SUPPLY CHAIN VISIBILITY IS DEAD

Continuously predicting behavior is driving far more value
Getting a tight grasp on supply chain activities has long been a priority for most enterprises. For supply chain professionals, visibility solutions are seen as the path to achieving this goal.

It stands to reason that if an enterprise can gain better visibility over supply chain events, it can react to them quickly and run operations more efficiently. In essence, more visibility is better than infrequent updates with too much latency.

For these reasons, real-time visibility has been the dream for many supply chain practitioners. That dream, however, is proving to be the shadow of a far more concrete value driver—understanding current and future behavior through predictive analytics.

While real-time visibility can alleviate some human-caused inefficiencies, it doesn’t by itself enable organizations to reduce supply chain variability, increase revenues or decrease inventories while maintaining or increasing service levels.

These major gains are driven by predictive analytics that deliver an ongoing understanding of critical supply chain behaviors, according to executives with TransVoyant, a leading digital supply chain solution provider. Real-time global, multi-mode visibility via Internet of Things (IoT) technology is part of its platform, but visibility is just one element of a platform that delivers predictive insights and prescriptive recommendations, explains Scott Byrnes, vice president of marketing at TransVoyant.

“Traditional supply chain visibility is dead,” says Byrnes. “Solutions that rely on EDI-based peer-to-peer, or even hub-and-spoke connectivity to trading partners aren’t sufficient to power today’s real-time digital supply chains. The status updates they provide are latent and often inaccurate.”
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According to Byrnes, even real-time visibility via IoT devices isn’t enough. “Visibility is just one data input ingested by today’s digital supply chain solutions to understand global supply chain behavior, produce predictive insights and continually provide prescriptive recommendations,” he says. “These are the things that lead to revenue gains, inventory reductions and service level improvements.”

This white paper explains why supply chain visibility has limited impact, and more importantly, explains how organizations can put in place a next-generation platform for digital supply chain transformation. Such platforms tap a pool of real-time Big Data from sensors, radar, satellites, smartphones and other devices that make up the IoT.

Traditional messages are folded into the platform, but the key is that the platform has predictive analytics to comb all available living data—including external factors like weather, traffic, cargo airport/port congestion, consumer sentiment and pricing data—to gain a precise understanding of supply chain behaviors. What’s more, it’s a platform that’s here today, and is delivering major cost savings and revenue gains related to dynamic supply and demand matching.

The Need
Digital supply chain pressures driven by rapidly changing customer demand behavior have compressed cycle times and caused supply chains to carry a growing amount of inventory to meet demand. And despite investment by enterprises in supply chain visibility and global trade management (GTM) solutions, inventories have risen significantly in the years coming out of the Great Recession of 2008/2009.

In fact, according to the annual “State of Logistics Report” from the Council of Supply Chain Management Professionals (CSCMP) and authored by A.T. Kearney, the value of total business inventory reached $2.49 billion in 2016, up from $2.47 billion in 2015. Inventory levels have grown steadily since the Great Recession, and now far exceed the $2.04 billion seen in 2007.

Why the growth in inventory? Complexity and variability are the short answers, though many factors are involved. The customer plunge into e-commerce drives the need for a broader assortment of inventory that can be had through multiple sales and delivery channels, leading to the concept of a “long tail” of slower moving inventories that need to be available.

Traditional retail channels, not wanting to lose ground to e-commerce, fear stock outs, so they stock more goods. Underlying it all, many businesses still lack real-time visibility over the movement of goods, and lack a true understanding of supply and demand dynamics. As a result, there is a great deal of human behavior-induced buffering in supply chains, and plans are typically based on dated historical averages, static lead times and little understanding of variability.
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TRADITIONAL SUPPLY CHAIN VISIBILITY

In the face of these complexities, the desire for improved supply chain visibility is understandable. In recent years, GTM solutions have improved visibility by taking a “hub and spoke” approach to updates in which all pertinent trading partner messages are brought together under one foundation. Updates from logistics partners, port arrivals, and traditional EDI can be managed centrally.

While this is an improvement over earlier point-to-point messaging, the problem with these visibility solutions is that traditional EDI messages still typically lag the actual events by hours or days and are often inaccurate. The update on the status of an air shipment might have 24-hours of latency, and an update on an ocean freight shipment might be days latent and inaccurate by the time it gets to the visibility solution.

IoT feeds from global positioning and vehicle tracking can help make visibility solutions more real time, but even this carries limited benefits. The primary benefit of improved real-time visibility, explains Dennis Groseclose, president and CEO of TransVoyant, is that it reduces human induced buffer ordering resulting from uncertainty. Thus, better visibility on a shipment of 10 pallets of goods helps avoid situations where someone orders, and perhaps expedites, an extra 10 pallets just to be sure their inventory requirements are covered.

