T E C H N O L O G Y   S P O T L I G H T

The Path to a Thinking Supply Chain

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The supply chain is experiencing a period of significant change. Changing business and customer requirements are putting new and greater pressures on the business, and emerging technologies are offering intriguing ways of working. Indeed, digital transformation is poised to change the supply chain more profoundly than any other functional area and more dramatically than at any point in its history. In the context of the challenges facing supply chains, both now and into the future, it becomes clear that the old ways of working will not suffice and that even best-in-class performance today is unlikely to be good enough in the future. It is the view of IDC that the supply chain must become a "thinking" supply chain, one that is intimately connected to data sources such as social sentiment and the IoT, enabled with comprehensive and fast analytics, openly collaborative through cloud-based commerce networks, conscious of cyberthreats, and cognitively interwoven.

Introduction

Digital transformation is poised to change the supply chain more profoundly than any other functional area and more dramatically than at any prior point in its history. In 2017, driven by social media and the Internet of Things (IoT), supply chains have 50 times more data available to them than just five years ago, with less than a quarter of it being analyzed in near real time for value. Within the next three years, half of all applications will have embedded cognitive capabilities — making them not only able to do things better and faster but to do things that simply couldn't have been done. In surveys conducted by IDC, 50% of supply chain organizations believe themselves to be past the midpoint of digital maturity, with almost 10% saying they are at the most advanced stage. While we might justifiably suspect a case of "rose-colored glasses," the reality is that leading companies are moving quickly and laggards may soon find themselves uncompetitive.

Supply chains in 2017 are being asked to be more customer centric, with direct selling to individual consumers a real near-term possibility for many. They are expected to be both dynamic and agile to meet customer needs, with the ability to respond more quickly than ever while maintaining accuracy and integrity. They must increasingly be always "on." Supply chains are expected to be data driven and demand aware, and they must have access to and the ability to analyze disparate data sources in the time frames required, with profound implications for B2B processes and their underpinning technology. If that weren't enough, they must be resilient in the face of external forces such as weather, war, workers, and regulation.

Indeed, the notion of "disruption" is now central to discussions of supply chain strategy and the necessary capabilities required to be competitive in the future. Disruption exists along two dimensions. First is the "black swan" event, anomalies that cannot be easily planned for and that present opportunities to make critical decisions. These events can be broad reaching, such as earthquakes or tsunamis that affect strategic decisions; they can also be more tactical, such as when

a storm imperils a critical shipment. Either way, the supply chain must be able to either anticipate or react quickly to mitigate any disruptions.

The second form of disruption relates to the emerging wave of revolutionary technology available to the supply chain that is likely to be a key element of competitive differentiation. While technology must ultimately serve the interest of the business, it is critically important to understand that these technologies will enable new capabilities or new business models — across all industries and all regions — that are not currently possible.

