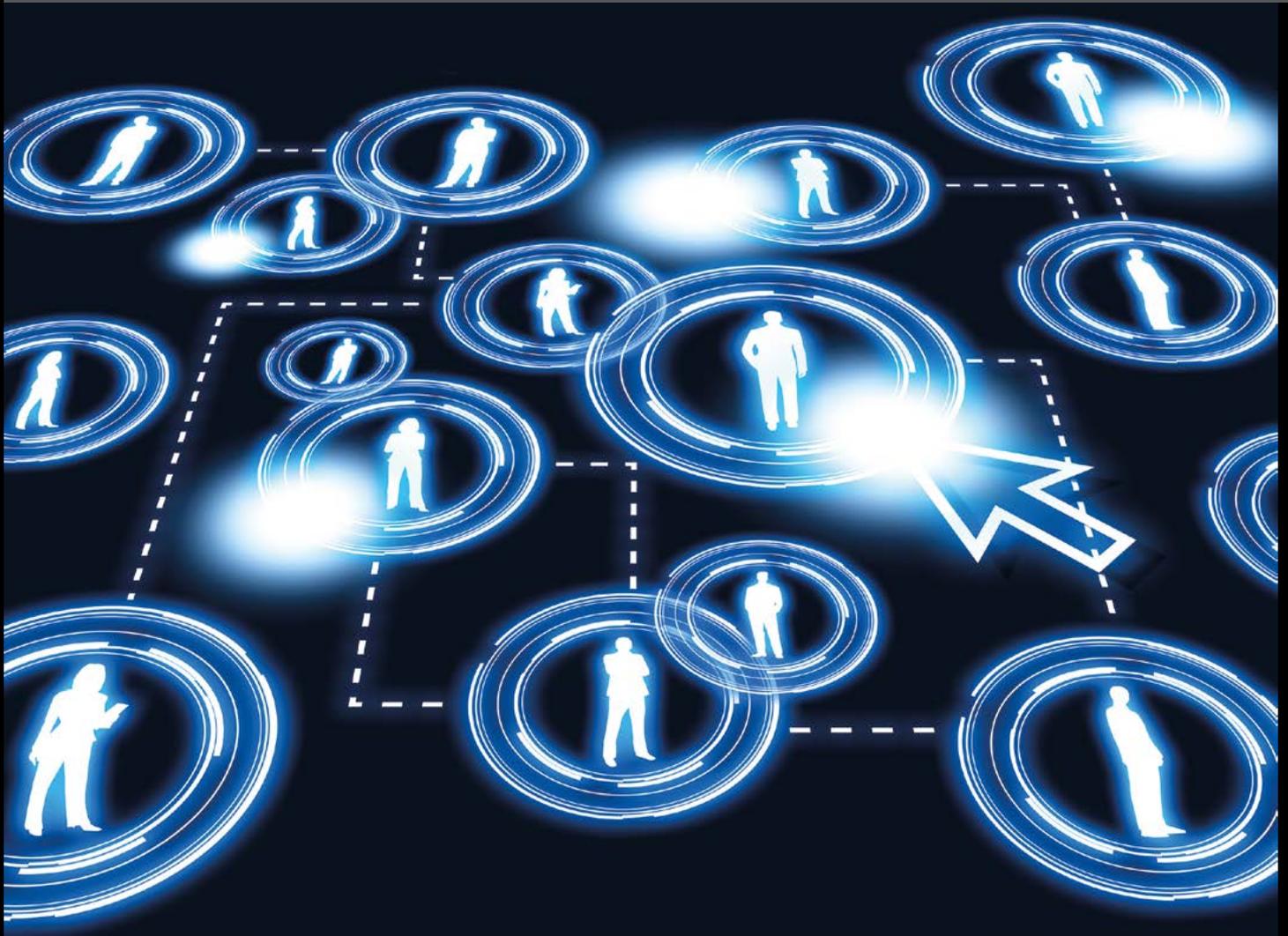


A report from The Economist Intelligence Unit

THE FUTURE OF BUSINESS: SUPPLY CHAINS

How companies are using data and analytics to make their supply chains more connected and agile



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“Amateurs talk strategy. Professionals talk logistics.”

This insight by Napoleon about the central role of logistics is widely cited in military circles—the adage applies to corporations as well as armies. Company executives have long been aware of the importance of their supply chains, but, today, B2B supply chains are increasingly taking centre stage in the quest for greater profits and competitive advantage.