“Having real-time visibility allows you to at least see what’s coming at you, so you don’t feel the need to put up and expedite that extra, perhaps unnecessary, order,” explains Groseclose.

“Improved visibility removes much of the human-caused variability and buffering from a supply chain, but it doesn’t provide insight into the larger global behaviors and precise dynamics of the supply chain.”
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DIGITAL SUPPLY CHAIN VISIBILITY

The critical behaviors in a supply chain include lead time, variability (i.e., demand/supply variability) and capacity in the production/logistics chain. These behaviors must be continuously learned and understood at every global node, lane, route, etc. These behaviors are influenced by a host of factors, such as fluctuating consumer demand triggered by price shifts, or the impact of weather, port congestion, traffic jams, or even the wave heights on ocean freighter lanes.

Traditional visibility doesn’t consider these external factors, and visibility control towers on their own lack the predictive analytics to make sense of external Big Data feeds and the resulting demand and supply behaviors.

“The next step in supply chain improvement is having a platform that analyzes and predicts key supply chain behaviors in real time,” explains Groseclose. “The massive value opportunity lies in understanding global interdependent supply chain behaviors, and making predictions based on that understanding.”

The Big Win Issues
For many supply chains, the biggest cost driver is the amount of capital tied up in static and moving inventory. The trick, of course, is being able to predict and dynamically adjust supply to meet shifting customer demand and global supply chain behaviors. Typically, being lean on inventory increases the risk of stock outs, lost sales, or poor service levels.

But if a living machine learning-based platform can intelligently plan and match dynamic supply to dynamic demand, factoring learned behavior models, predicted external events, variable lead times and throughput, it can continuously right-size inventory levels while avoiding potential service issues. In essence, it’s an intelligent machine, armed with much more detailed and real-time information than traditional supply chain solutions, making faster, smarter decisions.
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THE BIG WINS FROM ANALYTICS

DIGITAL SUPPLY CHAIN VISIBILITY
- Real-time data
- All modes and nodes
- All seeing, end-to-end
- Internal and external data

ADVANCED ANALYTICS
- Learned behavior models
- Machine learning algorithms
- Artificial intelligence
- Cognitive computing

PREDICTIVE INSIGHTS
- Future lead times and variability
- Global precise times of arrival
- Probable strike at supplier
- Carrier will make unscheduled stops
- Port will be congested
- Competitor running promotion
- Promise date to customer will miss due to delay in manufacturing

PRESCRIPTIVE ACTIONS
- Dynamic node inventory optimization
- Commit inventory in-transit
- Source from alternative supplier
- Select alternate carrier or mode
- Select disruption free lane
- Take price action
- Divert inventory in-transit to meet customer order and backfill original shipment with upstream supply

Considering the evidence, it’s an approach that’s working. Based on interviews with executives at more than 250 global companies, McKinsey & Company assessed 10 supply chain capabilities, plotting them on a scale of one to five for agility scores. The research, detailed in the article “How Agile is Your Supply Chain” found that companies with the more agile supply chain practices had service levels 7% points higher and inventory levels that were 23 days lower than their less agile peers. Similarly, research on “Next Generation Supply Chains” by PwC found that those companies rated as supply chain leaders averaged 15.3 inventory turns per year, while laggards achieved only 3.8 turns.

Events on the supply side can also impact the demand for products. A weather event like a hurricane or blizzard can drive up the price for certain goods. If supplies of bottled water or plywood run short because of a bad hurricane season, that will impact both supply and demand patterns across the country. Supply managers who have predictive analytics to precisely estimate such impacts are in a better position to adapt, whether that be to alter prices, position extra inventory in the affected regions, seek alternate suppliers, or promote similar products that appeal to the same consumer need.

So, what makes supply chains more agile? The leadership at TransVoyant asserts that the answer lies in continuously understanding supply chain “behavior,” rather than merely being responsive to exceptions.

Consumer demand, for example, is a constantly shifting dynamic. Certain products may rapidly gain popularity that exceeds the expectations of marketing plans or sales history for similar products. However, analysis of Big Data on consumer sentiment for a product, or news search and social media patterns for a product, can reveal an unfolding trend that a traditional forecasting solution can’t spot.