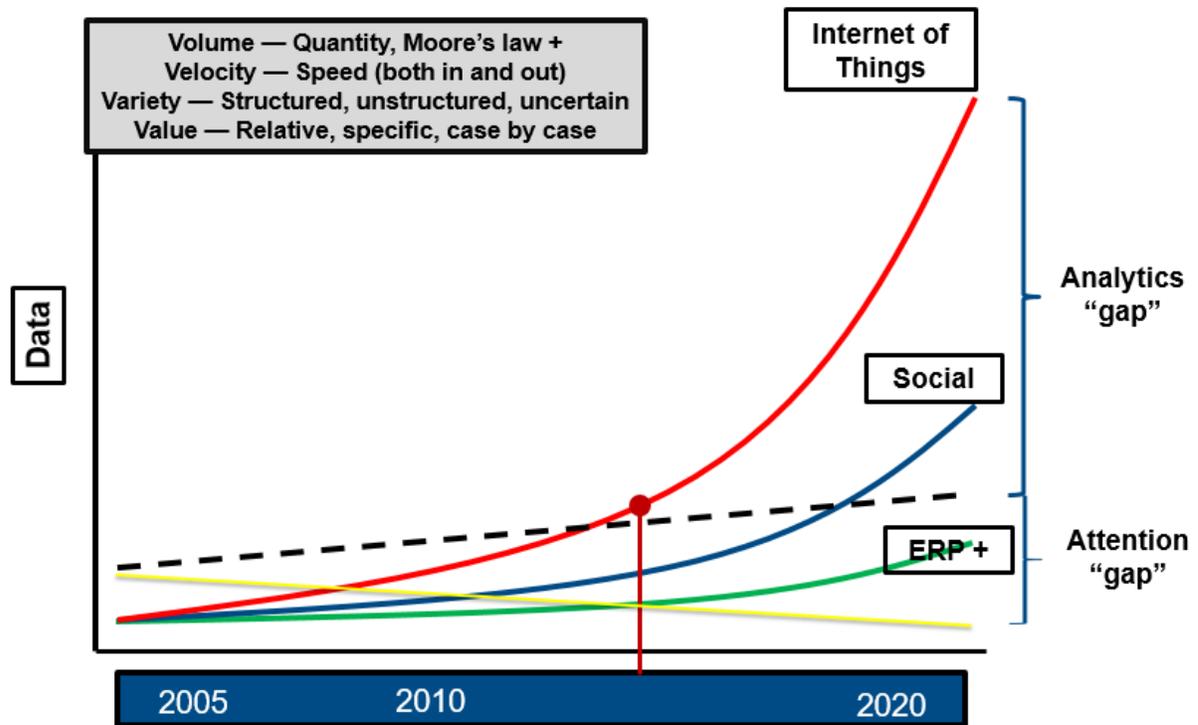## Benefits of a Digitally Enabled, "Thinking" Supply Chain

In the context of the challenges facing supply chains, both now and into the future, it becomes clear that the old ways of working will not suffice and that even a best-in-class performance today is unlikely to be good enough in the future. It is the view of IDC that the supply chain must become a "thinking" supply chain, one that is intimately connected to data sources such as social sentiment and the IoT, enabled with comprehensive and fast analytics, openly collaborative through cloud-based commerce networks, conscious of cyberthreats, and cognitively interwoven. The notion of a thinking supply chain is a powerful one that offers the prospect of a self-learning, intervention-free system.

If we broadly assess the typical supply chain, two major "gaps" emerge, as articulated in Figure 1. The first is an analytics gap whereby available analytics capabilities are not keeping up with the growth and diversification of data and data sources. If a supply chain aspires to being best in class, or even above average, available data must be full leveraged — whether it is traditional structured data that is easily searchable by basic algorithms or unstructured data more akin to human language. Unstructured data doesn't fit nicely into relational databases, and searching it based on traditional algorithms ranges from difficult to impossible. Then there is also dark data, broadly defined as that data which is not visible, or not yet visible, to an organization. Regardless of the nature of data, however, it is essential that the thinking supply chain have access to it in real time.

The second gap is one of attention and knowledge. Supply chain organizations have pursued cost reduction and traditional lean practices to the point that there are fewer people in the organization than at any time in the past, and as baby boomers retire, they take with them knowledge and practical experience that is not replaced by the millennials who succeed them. While this may be productive in the short term, as data analytics capabilities invariably grow in the supply chain, there likely won't be enough "eyeballs" available to act upon the resulting insights.

FIGURE 1

The Analytics and Attention Gaps

Source: IDC, 2017

Thus the imperative exists for a digitally enabled, thinking supply chain that can manage, in real time, massive amounts of structured and unstructured data from both internal and external sources, including data sets that might previously have been elusive. Imagine a thinking supply chain that could aggregate data across regions to both anticipate future demand accurately and manage current replenishment. Or one that could manage asset, inventory, and shipments through real-time tracking and optimization and then configure and change orders even in the middle of production — all done automatically without direct human intervention. People would have oversight, of course, but a thinking supply chain could iterate decisions far faster than any human could.

