



# Digitizing Your Supply Chain Through IoT Sensors

Supply chain managers worldwide are entering the information age – sometimes reluctantly, perhaps – but inevitably all the same.

If you had to pick one single industry most likely to benefit from the revolution created by the connectivity of the internet, empowered by the massively increased capacity of computers to digest data, it would have to be supply chain management. The cross-border nature of international trade, along with the sheer volume of events that need to be recorded in the life of cargo as it crisscrosses time zones and administrative borders leads to the kind of complexities no human brain can handle. Enter the internet. The last two decades have brought a host of super-smart supply chain technology companies eager to harness the power of data-hungry computers and fiendishly clever algorithms.

But the tendency has been to focus on the bits and bytes of information, and the software that directs them where they can be most useful. Less consideration, typically, is given to the hardware that does the heavy-lifting work of capturing that data in the first place. The recent buzz over the

“Internet of Things” (IoT) has drawn attention to a new breed of sophisticated, affordable gizmos that gather crucial data. But the plain fact is, that sort of hardware has been available in various forms for a long time. Although IoT has created a buzz in the industry, what it actually does is not new —connecting the physical with the digital. Supply chain managers who wish to make the most of the range of technologies available to improve supply chain visibility and manageability need to be aware of the different current options, and what works best for them.

Everyone’s digitizing their supply chain, for sure, and it’s happening at a very quick pace. Companies are hungry for data to feed into their increasingly sophisticated analytic systems, and they also, of course, want to fill information holes in the supply chain. Although useful data can come from stationary assets, mostly that information is gathered as things are moving around. In the global supply chain, as you are no doubt aware, there is

greatly increased visibility these days, but there are still a lot of gaps.

Meanwhile, the expectations of supply chain managers and business decision makers have changed, and rightly so. They are asking: if I can track my \$30 shipment of pet food from Amazon, why can’t I get anything approaching that level of information about a \$300,000 load of auto parts? The reason you can’t easily find out the status of that shipment is that information about it is being gathered and passed off between multiple carriers and other agencies, and it’s all done from their perspective, not yours. That’s the compelling problem that continues to exist in the logistics world — ocean carriers need to know where their ships are; container lessors need to know where their containers are; they don’t necessarily need to know where your pallet of sneakers is. The buzz about IoT is a sure sign that this issue is coming to a head because people are ravenous for the data that truly affects their business. The market is hungry to solve these problems right now.



Until relatively recently, there was a fairly simple choice to make. You could make do with the tracking information provided by transportation service providers — whether ocean carriers, 3PLs or trucking/rail companies — which offer a fairly low level of detail. You would typically be tracking at the container level, and data would only be available as certain events or milestones were passed, such as loading on a vessel, arrival at a port, leaving the dock and so on. If there was an unusually long period of time between any two of those events, there was no real way to tell where your cargo was or what had happened to it. Still, compared to the near-black-hole lack of visibility of 20 years ago, this was an improvement.

### **Real-time devices**

If that wasn't good enough; for example, if you had high-value, temperature-sensitive or hazardous cargo, or other products that had security or legislative compliance issues, then you had the option of expensive, dedicated sensors that would attach to

specific shipments (rather than simply a container- or truck-load). These would either passively or actively generate data about the position and condition of that shipment in real time. This is where Sensitech got its start in 1990 and continues to serve the industry today: providing conventional, wireless and GPS-based sensors for tracking cold-chain shipments that would be compromised if they went beyond a set temperature range for any amount of time, or for security-sensitive shipments. In the latter case, real-time devices keep cargo owners in touch with drivers, shippers, receivers on the dock, and anyone else responsible for handling the cargo. The devices can even help the driver be aware of high-risk locations or circumstances to watch for as loads are moving from place to place, including regular input from local law enforcement that together deliver high levels of intelligence in terms of cargo theft around the world.

These used to be what most people would consider “niche use” cas-

es, and until recently it didn't make sense to apply sensor technology outside of those uses, except perhaps when dealing with high-value items such as cellphones. What's changed in the last five years is that people are using sensors outside of specialty cases. Shippers are adopting this solution not just because it's become more affordable, but because they now realize the full value of genuine, real-time visibility at a granular level. On the flip side, they understand the cost of failing to keep up with the demand for that visibility in an increasingly competitive landscape. Customers demand more robust and timely information about their shipments, plain and simple. That means tracking the cargo and not the conveyance. As a result, today, the real-time technology used in security and cold-chain scenarios is coming over to regular shipments where shippers want to know more about their stuff.