Innovative supply-chain strategies have played key roles in the high-profile success of firms as diverse as Walmart and Dell Computer, and supply-chain innovation is now recognised as central to the disruptive success with which Amazon.com has reshaped the retail landscape.

At Unilever, management credits its supply chain for helping it double the size of its business while reducing its environmental impact. The Anglo-Dutch consumer packaged goods giant, recently ranked number one by Gartner among all European-headquartered companies (and fourth worldwide), invested significantly in IT systems to support its supply-chain capabilities. According to Gartner, Unilever “has established a virtual manufacturing network that can quickly support fluctuations in local demand and tap into global capacity as needed through flexible manufacturing”. The company pays careful attention to the demographics of the different countries in which it operates to customise its

products and design supply chains to support them. In doing so, it takes account of how much it costs to serve a particular customer, product and channel and makes trade-offs accordingly.

Inditex, the Spanish parent of the Zara chain of “fast fashion” retail outlets, is perhaps the most famous example of supply chain agility. The company has been able to speed up design, production and delivery, allowing it to deliver “on-trend” clothes at bargain prices to broad audiences. Zara ascertains demand by using sales data from its retail outlets. Instead of manufacturing in Asia, like most of its competitors, Zara makes most of its goods in Spain and nearby locales in Europe. The higher labour costs are offset by the flexibility of having production close to its centralised warehouses and distribution centres, a strategy that has been widely copied by competitors.

These capabilities have also been acknowledged as a crucial component in the ascension of Apple, which treats information about its supply-chain operations as one of its most valuable trade secrets. It is no accident Steve Jobs named Tim Cook as his hand-selected successor—Cook had overseen the company’s vaunted supply-chain operations since the late 1990s.

In the past, the supply-chain manager’s key challenge was to find lower-cost sources of supply. “Companies routinely looked to supply chains for ways to cut costs—a 5% cut, a 10% cut,” says Christopher Craighead, professor of supply chain management and director of research at the Center

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for Supply Chain Research at Pennsylvania State University. Today, he says, companies have captured most of the available efficiencies and struggle with ways to put more cost pressure on their supply bases.

Supply-chain managers have a new focus: to move from cutting costs to enabling new processes and making corporations more connected and agile to create value across the entire enterprise. Speed is crucial. Product cycles are becoming shorter and more fluid as customers press for quicker development and delivery of new products and services. Companies need to improve their response times to meet those demands, changing organisational structures and business processes as necessary.

A key part of this transition includes the transformation of traditional supply chains into demand-sensitive networks. Creating more agile companies requires building acceptance of rapid change into the organisational structure, allowing decisions to be made collaboratively and having roles and responsibilities be more flexible. Supply-chain managers can help their companies become more agile by making best use of the new data and analytic tools available to them.

The challenge of complexity

In the last few decades, supply chains have become infinitely more layered and complex. Not long ago, companies were content to deal with a small list of suppliers in relatively close proximity. But beginning in the 1980s, particularly as the emerging markets in Asia and Latin America developed manufacturing capabilities, companies started sourcing from an ever-widening variety of locations. Moreover, supply-chain complexity also has soared as companies have had to respond not only to the globalisation of suppliers, but also to the globalisation of demand, particularly the explosive growth of emerging “connected” middle classes in emerging markets.

This complexity leaves companies open to unanticipated negative surprises from suppliers halfway across the globe. Well-connected supply

chains can fall into disarray if companies fail to deliver on their commitments because of strikes or political events or because of transportation difficulties. A company could also be hurt by indirect or sub-tier suppliers of which they are largely unaware.

In some cases, companies are at risk because too much of their sub-tier supply base originates in a country that may be exposed to the threat of war, earthquakes or severe weather. This became clear during the Japan earthquake in 2011 when many Japanese factories had to shut down because they were unable to obtain parts from suppliers. Toyota’s own post-disaster analysis revealed that the company was surprisingly vulnerable to suppliers buried deep in the company’s supply chains. Because of such vulnerability, Toyota faced immediate shortages on more than 400 parts, and production capacity was reduced for six months following the disaster—not just in Japan, but also in its US operations.

