

The Supply Chain Future Has Arrived

The digital transformation of supply chains is in full swing as data and analytics take center stage

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What is a supply chain?

A couple of decades ago, the simple answer was something like: the management of the flow of parts and materials from suppliers to factories for the production and assembly of finished goods. The wave of U.S. and European technology companies setting up shop in China at the time was the dawn of the modern global supply chain era.

Back then, supply chain management was about orchestrating the movement of physical things such as managing inventory, supplier relationships, and logistics to make sure everything arrived on the production line just in time. Yes, information was necessary—lead times, availability, price, inventory—but it was primarily historical data used to manage physical operations.

Fast forward to 2017, and the balance has shifted. Data is now the foundation on which innovative supply chains are built. Operational execution is a prerequisite; table stakes for being in the game. Data is now at the core of competitive advantage essential for speeding time to market, increasing agility, efficiency and responsiveness, and delivering the all-important customer experience.

This shift is impacting all links in the electronics supply chain, from component makers to distributors, logistics providers, contract manufacturers and OEMs. There are companies in each of these sectors that are in the vanguard. For instance, chipmaker Intel and network equipment and software provider Cisco Systems are included in this year's [Gartner ranking](#) of the top 25 supply chains. And Gartner named Apple and Amazon supply chain “masters,” as they both have made the top 25 list for a number of consecutive years.

The top ranked supply chain performers

The cream of this year's crop from the Gartner 2017 Supply Chain Top 25 report includes four technology companies

Rank	Company Name
Master	Apple
Master	Amazon
Master	Procter & Gamble
1	Unilever
2	McDonald's
3	Inditex
4	Cisco Systems
5	H&M
6	Intel
7	Nestle
8	Nike
9	Colgate-Palmolive
10	Starbucks

Source: 2017 Supply Chain Top 25, Gartner, Inc.

Top-Tier distributors and contract manufacturers are driving change, too. For instance, Jabil, the third-largest contract manufacturer in the world, recently launched a [supply-chain-as-a-service offering](#) that includes design for supply chain, as well as diagnostics, visibility, and risk management capabilities. (Continued on page 3.)

Data at the Core

The volume of data available today—both structured and unstructured—is massive and growing rapidly, driven in part by the acceleration of Internet of Things (IoT) use cases. Indeed, data generated by IoT is projected to reach 600 zettabytes per year by 2020, according to Cisco.

Of course, data is only valuable if it reveals actionable insights. Cloud computing, algorithms, and artificial intelligence, specifically machine learning, are the necessary tools for unlocking the all-important insights hidden in the data. It's happening now in large part because software-defined network technology and the new business models for utilizing cloud services have brought the cost of compute and storage down to a point where it is affordable for companies to harness big datasets for analytics.

X as a Service

The digital economy is all about disruptive new business models and the shift from selling physical products to delivering solutions in the form of services: software-as-a-service (SaaS), infrastructure-as-a-service (IaaS), and yes, supply-chain-as-a-service (SCaaS).

Gartner defines the SCaaS architecture as “a set of tools and procedures to structure the operation and design activities of a supply chain to enable plug-and-play agility in meeting changing business and customer needs.” Plug-and-play allows segmentation of specific supply chain functions, creating a set of discrete, independent building blocks that companies can pick-and-choose from depending on their specific needs.¹

Cisco has been on the as-a-service journey for a while now. The network equipment company first articulated its long-term goal of structuring and delivering everything as a service (XaaS) in 2009. Last year, Cisco generated about a quarter of its revenue from services.²

The precursor to SCaaS early in the decade was Cisco's development of an operations-as-a-service (OaaS) program within its operations organization, which includes the supply chain organization. Then in 2015, the company launched the SCaaS initiative, focused on supply chain design and operation,

Other technologies are transforming supply chains as well. Robotics, additive manufacturing, autonomous vehicles—including truck fleets and drones—and augmented reality (AR) are improving efficiencies in factories, warehouses, and logistics operations. Google, Apple, and others are building platforms for developers to create next-generation AR applications. And Amazon is investing heavily in robotics and autonomous vehicles to transform fulfillment and logistics operations.

Supply chain security is experiencing technology disruption as blockchain takes the supply chain community by storm. The permissioned distributed-ledger system creates a foundation of trust across the ecosystem of participating companies by maintaining an independent, tamper-proof, and secure record of digital transactions, from financial deals and contracts to shipping manifests and the sharing of software. *(Continued on page 4.)*

with the emphasis on creating value for customers, rather than completing tasks or meeting metrics.