On the supply side, traditional visibility falls short because it’s a latent snapshot in time of the progress of a shipment. If, on average, it takes a container ship 20 days to go from China to the Port of Los Angeles, that might be a useful baseline for a legacy planning system solving static problems, but it’s less precise than a dynamic and predictive supply chain that must factor port behavior, sequencing, weather, wave heights, port congestion, unscheduled port stops, customs clearance times and other factors into predicted times of arrival.
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While traditional supply chain solutions factor a static average transit time for every single journey on a specific lane (e.g., 20 days), a digital supply chain solution might factor an 18-day journey for the same lane for vessels departing today, a 22-day lead time for those departing next week, and a 25-day lead time for vessels departing the week after, based on its understanding of the dynamic behavior of carriers (e.g., predicting that a carrier will make unscheduled port stops to capitalize on a spike in spot rates) and the events surrounding the shipment (e.g., predicted port congestion).

This level of precision and accuracy enables shippers to better schedule drayage pick up and better plan their downstream operations. More importantly, this level of precision allows for more frequent and more accurate resizing of static and moving inventory across all nodes of a complex global supply chain.

Predictive analytics platforms based on real-time Big Data and machine learning algorithms capitalize on new revenue opportunities because they assess this full range of factors influencing the critical behaviors of variability, lead times and capacity.

In summary, realizing transformational supply chain improvements today hinge on being able to assess and predict behaviors. “The transformation comes from understanding and predicting key behaviors—variability, lead time, and capacity, for every node, every lane, every assembly operation or warehouse in your value chain,” explains Groseclose. “With the right platform, organizations can understand those behaviors in real time and dynamically adjust parameters that drive significant benefits—more effective inventory management on the cost side, and better demand management and order promising on the revenue side.”

Applying the Analytics
The keys to predictive supply chain analytics lie in both the pool of Big Data available and in the algorithms that predict the key behaviors. With the TransVoyant solution, the pool of data is massive. The solution collects over a trillion global events per day, from weather and traffic data, sensor and satellite data, as well as real-time data about all carrier modes, border crossings, port stops and air cargo flights.

The company then applies machine learning algorithms and artificial intelligence to this living pool of data, leading to recommendations that it feeds to enterprise resource planning (ERP) systems, advanced planning & scheduling solutions, forecasting systems, or systems for transportation management for execution.
“We have a platform that understands the behavior of the globe—weather, traffic, shipments, suppliers, consumers, carriers and ports,” explains Byrnes. “And while the business applications for our platform are nearly endless, we’re focused on helping companies to match dynamic supply to dynamic demand in the most profitable way.”

For instance, the TransVoyant solution can predict that demand for a category of products in a certain region will run much higher than expected based on trending consumer sentiment. The platform then comes up with a precise prediction on how much inventory is needed and assesses how to fulfill that added demand via goods in warehouses, goods in transit, or by looking at what manufacturing partners can deliver on time to the region.

“By sensing and being able to predict a demand trend in a certain area of the globe, organizations can position inventory in a way that meets the demand instead of losing the opportunity because they were unable to see it—or unable to respond fast enough,” says Byrnes.

“Predictive analytics and behavior understanding is the next frontier in supply chain management,” says Groseclose. He asserts that the first generation relied heavily on EDI to update individual enterprise systems on an infrequent basis, with significant latency to the actual events. The second generation incorporated hub-and-spoke style latent visibility systems that did a better job of bringing together updates from partners in a value chain.

These traditional “visibility” systems have helped to take some of guesswork out of shipment monitoring, and have eliminated some of the human-caused buffering tied to lack of visibility. The new generation is predictive supply chain analytics that continuously works on top of a living pool of real time Big Data.

These machine-learning and AI-based platforms are driving significant inventory reductions and service level improvements. While the first generation may have its place for relaying messages between systems, it is essentially dead as a means of supply chain advantage.

As Groseclose sums up: “Think of it as a journey for your supply chain capabilities, from having only latent updates; to newer visibility systems that drive out human-caused buffering; to the competitive weapon of a living platform for predicting global behaviors. Continuously understanding and predicting behavior enables you to reduce inventory, cut costs and improve service levels by matching dynamic supply to dynamic demand in an optimal way. That’s where the biggest improvement opportunities exist today and into the future.”

TransVoyant is at the forefront of the supply chain predictive analytics space. From global sensors, satellites, radar, smartphones, video cameras, social media and other IoT devices, we collect over one trillion events each day, giving us one of the largest repositories of real-time big data in the world. Since 2012 we have been analyzing these massive big data streams with our proprietary machine learning algorithms, and establishing learned behaviour models for carriers, lanes, ports, roads, suppliers and other nodes in the global supply chain. These behaviour models, coupled with our continuous analysis of real-time and predicted global events, enables us to predict lead times, variability, disruptions and opportunities, and to initiate prescriptive actions that increase revenues and reduce costs. For more information, visit www.transvoyant.com.