The benefits of a thinking supply chain will be enormous. Data not previously utilized (or utilizable like natural language) will now be analyzed in real time. Insight not previously acted upon will now be part of the decision-making process. Companies will have far broader supply chain intelligence, which will allow them to be more efficient and effective, avoid internal and external disruptions, and support new business models. The supply chain will better understand the risks and potential disruptions not only to itself but to its suppliers and customers, and its executives will have greater insight into the bottom-line impact of their decisions. Another benefit of the thinking supply chain is prioritization. As analytics improve, they can recognize situations that are problematic and issue alerts, overwhelming human monitors. Cognitive allows for the prioritizing of alerts based on potential business impact. Supply chains are alerted to the big problems rather than trying to sift through all issues.

Technology Trends

Making the digitally enabled, thinking supply chain a reality is not a trivial undertaking, yet it is a process that we now see playing out before us. If we consider this process to be an aspirational journey, with capabilities acquired over time, then many supply chains have already begun their transformation. In a recent IDC survey of digital transformation, half of manufacturers believed themselves to be beyond the midpoint of digital maturity. This does not mean that they have a thinking supply chain yet — rather, they are on the journey to acquire the capabilities that will make such a system possible.

In our supply chain research, IDC has defined the thinking supply chain in the context of five "Cs": connected, collaborative, cyberaware, cognitively enabled, and possessed of comprehensive analytics. Each of these areas contributes critically to the thinking whole:

- **Connected:** Ultimately, the base of the thinking supply chain is data and the ability to access as much data as possible. Integration with all data sources is critical, as is automation of all documents across both internal functions and process and supply chain partners. A thinking supply chain can't learn from data it doesn't have. Connected means being able to access unstructured data from social media, structured data from the IoT, and more traditional data sets available via traditional ERP and B2B integration tools.

- **Collaborative:** IDC has estimated that over 50% of the value creation in manufactured products comes from outside the traditional manufacturing enterprise. Most come from suppliers and range from simple contract manufacturing to specify intellectual property contributions to new products. It varies by subsegment, being higher in discrete manufacturing than in process manufacturing, but it is material across the full breadth of the industry. Improving collaboration with suppliers is critical, and in the digitally enabled, thinking supply chain, this increasingly means the use of cloud-based commerce networks to enable multi-enterprise collaboration and engagement.

- **Cyberaware:** Although not a focus for this paper, the ability of the supply chain to harden its systems and databases from cyberintrusions and hacks is critical; it only becomes more important as we move into the era of the thinking supply chain. It is unrealistic to think that the supply chain will become a cybersecurity expert anytime soon, so this ends up being more of an enterprisewide concern.

- **Cognitively enabled:** The AI platform becomes the modern supply chain's control tower by collating, coordinating, and conducting decisions and next best actions across the chain in an automated and timely way. It can understand the business impact of data and events, and prioritize attention based on potential impact. Certain exceptions would require human intervention, but most of the supply chain would be automated and self-learning.

- **Comprehensive:** Analytics capabilities must be scaled with data and in real time. If the thinking supply chain is to perform better than humans could and support the required increases in supply chain speed, then insights must be comprehensive and fast. Latency is both unnecessary and unacceptable in the supply chain of the future.

If we accept these five "Cs" as critical to the thinking supply chain, then it becomes business critical to begin the process of acquiring these capabilities. Many supply chains have begun that process, with participation in cloud-based commerce networks at an all-time high and major efforts underway to bolster analytics capabilities. Although IoT implementations are growing, the ability to utilize sensor data is still in its relative infancy and must improve. Likewise, true cognitive/AI systems for the supply chain are the exception rather than the rule and represent the biggest opportunity moving forward to enable the thinking supply chain.

Last is the notion of platforms versus applications. Data and analytics exist in both places, and while IDC believes both have a role to play in the thinking supply chain, it is critical that they be transparently integrated. As noted, a thinking supply chain cannot act on, or learn from, data that it cannot see.

Digital capability, with cognitive enablement as a key element, is already defining the competitive edge. There are increasing examples of companies born into the digital age with a business model that would not have been possible just a few short years ago. Whether it is a Netflix's content streaming model exposing the antiquity of physical movie rentals or a small business like Mink enabling cosmetics personalization with 3D printer technology, the world of business is changing forever. And it's not just about innovative business models and disruption, though they get most of the press; it's also about innovating and improving business processes in ways that drive significant competitive edge. The digitally enabled, thinking supply chain is not an "if" but a "when" — and that "when"' increasingly appears to be now.

