How IoT can help enable a demand-driven supply chain

Miscalculating supply and demand metrics can be bad for business—it can lead to missed sales and future opportunities, a decrease in customer satisfaction, an overstock in inventory and, ultimately, decreased revenue. In times of economic uncertainty and fluctuations in demand, forecasting future sales and fulfilling them through increasing complex supply chains is more challenging than ever. Many firms are finding that using a supply chain model based on customer demand can help improve product availability and reduce overstock.

What is a demand-driven supply chain?

A demand-driven supply chain turns demand focus back toward the customer by responding in near real-time to their demand signals. In other words, the model is based on "pulling for sales" rather than "pushing to markets."

A demand-driven supply network (DDSN), is a system that uses integrated multi-channel systems (e-commerce, mobile and stores) to measure real-time demand. While traditional supply chains rely on demand forecasting and historical trends to assess demand projections, DDSNs can respond almost immediately to demand changes within their network of customers, employees and suppliers.

In its 2021 Future of Supply Chain report, KPMG said companies are "building interconnected, digitally-enabled and predictive networks with the customer at the center."[1] Digitization is now connecting companies directly with their customers, helping them understand trends and demand signals as they happen. This approach effectively ends an overreliance on demand forecasting and out-of-date historical trends that no longer adequately serve an increasingly capricious market.

According to BCG research, demand forecasting is the highest digital investment priority for supply chains. Similarly, Fictiv's State of Manufacturing report found manufacturers' top three responses to changing customer demands were:

- **Increased agility**
- **More efficient team coordination**
- **Faster integration of customer feedback**

How achieving Enterprise Intelligence can help with manufacturing supply chain management

To implement a demand-driven supply chain, manufacturers require better visibility into the full spectrum of the supply chain, including customers' actions. According to the Fictiv 2022 State of Manufacturing Report, 88% of manufacturers sought to reduce their number of suppliers for tighter integration of their operations and "to gain control and predictability over their supply chain."

Manufacturers need to do more than just connect their factory, they need to make the factory even smarter. The right on-site connectivity combined with technology and intelligence can help manufacturers achieve Enterprise Intelligence, delivering the smart factory of the future.

Data analytics and supply chain planning tools can offer near real-time insights and predictions that can help improve manufacturing supply chain management, allowing companies to track and respond to customer demand signals. But these tools require massive data and IoT devices to collect it all.

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IoT and supply chain visibility

Deploying IoT devices across the full supply chain can give manufacturers the visibility they crave. IoT devices can capture near real-time data from the factory to the store, which intelligent software can then analyze to make forecast and demand planning more accurate, responsive and timely. This helps companies optimize their production planning. Through these carefully managed and monitored information sources, manufacturers and suppliers can spot new trends and spikes in demand and then quickly turn to their supply chain to fulfill them.

Deloitte research determined that companies best equipped to respond to pandemic-related supply disruption had strong supplier relationships and tools in place to offer visibility into their broader supply networks.[2]

IoT can provide visibility for demand-driven manufacturing supply chain management in many ways:

• IoT sensors in factories and warehouses can update inventory data in near real-time, track availability, and automate inventory management and alerts for low supplies.

• Machines can be remotely monitored using IoT-connected devices and predictive maintenance to help avoid unscheduled downtime and repairs when most convenient, taking into account periods of reduced customer demand.

• IoT platforms can facilitate improved communication and information-sharing between suppliers, vendors and customers so manufacturers can plan for changes in supply or orders.

• Manufacturers can access data, such as weather information, from third-party IoT devices that could indicate possible changes in customer behavior and demand.

