SPOTLIGHT / DIGITAL SUPPLY CHAIN

Digital Supply Chain: Lead, Follow or Get Out of the Way

An ever-growing bevy of new IoT-enabled technologies has ignited a digital business revolution that is fundamentally, and irrevocably, transforming the relationship between people, processes, data and things and supply chains are on the front line of the battle. It's time for supply chain professionals to choose: be a disruptor or a disruptee.

Just when you start getting comfortable with the idea of digital business (http://www.gartner.com/it-glossary/digital-business/) disruption, a new wave of innovation-driving technologies comes along to push you right back into technology overload. At the Symposium/ITxpo 2015 earlier this month, Gartner identified what it predicts will be the top 10 strategic technology trends shaping digital business opportunities through 2020. The "algorithmic economy," "device mesh," and "ultra-efficient neuromorphic architectures" are just a few of the emerging IoT trends that are expected to further drive the fundamental transformation of the relationship between people, processes, data and things.

The challenge facing supply chain professionals is how to best leverage these technologies to fulfill what Gartner terms, their "bimodal" (http://www.gartner.com/newsroom/id/3053118) mandate, as both corporate "growth partner and operational caretaker." Developing and maintaining the systems

The Buzz

Glossary of New Tech Buzzwords

Algorithmic Economy

The rubric that combines software, data, sensors and physical assets together. In the not-so-distant future, according to Gartner, organizations will be valued not on their big data, but by the algorithms that turn data into actions, and ultimately into greater customer intimacy.

The Device Mesh

The expanding set of endpoints that connect people, data and things. The device mesh includes mobile devices, wearables, consumer and home electronic devices, automotive devices and environmental devices.

Information of Everything

Advances in semantic tools, such as graph databases and other emerging data classification and information analysis techniques, which bring sensory and contextual meaning to the data derived from the device mesh.

Ultraefficient Neuromorphic Architectures

Systems built on graphics processing units (GPUs) and FPGAs that enable machines to function more like human brains, using speech, visual and environmental recognition applications and other pattern-matching algorithms, while remaining highly energy efficient. IBM's "True North" architecture (http://news.rpi.edu/content/neuromorphic-processors-leading-new-double-life), for example, was capable of performing approximately 45 billion synaptic operations per second on about 70 milliwatts.

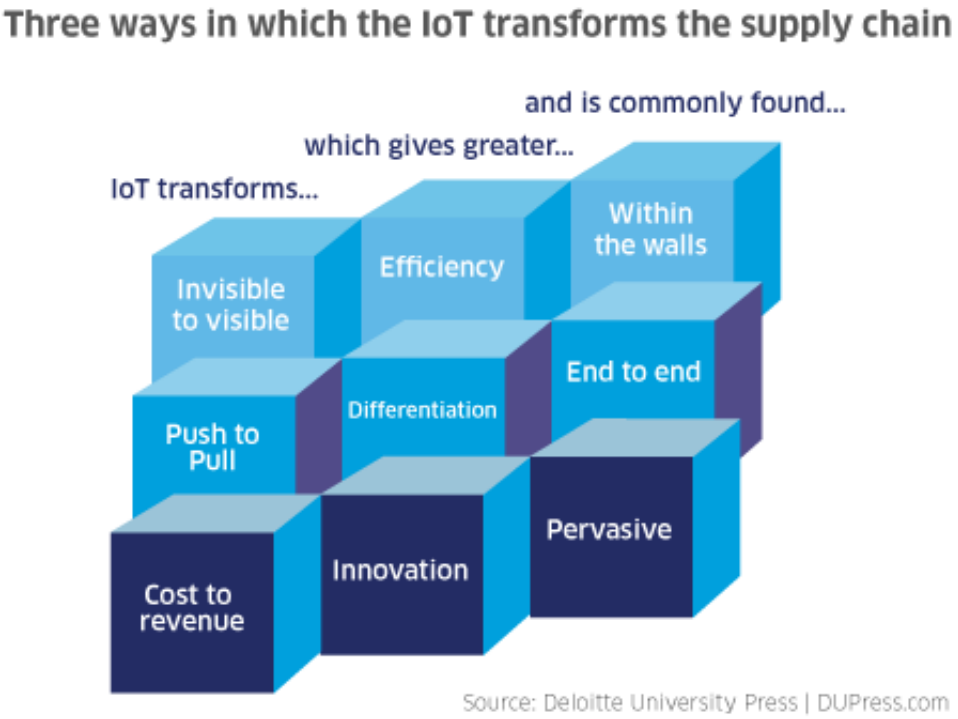
Runtime Application Self-Protection (RASP)

Security technology that is built into or linked to an application or an application runtime environment that uses insight into application logic, configuration, and data and event flows to control application execution and detect and prevent real-time attacks.

