Three game-changing supply-chain technologies

Supply-chain technologies don't always live up to their promise. Here are three that might.

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Supply-chain technology has a checkered history. Since the development of the first mainframe computers, companies have pursued technological solutions for their supply-chain challenges. Their search has led them up plenty of costly dead ends.

Some technologies created as many problems as they solved. Manufacturing-resource-planning (MRP) systems, for example, promised a fully automated solution to difficult production-scheduling activities. In practice, their mechanistic, inflexible approach often struggled to cope with the uncertainties and volatilities of the real world, in which machines break down, suppliers fail to deliver, and customers change their minds. Others turned out to be clever solutions in search of a real problem. Radio-frequency identification (RFID) tags were intended to provide a real-time view of the progress of every item from production line to customer, revolutionizing supply-chain management in the process. In practice, high cost and difficulties in implementation have limited the use of the technology to a few niche areas.

Over time, companies learned that out of every hundred radical new technologies that promised to transform supply-chain operations, only a handful actually fulfilled their potential. They also realized that technology was no substitute for fundamental good practices for supply-chain excellence: effective cross-functional collaboration, segmented supply chains that meet the needs of different product and consumer groups stronger supply-chain talent, and clear processes and incentives that keep the whole organization aligned.

Today, supply-chain leaders are facing a new wave of unprecedented technological opportunities. The building blocks of industry 4.0—low-cost sensors and computing devices, seamless communication, and powerful data-analytics capabilities– are driving an explosion of innovation in the supply chain space. And ideas are migrating from other sectors. Blockchain technologies—the distributed-ledger systems that underpin crypto-currencies like bitcoin—are being mined for potential supply-chain applications. When we asked a group of 76 supply-chain experts about the technologies they were using, piloting, or investigating, they identified more than 50 separate areas of innovation. Since many different vendors offer their own variants of those technologies, there are hundreds or even thousands of different opportunities on offer today.

If keeping up with what's out there is hard, understanding which technologies will really create business impact is a colossal challenge. As with the innovations of the past, the applicability and potential impact of those technologies will vary. Some may be useful enhancements to existing processes, some may only ever find niche applications, and some may be truly disruptive. That makes it tough for companies to

know where they should focus their supply-chain technology investments, while balancing their appetite for pursuing truly disruptive and game-changing big bets.

Three to watch

We believe three broad areas of innovation deserve particular attention today: Automation and robotics, open IT platforms, and on-demand transportation. These areas stand out thanks to high levels of activity by providers, and the impact already achieved by early adopters. As important, however, these technologies all share one critical characteristic: accessibility.

While adopting a new supply-chain technology might once have been a multi-year, multimillion dollar effort requiring significant changes across the business, these three technologies allow companies to smart small, addressing specific problems and achieving rapid impact. That minimizes risk, makes it easier to make the decision go with an innovative approach, and gives companies valuable knowhow that they can apply to other technologies or different areas of their supply chain. If, on the other hand, an idea doesn't work, it simply reinforces the new cultural imperative: [fail fast](#) and move on.

Automation and robotics

Warehouse operations, such as picking and packing, are one of last remaining labor-intensive steps in the supply chain. Warehouse-automation technologies are developing at a furious pace. Innovation is spilling over from the manufacturing world, where the uptake of robotics solutions has accelerated dramatically in recent years. The sector is also receiving interest from a host of new players. Warehouse-automation projects were once the preserve of specialist hardware and software companies, and their system-integrator partners. Now big robotics companies are entering the space with specialist products, while makers of conventional materials handling equipment (like forklift trucks) are adding automation to their products, and big end-users are developing their own in-house technologies.

Today's automation systems are more capable and flexible than ever. Fast picking systems can now handle between 1,000 and 2,400 picks per hour, thank to advanced vision technology that allow them to handle objects presented in arbitrary positions or orientations. Size and weight constraints limit the current range of applications of these systems; they are most successful in such as pharmaceuticals or mail-order picking. But intensive research is underway to develop robots that can achieve near-human levels of adaptability.

Other advances make selective automation a realistic option for many companies. Sensors and safety technologies allow robot arms and automated guided vehicles work around and alongside human colleagues. Falling system prices, combined with lower set-up costs, mean robots can reach payback even if they are applied only in specific roles for short periods.

The potential impact of warehouse automation goes beyond productivity improvements. Technology can help warehouses handle fast-changing multichannel and omnichannel requirements, and increase service levels to support same-day and next-day delivery. As significant, automation can increase storage density and reduce labor

overheads, giving companies more strategic freedom in their network-footprint decisions.

End-to-end visibility and performance management

Software advances have made robots faster to program, with similar effects on many other aspects of supply-chain IT. Increased standardization in data storage and communication has made it dramatically easier for companies to build, adapt, and integrate the software they use to run their supply chains. That streamlines the flow of information, frees organizations from dependence on a single vendor and makes it possible to pick best-in-class solutions that address specific business needs.

If the right solution isn't available on the market, building it yourself is much more possible. One healthcare company, for example, dramatically reduced volatility in levels of critical hospital supplies by developing a simple mobile phone app that nurses could use to scan product's barcodes as they were taken off the shelf. The app automatically generated a replenishment request and allowed stock levels to be adjusted to meet real demand.

Custom software solutions aren't just for niche applications, either. One global CPG company wanted to increase real-time visibility of the performance of its entire supply chain. The company introduced a new analytical system that pulled data from all its existing systems to generate a comprehensive set of more than thirty performance metrics, down to the SKU level. Every day, the system parses more than 1 terabyte of data, allowing the company to see where its supply chain is working well and where it isn't. That's roughly equivalent to 100,000 excel spreadsheets every day—a task far beyond the capabilities of human planners. When exceptions occur, managers can use the system to find the causes quickly, aiding problem solving and ongoing performance improvements.

As a result, the company cut its finished-goods inventories by 30 percent, while raising on-time, in-full service levels to 95 percent. And the entire solution took less than three months to develop and deploy. It has now become a crucial asset for short- to mid-term supply chain planning

On-demand delivery

Ride-hailing services have disrupted transportation industries in many cities around the world. The same concept—using smart software to match supply and demand in real time—is now being applied in logistics. Companies can use online auction systems to buy and sell space on trucks, pushing utilization up and cost down. One consumer ride-hailing player launched a trucking-industry version of its service in early 2017. As well as matching loads with available capacity, the system also aims to simplify rate negotiations and—especially important for small companies and owner-operators—speed up payments. Other organizations are offering crowd-sourced last-mile delivery services, allowing commuters, taxi drivers or students to pick up parcels and drop them as part of their regular journeys.

Systems such as these are changing how companies think about last-mile deliveries. That's becoming increasingly important as customers in many sectors have come to expect same-day service as a matter of

course. Retailers and manufacturers are already developing advanced omni-channel fulfilment offerings that allow a customer to pick a product online—often using a mobile device—and then select from a range of different collection or delivery options. Behind the scenes, these systems require an accurate, real-time view of inventory across the company's warehouse and store network, together with fast picking and packing operations ready for that on-demand last-mile delivery.

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Supply-chain technology development has entered an exciting phase. Available and emerging solutions have the potential to transform the speed, flexibility, and efficiency of organization's existing processes, and to enable entirely new business models and service offerings. For companies, the challenges lie in understanding which solutions will work for them, and in implementing those solutions faster and more effectively than their competitors. No two supply chains are the same, so that will require a willingness to experiment, and to accept that some experiments will fail. The good news: today's technologies support such experimentation. They are quicker and cheaper to implement, more straightforward to manage and easier to scale than those of the past∎

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