibility makes in-transit inventory "accessible" days before it would have been and providing the ability to make on-the-fly changes in routing should the need arise. Companies can reduce the need for expensive airfreight by increasing the certainty of the ocean shipment leg of the supply chain. Increased visibility absorbs some of the risk created by demand volatility.

Visibility makes in-transit inventory "accessible" and provides the ability to make on-the-fly changes in routing should the need arise.

You Can See Clearly Now — The Pain is Gone

Global sourcing has been widely adopted because it holds the promise of dramatically lower costs. However, inadequate visibility across the entire supply chain can conceal the real risks an increasingly complex global trade environment can produce. Because this dilemma directly undermines the usefulness of JIT and lean inventory strategies, a company must address these challenges before it can gain a competitive advantage through cost reduction.

Fortunately, new cloud supply chain platforms provide the intelligence and control needed to make JIT work in a global sourcing world. In particular, a sophisticated visibility tool, supplied with high-quality data from all of the participants in the extended supply network, can solve many of the problems caused by the collision of JIT demand fluctuations with the longer lead-times inherent in global sourcing.

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