Fortunately, a huge change has taken place in the economic equation regarding the use of sensors. Not only



are they cheaper, they are now as easily used as shipping labels. There's no longer the need for an elaborate miniature supply chain designed around getting expensive sensors back to where they belong. Although you can re-use them multiple times, for many shippers, the price point makes sensors practically disposable.

This is a game-changer. Here's an illustrative example that happens on a weekly basis. A container full of electronics leaves a contract manufacturer in China and goes to Shanghai to be loaded onto a container ship. How long does it sit in the port? You'd think that would be an easy thing to answer. But the traditional information flow leaves plenty of room for gaps. Sure, the folks in Long Beach and Chicago — the next two destinations for the shipment — are expecting it on a particular day according to the usual transit times.

But the information about whether the load is on a boat or not comes from the ocean carrier to the 3PL to the shipper, and doesn't have a high level of accuracy. There could be port congestion, delays at Customs; any number of holdups. With a sensor dedicated to the cargo, you know for sure when it leaves the port and that it should show up in Long Beach in 14 days. But here it is, still active in Shanghai three days later. Now, you can raise an alert, and it's still only three days behind schedule, instead of the usual 25 days you'd typically wait to identify that it hadn't shown up in Chicago, way outside the retailer's lead-time. That way, you avoid the panic that comes when a container full of electronics that was supposed to arrive in time for Black Friday is still sitting on the dock in Shanghai.

This is the sort of story that is repeated every day across multiple commodities.

Since many consumer and B2B products continue to be manufactured in Asia, the overseas aspect really makes it hypercritical that timely information be communicated where and when it's needed. This is a huge contrast to a more controlled supply chain — say a US-based food distributor that has their own fleet of trucks or uses a small number of dedicated carriers. That company sends their product out on 1,000 trucks that have tracking systems on them. The shipments take less than a day, so there is less lead-time risk. Additionally, continuous operational adjustments are possible without significant impact to the on-time delivery. The example of electronics coming from China is an opposite extreme that involves a road carrier in China, a trans-Pacific ocean carrier, a rail company, and a trucking company responsible for bringing the shipment to the final distribution center, then another road carrier to take it



to the store or customer distribution center. There's a real challenge in piecing together an accurate view of what's happening to that shipment within the supply chain.

### **Data needed**

Software companies and platform providers would have you believe they solve these problems, but they can't do it alone. The software or the platform is useless if you don't have the data you need. You're left with getting on the phone and calling dispatch and trying to figure out who had the shipment last, and that can take days, even before you find out the container is stuck somewhere. Sensor technology means you can answer those questions, practically before you've had to ask them.

It's a mistake to think this technology cannot provide a critical competitive advantage in domestic road transport

scenarios as well. Take the case of a company delivering computer servers to a customer data center. Typically these are high-value, business-critical items that have been customized with special firmware and software. At the data center, the customer will have arranged for multiple IT experts to be on site, each charging hundreds of dollars per hour. Add to that these things are heavy and often require specialized installation equipment, plus the installation crew is often being put up in a hotel overnight nearby. If you miss the agreed delivery window, there are huge implications. You'd think it would be really easy for truck drivers to call ahead and say they're going to be late. But that's almost never how it works. There's little incentive for a driver to proactively alert you or give you an accurate ETA. Truck drivers are in short supply and they know it! You simply can't afford to get bad in-

formation about such a critical delivery. If a truckload of shampoo doesn't make it in time for a delivery window at Walmart, someone's annoyed and someone's getting fined, but you're most likely not going to lose a customer. Alternatively, if you're late to a data center installation a couple of times, you're going to lose that business.

With all of the activity around Industry 4.0 and machine learning, coupled with the demand for improved supply chain visibility, it's clear that supply chain leaders face increasing pressure to digitize their global supply chains. In order to achieve those goals, a company must have sophisticated supply chain management software tightly integrated with real-time IoT sensors that translate physical supply chain events into the digital world and empower those systems to do their job.