By rethinking *what* Cisco's supply chain organization does, rather than improving *how* it does things, the company was able to improve overall performance, according to Gartner. This included an 8% improvement in forecast accuracy and a 14% reduction in nonmaterial spend. Cisco reported an improvement in overall customer satisfaction with a

19% increase in its Net Promotor Score, which which measures the willingness of customers to recommend the company to others. ■

Cisco's SCaaS model performance

Net Promoter Score	Up 19%
Forecast accuracy	Up 8%
Scheduled to lead-time	Up 11%
Fulfillment to lead-time	Up 2%
Customer escalation for hardware	Down 25%
Customer escalation for software	Down 15%
Nonmaterial spend	Down 14%

Source: Cisco Systems, published by Gartner. April 2017

Amazon, IBM, Microsoft, Cisco, and others are creating platforms and offering blockchain-as-a-service (BaaS) solutions for secure transactions. Maersk, the largest container shipping companies in the world, recently worked with IBM to test the performance of a BaaS application on a shipment of refrigerated flowers from Mombasa to Rotterdam. The expectation is that blockchain can help reduce shipment costs, the volume of paperwork required, and the number of time-consuming steps in the process. The development activity around blockchain today suggests that this time next year, the technology could well be a standard tool in supply chain service offerings.

The convergence of so many technologies is creating a perfect digital storm that is expected to produce significant business value for the winners and uncertain futures for the losers. Being a fast-follower may not be a viable business strategy for much longer.

For example, leaders in digital supply chain management can respond 25% faster to changes in market demand than their non-digital competitors,

according to a 2016 survey study by [The Boston Consulting Group](#) (BCG). What's more, they have 40% to 110% higher operating margins and 17% to 64% fewer cash conversion days.

The source of these performance gains, according to BCG, is the ability to harness data, including:

- **Advanced analytics** that helps companies dynamically calculate optimal inventory allocations and forecast demand more accurately than traditional enterprise resource planning systems.
- **Intelligent and adaptive algorithms** that digitally handle up to 95% of orders, compressing the order-to-cash cycle.
- **Integrated control-tower technologies** to automatically track components down to the individual unit in real-time, enabling teams to predict delivery times much more accurately, quickly reroute parts around disruptions, and communicate solutions proactively to customers when things go wrong.

(Continued on page 5.)

Apple May Be a Supply Chain Master, But It's Not Immune to Supply Chain Disruption

It's no coincidence that Apple is a perennial top performer on the Gartner Supply Chain Top 25 list, having been listed for ten consecutive years. That's because CEO Tim Cook is a supply chain expert.

Next year will be Cook's 20-year anniversary with Apple. Steve Jobs hired him away from Compaq in 1998 to be senior vice president for worldwide operations, at a time when Apple was on the ropes. Jobs himself had just rejoined the company with a mission to revitalize the Mac. The launch of the iPod and iTunes was three years away, and the iPhone nine years.

Cook's first task was to restructure global operations. He closed factories and warehouses and replaced them with contract manufacturers. This resulted in a reduction of the company's inventory from months to days. His group invested in long-term component agreements to guarantee stable supply; a novel idea back in the day that gave Apple a competitive advantage.



In January 2007, Cook was promoted to lead operations and then chief executive in 2009, while Jobs was away on medical leave. Jobs died in October 2011.

Still, Apple is not immune to supply chain disruption. It's been reported that the OLED screen for the Apple 8, manufactured by rival Samsung Electronics, may be delayed by a few months. This could push out the all-important Apple 8 launch date planning for September, sources say. Samsung is reported to be the sole supplier of OLED screens to Apple this year, but other vendors are looking to gain share in 2018. ■

The speed at which innovative frontline companies are digitally transforming their supply chain operations is remarkable, eliciting a full-throttle response from competitors across all industries. Dramatically improving time-to-market, compressing product lifecycles, and boosting the return on research and development investment are at the top of the list for suppliers, distributors, contract manufacturers, logistics providers, and OEMs.

“Companies are asking us to find ways to cut their time-to-market by 50%,” says Don Hnatyshin, senior vice president and chief supply chain and procurement officer at Jabil. “Speed and agility, from a macro point of view, is what’s driving next-generation supply chain expectations,” he says.

At Amazon it’s always Day 1

For many company executives, their worst nightmare is that Amazon has announced it is entering their market. And justifiably so: the born-digital leader by definition is a market disrupter. For Amazon founder and CEO Jeff Bezos, his nightmare is that Amazon will one day stop being a disruptor.

In his [annual letter to shareholders](#) in April, Bezos addressed the existential question: “What does Day 2 look like?”

His short answer: “Day 2 is stasis. Followed by irrelevance. Followed by excruciating, painful decline. Followed by death. And that is why it is always Day 1.”

For Amazon, says Bezos, Day 1 means customer obsession, a skeptical view of proxies, the eager adoption of external trends and high-velocity decision making. The company’s attitude is foundational to its market success and a contributing factor to why Gartner named it to the 2017 Supply Chain Masters list, joining Apple and Procter & Gamble.

Why Now?