More generally, other downstream auto industry operations around the globe were surprised to discover that their businesses were significantly disrupted by problems that had occurred far upstream in the supply chain. With the right tools, companies can implement informed and strategic measures that can effectively mitigate the risk of supply shortages. Otherwise, they are likely to resort to grossly suboptimal and reflexive responses such as simply holding excess inventory.

Leveraging the power of data, digital tools and business networks

Globalisation, new business models and an empowered customer and workforce have accelerated the pace of business beyond what seemed possible just five years ago. Businesses can’t afford to simply project what might happen to their competitors and their markets in the future. To succeed, they must be agile enough to innovate and adapt their existing processes quickly to capitalise on those shifts.

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Companies have been meeting these new supply-chain challenges with a new set of tools. Cloud technologies can help companies to reconfigure business processes quickly and extend information to employees and partners across the globe. Companies are finding ways to develop forecasts that come closer to actual demand by incorporating data from new structured and unstructured sources (eg social media). Many leading supply-chain organisations are using these solutions to reduce risk, to make their supply chains more agile, transparent and robust, and to improve product and process innovation.

Companies are drilling deeper into business intelligence data to better understand what has happened in the past and what is occurring now. They are also tapping into the insights and intelligence within business networks to predict the future and shape it to their advantage. For instance, logistics teams can combine in-the-moment purchasing data with historic trends to arrange to replenish their stocks of goods before they run out. Similarly, procurement groups can be alerted to potential future risks in the sub-tier supply chain by analysing real-time supplier performance inputs, such as changes in payment status, key customer losses, as well as changes in leadership and commodity price or supply fluctuations. This data can be compared with historical results to identify potential patterns. The resulting alerts can be supplemented with recommended responses or alternative suppliers based on community-generated ratings and buying patterns of similar firms in a particular business network.

Consider the Home Depot's response to a severe weather forecast. "The company has a high level of understanding of what type of products will be needed in what geographies based on where the bad weather impact will hit hardest," explains Cheri Speier-Pero, professor of information systems at Michigan State University. "They are able to stage the distribution centres in those regions of the country and push the trucks out with the right product into specific stores at the right time." The company also extends store hours and

arranges for shipments to be delivered to affected locations around the clock.

The company's responses are based on Big Data analyses that combine and analyse information from diverse sources to predict geographically specific shifts in patterns of consumer behaviour. "A variety of consumer consumption in advance of events can be predicted with a fair degree of accuracy," says Ms Speier-Pero. "There are the traditional severe-weather needs for duct tape and the plywood, but they also buy strawberry pop tarts."

A core part of the strategy involves using business networks to keep consumers informed about what is transpiring during high-intensity periods. In the past, for example, generators would sell out soon after they arrived, leaving customers frustrated. Today, Home Depot tweets information to consumers, telling them: "Our generators just went out of stock at this particular Home Depot store, but these other locations still have some left." Ms Spiero-Pero adds that the company uses e-mail and text messages "to communicate information to those who are most in need of information—and to deliver the information even if they might have lost power and the only device that they have that is still working is their cell phone".

Supply-chain managers at Home Depot typify some of the dramatic changes happening in supply-chain management. Their role has evolved far beyond simply cutting costs. Today, their supply-chain initiatives help the company create immediate value for the company and for its customers.

Ms Speier-Pero adds that something as simple as traffic data may be able to help companies create significant value in less dire situations. "Here in Lansing, we have a Cadillac plant where they work on two hours of inventory on the plant floor, and the ability to get resupplied within a very tight time window is essential. A lot of the suppliers have distribution centres that are very close. They are doing 15-minute truck deliveries, instead of driving across the country, but they are still are constantly under intense time pressure."

New sources of data

The new approach to supply chains starts with data. More data are available about current and potential suppliers from more sources than ever before.

Business networks, for instance, have sparked an explosion of a new class of “unstructured” data—texts, tweets, blog posts, Web-based videos and other social postings. This data can now be combined with internal data from units involved in production, marketing, sales and pricing, HR, finance, facilities and operations. They can also involve transaction-level data from supplier, customer and partner relationships. All these new data sources can provide companies with additional insights that enable them to make better business decisions.

Buyers and sellers can make more informed decisions by leveraging the aggregated history of millions of business transactions. This data may allow them to detect changes in buying patterns or pricing trends and give them the confidence and qualifying information to consider trading with unfamiliar potential partners. When combined with community-generated ratings and content, such analysis can also provide real-time insights and recommended strategies for moving their businesses forward.

