

The Internet of Things Supply Chain
Data-driven, Agile, Real-time

The Internet of Things Brings Insight to Industry — Will You Be Ready?

The Internet of Things (IoT) is a sweeping change to the way everyday objects and large-scale machines interface, operate, and communicate. As it gets cheaper to put powerful chips and sensors into devices, and Internet access becomes ubiquitous, the number of aware-and-connected objects will skyrocket.

Consider the following Gartner statistics: In 1984, the number of devices connected to the Internet was 1000. In 2012, that number reached 17,000,000,000. By 2020, Gartner estimates anywhere from 26,000,000,000 to 50,000,000,000 devices will connect to the Internet.

That includes more than just computers and mobile devices. All kinds of objects from refrigerators and watches to electrical transformers and shipping pallets will become “smart.” Sensors will make them aware of real-time conditions, and connectivity will let them communicate those conditions instantly via the Internet.

This will create a tremendous explosion of data everywhere.

For supply chains, that means things will get very complex. The IoT will give birth to new demand and new business models, leaving supply chains with no choice but to cope.

The good news is that the IoT will also help supply chains by providing unprecedented end-to-end visibility into every granular process and transaction. But more than that, the IoT’s “big data” will enable a new kind of predictive insight for supply chains — one where undesirable conditions, like a transportation delay, will do more than just trigger a dumb alert. They will cause systems to assess priorities, weigh choices, and make course-correcting decisions automatically.

Smart devices, producing big data, yielding business insight for decision-makers is what the IoT is all about.

Savvy retailers and manufacturers will harness the power of the IoT to undergo digital transformations and develop new business opportunities, like selling services based on data. Others will struggle to stay afloat in a world where every company will need to become, to some extent, a technology company.

New Technology Means Even More Complexity for Supply Chains

Supply chains today, even prior to the IoT, are under a lot of pressure. Market trends like omnichannel, fast fashion, and smart manufacturing are forcing supply chains to satisfy a growing customer demand for quicker, cheaper, more reliable, more easily delivered, highly configurable goods.

The IoT will further serve this demand for speed and customization by enabling manufacturers and retailers to tailor their operations to real-time market conditions, and deliver high levels of operational excellence to customers.

For example, in an IoT world, smart airplane engines will analyze real-time flight data and compare the opportunity cost of performing preemptive maintenance now versus waiting, with risk of failure, until a scheduled maintenance time. The engine could then decide to order maintenance preemptively to avoid, what it assesses, is an unacceptably high cost of failure.

Suppliers will need to be incredibly flexible to support the infrastructure of servicing and replacing parts on-demand, at will, wherever in the world, instead of at predestined times and places.

By allowing businesses to be more ambitious in delivering operational excellence, the IoT will weigh heavily on the supply chain. Handling that weight will require supply chains to be, above all else, agile.

The Internet of Things on the Retail Floor

The rollout of the IoT is already beginning in retail. Macy's recently deployed sensors throughout its flagship stores based on Apple's iBeacon (Bluetooth low energy) technology. As customers walk around to different areas of the stores, the iBeacons present relevant deals on their smartphones. By seeing what sorts of deals and products provoke customers to respond, Macy's can make changes to its assortment. In this way, IoT technologies like iBeacons can directly capture customer demand, and as they roll out, they'll impact inventory and omnichannel strategy, which have their foundations all the way up the supply chain. Companies will need to focus on agility, and the ability to adjust on a dime to changing demand, in order to serve an IoT-equipped retail world.

New Technology Also Means Greater End-to-End Visibility and Predictive Power

By being agile, supply chains can respond to volatile conditions and do things like:

- Reroute inventory at will
- Consolidate and create efficient shipments
- Accommodate painless and profitable returns
- Support servicing parts on-demand
- Manufacture quick runs of short-lifecycle products
- Configure and change orders even in the middle of production
- Aggregate data across regions to predict future demand accurately

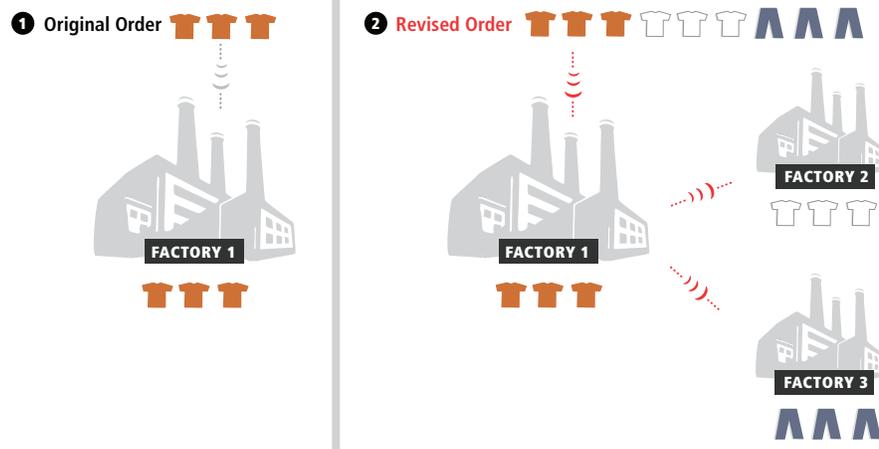
The first step toward agility is visibility. It's impossible to adjust operations when there isn't a complete picture of what's happening. End-to-end visibility means being able to see what's happening at any stage across the entire supply chain. The status of every step, from supplier to customer, should be knowable and potentially actionable in real-time. Only then can a supply chain compensate for sudden, unexpected conditions.

The IoT will provide unprecedented end-to-end visibility across the supply chain through the enormous data it generates. Every smart device in the supply chain, from intelligent factory equipment to RFID-equipped shipping containers, will give off streams of useful real-time data.