Sources: Gartner's Top 10 Strategic Technology Trends for 2016; Wikipedia; RPI News; Security Think Tank (http://www.gartner.com/newsroom/id/3143521?cm_mmc=social-_-sm-_-pr-_-gartpr)

and processes needed to model a digital supply chain capable of increasing productivity, delivering more value and creating better customer (http://www.newsfactor.com/accuserve/accuserve-go.php?c=17016) experiences is a monumental effort that no one functional organization can expect to manage on its

own. It requires buy in and collaboration with both internal stakeholders and external supply chain partners—upstream and down.



All or Nothing?

So, where do you start? Within the analyst community, there are generally two trains of thought about how best to approach this mission. In its report, *The Digital Supply Network: A New Paradigm for Supply Chain Management (https://www.accenture.com/t20150708T060457__w__/us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Dualpub_1/Accenture-Digital-Supply-Network-New-Standard-Modern-Supply-Chain-Management.pdf)*, management consulting firm Accenture posited that "piecemeal digitization of supply chain elements is counterproductive," and likened the effort to a contractor trying to "construct new buildings on old foundations: re-fitting, re-wiring and re-adapting instead of re-inventing." The result, they say is "reams of inconsistent, redundant data; myriad inefficiencies; and (most important) huge amounts of unrealized performance potential."

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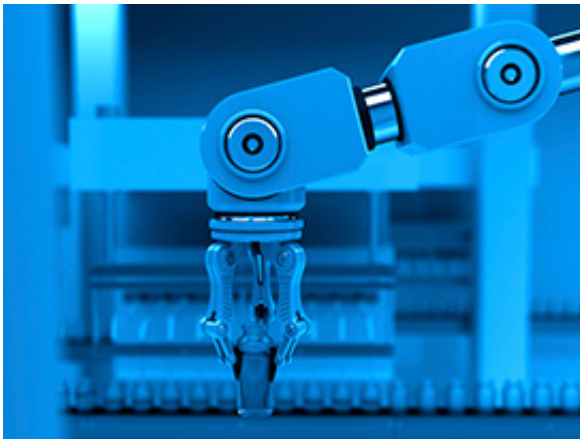
While a wholesale re-invention of the supply chain as a fully digital, integrated supply network may be the ideal scenario, it is generally not a realistic expectation for a large portion of the electronic component supply chain. "The disruptive nature of IoT is driving many to portray it as a driver for business and supply chain transformation. And it can be," according to the Gartner report, Five Ways the Internet of Things Will Benefit the Supply Chain (http://www.gartner.com/smarterwithgartner/five-ways-the-internet-of-things-will-benefit-the-supply-chain-2/). However, "it can also drive incremental benefits to existing supply chain processes spanning asset utilization, warehouse space optimization or production planning"

Making the Invisible Visible



For supply chain professionals, IoT-based technologies enabling the capture and analysis of real-time operational data represent an opportunity to do what was once thought impossible: make the invisible visible (http://dupress.com/articles/internet-of-things-supply-chain-management/). Whether its transparency of products moving through a supply chain, conditions on a factory floor, manufacturing energy consumption or end user preferences, within the enterprise or across the globe, the data collected and the information it begets are the "fuel that is driving the whole idea of digital supply chain," said Tom Linton, chief procurement and supply chain officer for Flextronics at the company's 2015 Analyst Day meeting (http://investors.flextronics.com/files/doc_events/2015/FLEX-US-Investor_and_Analyst_Day.pdf).

Flextronics, like other high-tech giants including Intel, Cisco and GE, has taken Accenture's "go big, or go home" approach to its digitization efforts. Flex has invested in 3D manufacturing technology, increased the use of automation and robotics in its factories and developed a proprietary cloud-based supply chain tracking software, which is now being marketed by a company called Elementum (http://www.forbes.com/sites/alexkonrad/2014/02/04/elementum-launches-with-lots-of-cash/).