Many automobile manufacturers, for example, have access to data from customer-facing auto dealerships. This allows them to determine when a particular part is causing problems. While the problem might not rise to the level of recall, it may encourage a company to swap out parts suppliers or ask a particular supplier to look at its lot numbers to try to identify where a quality issue might be present.

Similarly, pharmaceutical companies have long been required to address provenance issues, but new legislation is introducing even more stringent requirements for tracking and tracing over-the-counter and prescription products. New concerns about contaminants in medicine and food are placing pressure on manufacturers to develop a more detailed understanding of the sourcing of

their products.

Additional sources of information about suppliers can come from social media. Organisations that have strong public policy constituencies can track what those constituencies think of their suppliers on Twitter, for example, or on other social media venues. This content could reveal that a supplier may have cash-flow problems or that a key executive is about to be dismissed.

Proactively querying the data

Gaining access to data is one thing. Leveraging the ability to analyse it is another, although here, too, companies are succeeding. On the most basic level, this involves looking at the available data in greater detail. With more data, companies can start their analysis with their worldwide transportation costs and drill down to what is going on in the Pacific Rim and what’s going on in Japan, for example. Outliers in the data can reveal weak points and interconnected vulnerabilities.

The same analysis can also help establish and implement more rapid and effective recovery plans should problems arise. The development of mathematical models that produce computerised descriptions of supply chains has helped companies make greater sense of their data and develop insights helpful in decision-making. The models can estimate the impact of potential failures at points along the supply chain—whether caused by a fire at a factory or a flood at a distribution centre.

To get and stay ahead of the competition, companies must not only sense the present, but see the future and proactively shape it to their advantage. They must anticipate risks and trends in the market and develop plans and adapt processes to meet those challenges before anyone else. By making best use of cloud, mobile, enterprise applications, social media and communities, supply-chain organisations can become more connected and operate in a more predictive way, thus improving their productivity and, ultimately, the value that they deliver.

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Companies also are making use of a new generation of tools that can bring what is taking place in a company's supply chain to life. For instance, increasingly sophisticated, user-friendly graphic software is empowering supply-chain managers to slice, dice, rotate and pivot massive databases compiled from diverse combinations of internal and external Big Data sources. Combined with ever-improving visualisation tools, the software greatly improves the ability of supply-chain managers to drill down, discuss, analyse and develop what-if scenarios on the fly. The tools also allow them to better identify key variables and issues.

By using these techniques, managers who are aware of the company's business processes can very quickly identify what might be an opportunity or a problem. This type of analysis can reveal weak points and other threats to a supply chain's connectivity. It can also help establish and implement more rapid and effective recovery plans should problems arise.

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Christopher Craighead, professor of supply chain management and director of research at the Center for Supply Chain Research at Pennsylvania State University

Working in sync

Instead of simply viewing suppliers as order-takers, many companies are taking new steps to tap into their product expertise. While this type of collaboration often allows companies to do things better, it also allows them to do different things and be more innovative. In some cases, suppliers know the product so well, they can come up with products that customers don't even know they want.

This type of collaboration has led to new types of process innovation that changes how a product is made or delivered. It has also led companies to develop more customised products to serve different industry segments or to provide different options that customers want. "A lot of customers want variety," says Mr Craighead. "Instead of white, they want a blue one with red stripes." He likens it to a paint store that starts with a base paint and then creates custom colours.

Companies also can reap significant benefits by using increasingly powerful supplier-collaboration

platforms that help them share more information with their supply-chain trading partners. By doing so, they may reduce sales costs and increase the overall speed, accuracy and adaptability of their supply networks. Philips, the Dutch diversified technology giant, recently rolled out a supplier-collaboration platform to get better real-time information about demand, order confirmation and stock status in its consumer lifecycles unit, which develops personal care, television and audio, and household products. The platform linked 600 suppliers across 11 Philips sites and was able to reduce vendor-managed inventory levels by 10-15% by paying closer attention to variations in supply and demand. The system also led to productivity improvements in the company's procurement and goods receipt processing groups.

Some companies have tapped into the power of their business networks by posting a specific problem they need to address and letting the market find the most creative and innovative way to solve it.

