Orchestrating tomorrow's supply chain

Infusing the electronics supply chain with new potential

IBM Institute for Business Value

The old and the new

The modern supply chain ecosystem requires a new mindset and a new breed of experts. While yesterday's supply chains were focused on the availability, movement and cost of physical assets, today's are about the management of data, services and products bundled into solutions. These modern supply chains leverage massive amounts of data, curated by analytical experts and data scientists. Next-generation supply chain leaders and the Enterprise Resource Planning (ERP) systems they manage will drive their organizations and ecosystems to optimize the usefulness of data, analyzing it in real time with minimal latency. Insights will be instantly distributed across the supply chain, manufacturing, distribution and field operations for effective cost containment.

Supply chains and AI

The modern supply chain is about much more than just "where" and "when." Supply chains affect product and service quality, delivery, costs, the customer experience and ultimately, profitability. Harnessing the data tsunami inherent in the modern supply chain and converting it into operational insight is creating a challenge for traditional information technology infrastructures.

The data tsunami is real.[1] In 2017 a typical supply chain accessed 50 times more data than just five years earlier. However, less than a quarter of this data is being analyzed in real or near real time.[2] That means the value of critical, time-sensitive data, such as weather, sudden labor shortages, political unrest and micro-bursts in demand, can be lost before being put to use.
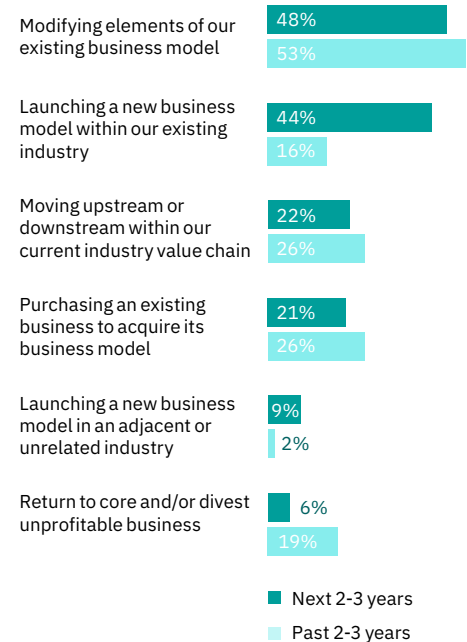
This *value loss* issue is exacerbated by electronics companies' further embrace of new software and data business models.

According to the 2018 IBM Institute for Business Value Global C-suite Study "Incumbents strike back," 44 percent of surveyed electronics industry executives intend to launch completely new business models in the next few years.[3] Many of these models extend into services, creating opportunities for incremental revenue beyond the product price.

The evidence of the electronics industry moving to new business models is clear and convincing. In a recent study of industry executives, the percentage that said they are modifying elements of their existing business model in the next 2–3 years actually declined slightly from the prior 2–3 years. But the percentage that said they are launching a new business model within our existing industry in the next 2–3 years more than doubled from the earlier period (See Figure 1).

Figure 1

Changes in our enterprise's business model

Modifying elements of our existing business model
48%
53%

Launching a new business model within our existing industry
44%
16%

Moving upstream or downstream within our current industry value chain
22%
26%

Purchasing an existing business to acquire its business model
21%
26%

Launching a new business model in an adjacent or unrelated industry
9%
2%

Return to core and/or divest unprofitable business
6%
19%

■ Next 2-3 years
□ Past 2-3 years

New models are rocketing

Traditional supply chain software is not tuned to easily accept the changes these new business models can require. Instead, supply chain experts have pursued new technologies that allow AI to analyze data in streams without ever requiring it to be stored. This approach integrates artificial intelligence (AI) into ERP systems with less risk. ERP processes with AI possess more insight, efficiency and flexibility, while keeping the systems stable and strong.

Leading supply chain organizations are working to use data and new techniques as decision inputs to current infrastructure and processes. This allows them to deliver increased value to the top and bottom lines. In other words, they are able to orchestrate tomorrow's supply chain today.