"You can't move what you can't see. So we believe that building capability around visibility is really critical to making a supply chain faster and more intelligent"

Digital Body Language Speaks Volumes

When political strategist Lee Atwater coined the phrase "perception is reality" in the 1980s, he was stating a simple truth that sales and marketing executives have long understood—opinions are as influenced by what we feel as they are by what we know to be fact. This is why non-verbal communication has always played such a significant role in defining the tenor of business-to-business relationships. Today, however, professionals need to be cognizant of not only the signals their physical demeanor may be sending to customers and/or suppliers, but what their "digital body language" may be revealing as well.

Digital body language is a concept first introduced in 2009 by Eloqua co-founder Steve Woods in his book *Digital Body Language: Deciphering Customer Intentions in an Online World*. According to Woods, every time you visit a website, attend a webinar, open an email, complete a Web form or post, like or share a social media message, you are creating the electronic version of a trail of breadcrumbs, the aggregate of which determines your digital body language.

Woods positioned the understanding of digital body language as an opportunity for sales and marketing professionals to ascertain customer intent without the benefit of the face-to-face corporal body language cues they have become accustomed to reading. However, any executive who engages in digital communications—and that would be *everyone*—should be mindful that these analyses are not a one-way street. Your customers and/or suppliers are likely reading *your* digital body language as well. And, recent research by Michal Kosinski, an assistant professor in organizational behavior at the Stanford Graduate School of Business found that over the long run, the perceptions of a person derived from social media activities can actually reveal more about their "true selves" than a brief face-to-face interaction may.

So, a word of caution: just as early adopters of corporate email communications may have learned the hard way that a message in ALL CAPS was perceived as angry or threatening, today's professionals must consider the myriad ways their various digital activities may be construed—or misconstrued.

The crown jewel in the Flex digital supply chain transformation, however, is the "situation room," located within its Silicon Valley Innovation center. The room features

a wall of 22 touch-screen panels offering a visual representation of the entire Flex supply chain, drawn from the live-streaming data of systems including inventory monitoring, manufacturing, quality, outbound transportation and delivery.

"You can't move what you can't see. So we believe that building capability around visibility is really critical to making a supply chain faster and more intelligent." And, more profitable. Linton explained that for Flextronics, a typical production cycle operates at 55 days and equals $3.5 billion worth of inventory. If, using real-time information, Flex can accelerate its production cycle by just one day, the benefits in terms of asset velocity benefit and speed of a supply chain would be equal to $65 million cash (http://investors.flextronics.com/files/doc_events/2015/FLEX-US-Investor_and_Analyst_Day.pdf).

It's a Start

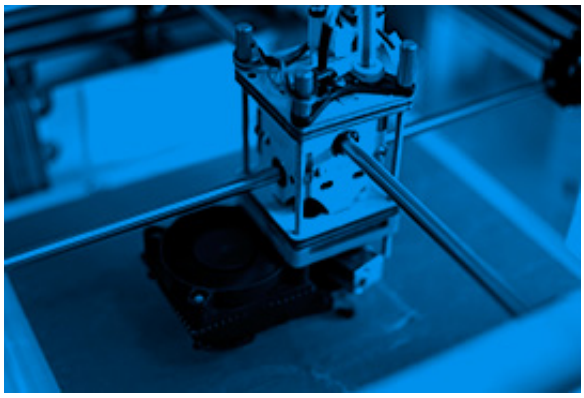
Those without the reach and resources of a multinational billion-dollar enterprise should not let the enormity of the Industrial Internet trigger analysis paralysis. A slow, but steady, application of digital enablers in existing business processes can also boost effectiveness and, in the long run, prove transformative for the business. Success, according to the McKinsey & Company report Raising your Digital Quotient (http://www.mckinsey.com/insights/strategy/raising_your_digital_quotient), "depends on the ability to invest in relevant digital capabilities that are well aligned with strategy."

For those who must, or choose to, take a more incremental approach to digitization, manufacturing and logistics are two functions at the heart of many digital capabilities that offer an array of adoption options.

For example, the DHL report on the Internet of Things in Logistics (http://www.dhl.com/en/about_us/logistics_insights/dhl_trend_research/internet_of_things.html) stated that cloud-based GPS and Radio Frequency Identification (RFID) technologies can enable connected pallets to transmit their location and the condition of their shipment, providing valuable in-transit visibility.

You can ignore additive manufacturing, but others will not, and at a certain point the technology will breakout in your industry and you will be unprepared to compete

Additive manufacturing also represents a potentially valuable vehicle to improve supply chain performance, said Mark Cotteleer, research director with Deloitte Services LP. Among the benefits additive manufacturing can have on supply chains are reduced material waste, increased production flexibility and the ability to decentralize production.