The trick will be to make sense of that data. Leaders will differentiate themselves by harnessing data, through analytics, to create systems that predict and prescribe actions in anticipation of upcoming needs.

Picture a sudden order change coming into a smart factory where machines talk to each other, assess one another's capacity, coordinate with machines in another location, optimize operations, and begin altering production all on their own. Any adjustments made on the fly are updated across the entire supply chain, so that stakeholders halfway across the world immediately know their changes are happening.

FIGURE 1: The IoT enables “Smart Factories” that will optimize operations dynamically, making sudden order changes manageable.



Intelligent Transport

The transportation of goods today is still quite fragmented by region and mode. The IoT brings new levels of connectivity to track not only goods themselves, but the boats, planes, trucks, and trains that carry them. Going another layer deeper, sensors on each vessel track the performance and health of its parts. If a ship in the Pacific is on the verge of mechanical difficulty, a sensor in the engine room sends a signal to the network, alerting not only the captain and maintenance team on ship, but the nearest part supplier, port, end customer, and any other stakeholder with an interest in the ship's arrival time. Not only does this activate the repair process, but it alerts the customer to know the shipment will be delayed, allowing them to make rapid adjustments. Perhaps the parts are expedited once the ship arrives — or product from elsewhere in the supply chain is automatically re-routed and air-shipped to the customer. Today, this process is a wave of phone calls and emails that result in lost time and unhappy customers. The IoT empowers the supply chain to make these observations and decisions in real time.

Making sense of big data won't be easy. In fact, it will be incredibly challenging. Businesses who strive to be leaders in the IoT era will have to adjust their mindsets and be open to new business models that come as a result of digital transformation. Those who do will reap the benefits beyond just cutting costs and increasing agility — they'll be able to tap into innovative new revenue streams previously unimaginable in the pre-IoT age.

Think You're in the Retail or Manufacturing Business? Think Again.

The IoT will change the way businesses work. But, far more importantly, it will change what businesses are.

A company like General Electric (GE) used to only make stand-alone physical engineering equipment like MRI machines, airplane engines, and oil drills. It sold them, and sold support contracts for them. Now, GE has pushed its IoT initiative, the Industrial Internet, to sell outcomes-based services to its clients, guaranteeing that GE's smart machines and big data analytics — delivered through its own cloud-aware software platform — will provide specific, measurable efficiencies. GE has evolved from a being more than just a physical asset company. It's now a data company.¹

¹ <https://hbr.org/2014/11/digital-ubiquity-how-connections-sensors-and-data-are-revolutionizing-business>

Likewise, Domino's Pizza recently reinvented itself with technology, creating a sophisticated online and mobile ordering service that included features like a 3-D pizza builder, a Pizza Tracker, games, and pizza profiles for customers. The single biggest department at Domino's headquarters is now its IT department.²

Retailers, manufacturers, and logistics providers need to realize that they are entering an era where the classic divisions between business roles are breaking down. A car company making sensor-equipped smart cars that feed data and learn a driver's habits is no longer just in the car business, it's in the digital transportation business.

According to the Harvard Business Review (HBR), data aggregation and analytics will create many such second-order effects beyond just improving processes; they will generate new options for revenue that cut across industries.³

By doing so, the IoT will also cause inter-business relationships to change.

Businesses previously in different sectors might find themselves suddenly overlapping and competing with one another. Long-time competitors might need to cooperate to share and benefit from each other's data to satisfy customer expectations. Individual businesses won't compete. Ecosystems will.

The leaders who will thrive in this new era of digital business will be the ones who understand that they need swift, responsive systems and data capabilities that can fuse with vast networks of external partners. Businesses won't differentiate themselves by how well they use their internal ERP software. They'll stand out by how well they can wield big data to ensure the survival of the larger ecosystem upon which they depend.

Start Preparing Now for the Internet of Things

The biggest obstacle to being ready for the IoT is mindset. Businesses need to think beyond their traditional roles in order to thrive when the IoT arrives in full force.

For supply chains, one can't understate the importance of thinking in terms of networks, ecosystems, and data. In fact, there are tremendous advantages to be had, right now, thinking beyond the confines of an individual business. It becomes far easier to tackle the problems of omnichannel, fast fashion, and smart manufacturing when you synchronize with the entire value chain.

Getting data savvy is crucial too. To make better decisions that will more accurately align supply with demand, businesses need to capture, interpret, and act on data in split seconds. The good news is that end-to-end visibility of the supply chain doesn't need to wait for the IoT. It can happen now.

Cloud technology providing end-to-end supply chain visibility already exists today, and when the IoT arrives, it can act as a basic infrastructure to handle the IoT's far more granular big data and make sense of it. By being centrally-located, always available, massively scalable, and hardware-independent, the cloud is fantastically positioned to turn IoT supply chain data into insight and help businesses operate as networks.

² <http://www.fastcocreate.com/3030869/behind-the-brand/how-dominos-became-a-tech-company>

³ <https://hbr.org/2014/07/how-the-internet-of-things-changes-business-models>, <https://hbr.org/2014/11/webinar-strategy-and-the-internet-of-things>

By fostering collaboration among supply chain partners and creating strong ecosystems, the cloud-network approach can put businesses in a position today where they can collectively take chances and explore new business opportunities. It's the concept of a social supply chain, where all parties communicate, collaborate, and share data in real time.

Hardwired work streams, portals, traditional software, and siloed mindsets simply won't have a place in tomorrow's IoT supply chain. Making your present supply chain ecosystem-focused and data-driven is critical.

Data quality delivered on a cloud network — where all parties, goods, assets, and sensors connect and communicate — can provide immediate substantial benefits and create a strong foundation for businesses as they enter the IoT era.

With 26 billion devices on the horizon, the time to act is now.