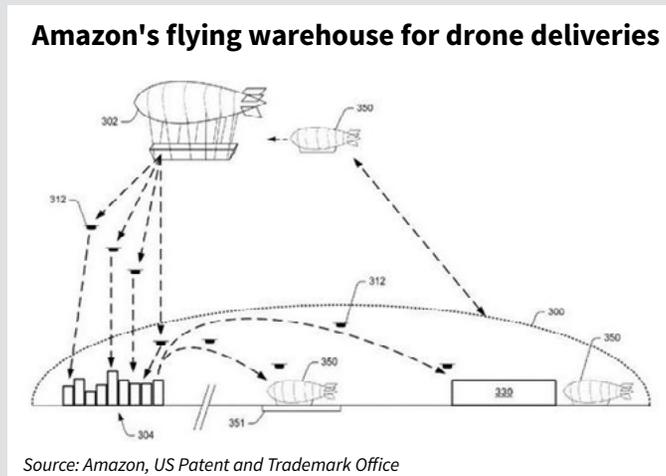
All this change seems to be happening at breakneck speed all at once. Yes, the economics of the cloud and the rise of “as-a-service” business models are driving tighter digital connectivity within supply chains ecosystems with the goal of improving speed and agility. But other factors are contributing to the cultural change.

For one, the stakes are very high. Indeed, not responding immediately to the challenge posed by innovative competitors is potentially an existential threat. As a consequence, one of the most noticeable changes in the supply chain culture is the willingness of ecosystem participants to share what had long been considered highly coveted, proprietary data with supply chain partners. It’s perhaps most notable among component suppliers. *(Continued on page 6.)*

Gartner calls out Amazon’s technology leadership as a major factor for the company’s supply chain performance. Specifically, the subsidiary Amazon Web Services, which is [the dominant](#) on-demand Infrastructure-as-a-Service cloud computing platform in the world. AWS is capitalizing on the insatiable appetite for cloud services by companies plotting their own digital transformations.

The company is also investing heavily in automation. For example, it increased its use of industrial robots in 2016 by 15,000 at approximately 20 fulfillment centers, up from 30,000 in 2015. Amazon’s logistics investments include autonomous trucking as part of its objective to control its own transportation system, potentially challenging the likes of UPS and FedEx.

And Amazon has secured patents for a flying warehouse that will deploy drones to swoop down from the sky to deliver packages. It’s part of a broader portfolio of patents focused on advanced logistics, automated in-store retail—Amazon Go—and voice-activated home ordering technologies, aimed at keeping the company operating forever in Day 1. ■



The compression of product life cycles and the requirement for speeding time-to-market has meant suppliers are now willing to share much more information about their own operations much earlier in the OEM's product design process, sources say. The rationale is simple: there are no second chances these days for getting on an OEM's approved vendor list for a blockbuster product that serves a global market and has a lifespan of perhaps a couple of years.

The recent uptick in merger-and-acquisition activity in the technology sector is contributing to this trend, as chip companies invest in new cognitive technologies and fill gaps in their product offerings. Semiconductor industry M&A activity shot up from \$17 billion in 2014 to an estimated \$64 billion in 2015 and \$116 billion in 2016, [according to SEMI](#). Projections for 2017 are close to \$100 billion. The consolidation in the maturing market is being driven by efforts to grow scale and competitiveness and by OEM customers' demand for integrated products.

The information component suppliers are willing to share now includes things like the number of customers they are delivering to, their manufacturing strategy—building to order or building to inventory—and details about their planning and logistics operations. This information allows OEMs and their contract manufacturers to fine-tune their operations and shave days or even weeks off the production cycle.

For instance, an OEM hardware designer might select a certain priority part from vendor A with a lead-time of 26 weeks. However, the engineer doesn't have the visibility across the supply base to know that two other suppliers have a part with similar features or functionality with lead times of 12 weeks and developed as a standard part. Multiplying this insight by hundreds or thousands of components and the impact on time-to-market can be dramatic.

Similar benefits can be gained by applying advanced analytics when scaling production and determining where to manufacture. Economic and political sentiment data, plus many other variables captured in both structured and unstructured data, add additional insight to the decision-making process.

This type of data is particularly relevant today considering the globalization backlash is top-of-mind for supply chain organizations. The UK's exit from the European Union, President Donald Trump's call to renegotiate NAFTA (among other things), and the rise of nationalism across Europe is adding risk to global supply chain decisions. Consequently, companies are developing contingency plans in anticipation of the increase in restrictive trade policies.

Investment in data and analytics will be a factor in successfully managing these and other challenges as electronics companies adapt to the new supply chain future.

Takeaways

- Resisting the everything-as-a-service trend will be detrimental as the performance gains that the model unlocks can be significant, for both the company and the supply chain ecosystem as a whole.
- Study digital leaders across many industries. The retail, healthcare, and industrial sectors all face similar supply chain challenges, and many companies in these sectors are implementing innovative digital solutions that are relevant to the electronics industry.
- Monitor the progress of supply chain services by the big platform companies such as Amazon, Apple, IBM, and Microsoft. Hardly a day goes by when at least one of them announces a new disruptive service or capability.

By Bruce Rayner

1. "Case Study, Part 1: Cisco's Supply-Chain-as-a-Service Architecture Enables Subscription Solutions in a Digital Business Transformation," Gartner, Inc., April 2017. <https://www.gartner.com/doc/3696117/case-study-ciscos-supplychainasaservice-architecture>
2. Cisco Systems Inc. 2016 Annual Report, https://www.cisco.com/c/dam/en_us/about/annual-report/2016-annual-report-full.pdf

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