While 3D printing is most commonly associated with fast prototyping, the technology has evolved considerably in recent years to include a broad array of new processes and materials. An advantage for smaller manufacturers is that there are a variety of ways 3D printing can be introduced into the manufacturing chain, including tooling, maintenance and support, without the need for radical change, he noted.

"Additive manufacturing is like many other innovations that have swept through manufacturing," said Cotteleer. "You can ignore it for a long time; but others will not, and at a certain point the technology will break out in your industry and you will be unprepared to compete."

That breakout may be coming sooner than many expect. A recently released Gartner report (http://blogs.gartner.com/pete-basiliere/2015/09/29/3d-printer-market-sales-will-exceed-14-6-billion-in-2019/) forecasts that the total number of 3D printers purchased per year will increase from more than 106,000 units in 2014 to more than 5.6 million units in 2019—a CAGR of 121.9 percent.

Game On

Upping the Cool Factor[10]

While most manufacturers are just starting to explore the opportunities to integrate 3D printing into their production strategy, researchers are already well on their way to developing commercially-viable 4D printing techniques (http://3dprint.com/78035/4d-printing-market/), in which the fourth dimension of time is added to the existing width, height and depth features.

As demonstrated in this video (http://www.ted.com/talks/skylar_tibbits_the_emergence_of_4d_printing?language=en) featuring 4D printing pioneer Skylar Tibbits, founder of the Self-Assembly Lab at MIT (http://www.selfassemblylab.net/), a 4D-printed object can self-assemble or change shape in response to external stimuli. What's truly revolutionary about this is that it utilizes existing additive manufacturing processes; but by implementing geometric code and using smart actuating and sensing materials, such as shape-memory polymers, the end product is dynamic, capable of transforming without the need for electronic sensors, circuits or power supplies

Click here (https://youtu.be/-B-Bnm_IUts) to see a 4D-printed self-folding cube in action.

With a value-at-stake (http://www.dhl.com/en/press/releases/releases_2015/logistics/internet_of_things_will_deliver_boost_to_supply_chain_and_logistics_operations.html) of more than $8T over the next 10 years, this rise of the machines is not likely to lead to a stereotypical sci-fi pitting of man vs. machine. Rather, the digital business revolution is about augmenting the capability of both, said IBM CEO Ginni Rometty during her keynote address at the Gartner Symposium/ITxpo (https://youtu.be/50ZSk3rQJfs). "Together, man and machine can perform better than either one can on their own." Whether or

not one accepts this concept will be the difference between becoming a disruptor or a disruptee, she concluded.

Here's a preview of some insights in this section from supply chain thought leaders on the technologies, opportunities and implications of the digitization of the supply chain:

- Alex Iuorio, senior vice president of supplier management and business development for Avnet Electronics Marketing, IoT Proliferation Teeters on the Edge (http://scnavigator.avnet.com/article/october-2015/iot-proliferation-teeters-on-the-edge/): *"Cloud technologies and the Internet of Things make it very difficult for organizations to define, and therefore defend, the 'edge' of their enterprise."*
- Octopart co-founder Sam Wurzel, One-Click Manufacturing: Could It Really Be That Easy (http://scnavigator.avnet.com/article/october-2015/one-click-manufacturing-could-it-really-be-that-easy/): *"OCM can provide a significant time-to-market advantage, particularly for hardware startups competing against large, entrenched players."*

Related Resources:

- Report: The Digital Supply Network: A New Paradigm for Supply Chain Management, (https://www.accenture.com/t20150708T025455__w__/fr-fr/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Local/fr-fr/PDF_5/Accenture-Digital-Supply-Network-New-Standard-Modern-Supply-Chain-Management.pdf)
- Report: A Conceptual Framework for Digital Business Transformation (http://www.imd.org/uupload/IMD.WebSite/DBT/Digital%20Business%20Transformation%20Framework.pdf)
- Report: 3D opportunity for the supply chain (https://bus.wisc.edu/~/media/bus/mba/specializations/supply%20chain management/top_us_supply_chain_graduate_269751.ashx)
- Initiative: The Global Center for Digital Business Transformation (http://global-center-digital-business-transformation.imd.org)
- Article: How Can I Secure My Digital Supply Chain? (http://timreview.ca/article/890)
- Article: Objects That Change Shape On Their Own (http://www.smithsonianmag.com/innovation/Objects-That-Change-Shape-On-Their-Own-180951449/#RakoerLRD4AQgEQU.99)