Considering IBM

IBM has emerged as an early pioneer in the cognitive computing space with its Watson technology. Recent announcements from Watson Supply Chain have brought some notable capabilities to bear on the supply chain space. Supply chain optimization, in concert with Watson's cognitive capabilities, enables an organization to build a supply chain that is more intelligent, demand sensitive, and customer centric. Organizations can use the platform to proactively predict, assess, and mitigate disruptions and risks. It also establishes a business partner network that helps an organization to be more efficient and agile in meeting the demand of digital business.

- **IBM Supply Chain Insights (SCI)** uses cognitive technology to provide comprehensive search, visibility, and insights across the entire supply chain. With SCI, organizations can optimize the supply chain by predicting, assessing, and mitigating disruptions and risks and thus deliver greater value to the business.

  - SCI Operations Center proactively monitors and governs operations with speed and agility and provides smart alerts for exceptions and disruptions. SCI Resolution Rooms provide cognitive-enabled insights and recommendations based on learned best practices to drive collaboration in responding to disruptions and events.

  - Benefits include slashing information-retrieval and disruption management time from days to just minutes.

- **IBM Supply Chain Business Network (SCBN)** establishes digital connections with suppliers and partners to automate, digitize, and correlate all B2B documents to deliver deep search and visibility into the B2B transaction life cycle and partner performance. Organizations can search and view the entire business transaction landscape and obtain the real-time information and intelligence.

  - SCBN enables supply chain, IT, and line-of-business users to easily find transactional information and documents and drill down into granular detail using simple natural language search. It also provides expert guidance and smart alerts to monitor transactions and partner performance against SLAs and internal benchmarks.

  - With SCBN Business Transaction Intelligence, driven by Watson, an organization can search and see the entire life cycle of a transaction in real time and in context or drill down to the granular detail of a specific transaction.

  - SCBN blockchain capabilities provide shared multiparty visibility around key business transactions including orders, promise dates, key contract terms, shipment details, and payment terms. With a single, shared view of events, partners can easily resolve issues and potential disputes.

- SCBN's intuitive features translates into employee adoption and reduced time to value.

Challenges

IBM Watson is well known in the technology space but not in the supply chain space. Thus it will be incumbent upon IBM to be very clear about the role Watson can play and the benefits that will result. Watson is dependent both upon data and on the ability to interact with supply chain application systems. Watson cannot advise or learn from data it does not have access to, and it cannot help to make operational decisions without clear connections to the operational supply chain systems. The recent partnership with SAP Ariba is a perfect example of how Watson Supply Chain must become integrated with the systems that run the supply chain on a day-to-day basis.

Conclusion

Supply chains face enormous pressure to be more efficient and more effective — and even to be enablers of new business models. While technology isn't the only "lever" able to accomplish changing requirements, it is a powerful one. The notion of a digitally enabled, thinking supply chain that acts on all available data to prioritize actions and deliver superior results is something that can be a driver of sustainable competitive differentiation.

If we consider this shift to a thinking supply chain to be an aspirational journey, with capabilities acquired over time, then many supply chains have already begun their transformations. But they need to become digitally enabled quickly, otherwise that aspirational supply chain might become a reality somewhere else. Being digitally enabled means connecting and automating internally across functional areas or with end-to-end processes like order to cash and with suppliers, customers, and consumers. There will be a "network" effect where value grows exponentially with the automation of transactions, documents, and key partner enablement.

While the notion of a thinking supply chain remains aspirational for most companies, progress is fast. It is IDC's view that companies should begin exploring the thinking supply chain now. We suggest the following steps:

- Understand what digital transformation means to your business and the role for the supply chain.

- Do a digital self-assessment of your supply chain — what can competitors do that we cannot?

- Educate yourself to the potential opportunities digital technologies can bring to the supply chain.

- Identify key technology partners to collaborate on the best way to begin adopting these new technologies.

The supply chain is the most obvious "face" of the business for customers and consumers. The better and more effective the supply chain is, the better it protects business reputation and long-term sustainability.