"Most big companies are using suppliers as sources of innovation," says Mr Craighead. "With Johnson & Johnson, maybe it is different ingredients or fragrance or a new combination of products. It might not just be the main product itself. They might say, 'Let's look to our packaging suppliers to provide us with more sustainable, more environmentally friendly packaging.'"

Digital networks have made it easier than ever for companies to collaborate. They give firms the opportunity to work off the same data—businesses benefit from a shared view of information.

Expanding the network

The same techniques are allowing companies to expand their network of potential suppliers in ways that would have been unimaginable a few years ago.

In the past, companies were reluctant to move beyond larger and established suppliers. With the increased transparency and more detailed information about prospective suppliers that can be gleaned from business networks, more firms are

able to find small, specialised suppliers and the information they need to make a buying decision. For instance, network-derived intelligence and community-generated content can be used to guide buyers to qualified suppliers based on a host of inputs, including their unique requirements, supplier capabilities and performance ratings, and how often other buyers on the network have awarded business to them.

By the same token, small firms that wanted to market specialised goods or services globally faced formidable barriers, including difficulty identifying buying managers at large companies. Today, small businesses and start-ups can much more easily identify and connect with key influencers and purchasers around the globe. Web-based business networks can help by turning to a savvy combination of Web-based searches and data available from social media sources, including LinkedIn.

These techniques are helping to connect companies with distant suppliers—they are also helping companies rethink the geographic location of their supply chains, including finding sources closer to home. Many companies are putting more emphasis on tapping suppliers located in (or in close proximity to) local communities in which the firms want to do business. As companies are starting to move their manufacturing (and their suppliers) to these new locations, they are aided by tools that allow them to better and more efficiently pinpoint nearby suppliers with the requisite capabilities and attributes.

The food industry has already experienced significant effects. Many grocery stores and restaurants are starting to realise that customers will pay a little bit more for food that is locally sourced and responsibly produced. Instead of relying on large food service suppliers and food distribution channels, the transparency and availability of information makes obtaining foodstuffs from local suppliers far easier.

The same techniques may be encouraging companies to become better citizens by making better use of the local communities in which they want to do business. Some are also looking at minority-owned businesses and women-owned

businesses to increase the diversity of their supply chains, with cost considerations often coming in a distant second.

On the horizon

The results of this new approach to supply-chain management will be felt for years to come on multiple fronts:

- **Supply chains will become more agile and more robust.** Greater transparency will help companies improve connectivity and reduce risks by allowing them to anticipate potential problems and prepare for speedy recovery when disasters do occur. For example, if a natural disaster causes a semiconductor supplier to shut down, companies that have done their homework will have a backup supply close at hand or be able to find alternate supply a lot faster.
- **As more data are collected, companies will be able to mine the data for additional insights.** Companies will be able to access data from a much wider variety of sources. The “Internet of Things” will throw off data from a variety of sources. Companies will be able to harness the knowledge of crowds through business networks. They will also be able to “geofence” objects, using global positioning systems or radio frequency identification systems that tell companies when a device enters (or exits) the boundaries defined by the administrator. And as companies learn to tap these vast amounts of data, the focus of analytics will move from forecasting to analysing trends in real time.
- **Companies wanting to assure themselves of the quality of a particular supplier can tap the insights and intelligence of entire communities.** By leveraging recommendations, feedback and other community-generated content within business networks, companies can make more informed decisions and identify the right partners to support their requirements and advance their business.

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- **As the huge complex of supply chains become more streamlined, many of them may also become more regional.** This may occur in certain industries that want to improve connectivity, reduce safety exposure and have less impact on the environment.
- **More efficient supply chains will allow companies to reduce and optimise their inventories—and perhaps even to reduce their capital reserves.** Enterprise inventory optimisation tools can help companies not only to reduce overall inventory but also to have the right inventory (materials, intermediates and products) at the right place in the multi-tiered network—at the right time and in the right quantity. More generally, companies typically

need to retain capital reserves to protect themselves from supply-chain risks. For all businesses—but especially for small businesses and for start-ups—there is a dynamic balance between risk and capital. Taking on more risk requires a larger capital reserve. By making supply chains less risky, companies will be able to better manage their inventory-carrying costs and their need for risk reserves.

Clearly, B2B supply chains are no longer simply logistics operations. Supply-chain managers are now on the front lines of the rapidly evolving digital networked economy, leading the way for their companies with agile, highly responsive strategies and the potential to win a formidable competitive advantage regardless of the challenges. ■

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