IoT and supply chain digital twins

Digital twin technology is an example of how IoT technology can help test how different levels of customer demands may impact the supply chain. Digital twins are accurate and responsive virtual models of physical objects and devices. Using data sourced from IoT, manufacturers can create a virtual copy of their supply chain, including all the various assets, warehouses and logistics. This "digital twin" can then be used for scenario planning, helping manufacturers identify risks, such as the likelihood of warehouse future congestion, and make decisions around optimization earlier than previously possible.
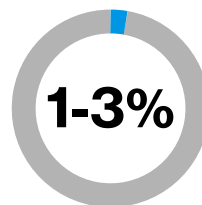
Early implementers of supply chain digital twins have seen the following benefits:
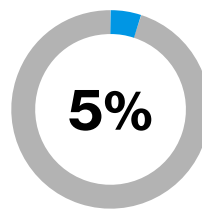
5% — Five percent increases in sustainable inventory.
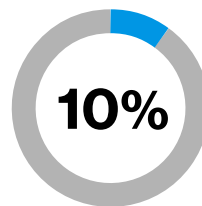
10% — Ten percent capital expense reductions from better resource planning and investment decisions

1-3% — One to three percent EBITDA improvements

The benefits of a demand-driven supply chain

Using IoT and supply chain analytics offers manufacturers many benefits.

Enhanced forecasting of demand, supply and sales
Manufacturers can respond faster and more effectively to supply chain impacts, such as customer demand or weather-related events. When demand signals are positive, the factory can increase production (and revenue); when demand signals are weak, manufacturers can save from building excess supply.

Faster and more efficient factory operations and shipment
IoT can drive factory efficiency and dynamic route optimization for deliveries.

More accurate asset and inventory tracking
IoT sensors can help manufacturers know where everything is and the environmental conditions around it, potentially helping to reduce waste, damage or shrinkage of assets and inventory.

Improved customer satisfaction
A more efficient supply chain means customers could encounter fewer empty shelves and receive their orders earlier.

Increased transparency
Companies are under increasing pressure from customers, advocacy groups and governments to provide more visibility into their supply chains, particularly in regard to corporate social responsibility. IoT technology — like sensors that can share near real-time information about shipments, for instance — could help provide that transparency.

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The network infrastructure for IoT and supply chain technology

Collecting and managing data from IoT devices in near real-time requires reliable connectivity that can handle the volume of data needed to your IoT solution and supply chain analytics. What's more, getting it to the right people at the right time requires integrating operational technology and business systems.

The low latency, increased bandwidth and faster throughput that 5G-enabled devices can provide could give manufacturers the performance they need to implement a demand-driven supply chain. A Manufacturing Institute survey found 91% of manufacturers believe 5G connectivity will be important to their business's future.[3] And when asked to name which part of operations would be most impacted by 5G, inventory tracking was the top response.[4]

Working at scale

Combined with complementary technologies, such as mobile edge computing (MEC), artificial intelligence and machine learning, demand-driven manufacturing supply chain management can be done at scale, with increasing accuracy and automation.

For example, MEC systems harnessing these technologies can send data to enterprise resource planning systems for near-immediate analysis and processing. A cloud-based digital platform can share information and insights, a single truth of information, across an organization and with trusted partners,

so everyone can collaborate seamlessly regardless of their geographical location. Optimization and automation of just-in-time manufacturing and delivery processes can then be unlocked for a faster, more agile demand-driven supply chain. In addition, edge computing and 5G can shorten the data loop by bringing the processing to where the machines and operators are working.

Modern manufacturing supply chain management can appear increasingly complex. But IoT and supply chain analytics can give manufacturers the data and insights needed to organize their operations around a simple proposition — respond to customer demands, otherwise known as a demand-driven supply chain.

Learn more about how Verizon's solutions can help you create a secure, flexible, robust and sustainable supply chain that offers enhanced, near real-time visibility into every stage.

The author of this content is a paid contributor for Verizon.

[1] KPMG, Future of Supply Chain, page 5.

[2] Deloitte, COVID-19: Managing Supply Chain Risk and Disruption, page 4.

[3] The Manufacturing Institute, How 5G is Transforming the Manufacturing Landscape, page 4.

[4] The Manufacturing Institute, page 26.

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