Of course, new models require new data, new skills and expanded business requirements, such as:

– *More data sources:* Connected device data can inform manufacturers about applications, usage, demand and consumer behavior. AI can be used to analyze environmental data to identify optimal supply routes and perform pattern analysis to streamline deliveries and operations.

– *Next-generation products, manufacturing and business models:* AI, in combination with the Internet of Things (IoT), allows users to derive advanced insight into equipment performance, proactively manage potential quality issues and optimize service costs. Optimized service and quality often improves customer experiences – especially as more product updates and enhancements are made via software. These interactions bring the supply chain closer to the product user and support a more responsive and agile service operation.

– *Increased traceability and provenance to predict problems earlier:* More than ever, customers are examining an electronics company's brand reputation as part of their purchase decision. Protecting the organization from unethical, fraudulent or less-than-honorable sources is increasingly important. In this arena, blockchain utilities can reduce business process friction and increase speed of service and authentication. New approaches to testing metals, parts and components also mitigate risk throughout the supply chain – from sourcing to delivery.

These new approaches require new thinking. When asked which business accelerators would improve the performance of their enterprise, 55 percent of electronics CEOs chose "investing in people or resources with more relevant skills," the only answer that surpassed 50 percent.[4]

New supply chain applications

By applying advanced technology to legacy systems, companies can support a battery of new applications. One application is *demand sensing,* in which AI analytics can extract insights from the market to drive customer-to-business supply chain models. This AI augmentation can help expand customer relationships and shape new products, while blockchain can decrease friction and build brand trust. (See sidebar: "Are electronics executives ready for change?")

Another application is risk insights, where advanced analytics generate alerts, mitigating the impact of impending supply chain risks. The AI augmentation can provide improved decision making, while blockchain can provide continuous verification to prevent lost shipments.

Transparency also can be improved. Advanced analytics can parse and understand complex regulations to ensure suppliers abide by rules. AI augmented verification technology can help determine material provenance, while blockchain can provide real-time provenance visibility to reduce tampering and counterfeiting.

Blockchain can also be used for intellectual property by creating evidence of ownership, critical for electronics companies helping enforce agreements, licensing and distribution rights. It can be used with designs, photos and data in addition to transactions, providing immutable evidence with a practical way to store and trace it. And blockchain can streamline the lifecycle management of IP – including patents, trade secrets or trademarks – enabling transactional access privileges that better protect assets.

Modern supply chains are using data to improve the quality of audits, inspections and assembly. For example, one such system can detect and prioritize quality issues earlier than traditional supply chain software with fewer false alarms.[5] Another uses spectral analysis to identify and verify the authenticity of a physical asset such as a diamond or an assembled component. Assets can travel through a complex chain of custody on their way to their final destinations.

To reduce the chance of counterfeiting and help ensure provenance, an asset can be scanned using AI technology on a smartphone. Spectral analysis captures unique microscopic properties, creating a digital fingerprint that can be used to verify authenticity.[6]

Getting started

Are electronics executives ready for change?

In the 2018 IBM Global C-Suite study, we asked electronics executives where they expected to use AI and cognitive approaches. Nearly half said they expected to enhance forecasting and decision-making capabilities in the next 2 - 3 years, and 29 percent say their organization has identified business processes that can be augmented or automated by AI. But only 31 percent are using unstructured data as part of ERP and other transactional processes and 9 percent are using autonomous cognitive decision-making capabilities based on data discovery.[7]

Augmenting a supply chain with new technology doesn't require revamping an enterprise's entire I/T infrastructure. It does, however, require some careful thought and a few actions to help the change go as smoothly as possible.

Find the right skills: Management of modern supply chains calls for expertise in advanced data analytics and statistical modeling. If these skills aren't available within the supply chain staff, be prepared to reshuffle, retrain or recruit them.

Determine where to deploy an AI-augmented supply chain first: Assess the status of supply chain operations. Find an important but isolated area that could benefit from greater data analysis. Or choose an area in which data exists but can't be analyzed quickly enough? Select an area offering competitive advantage. Start with a small proof-of-concept, set goals, measure success and grow capabilities quickly.

Perhaps most important, it's about the business, not the technology: While AI and blockchain are exciting new technologies, remember that focus should be on solving specific problems and creating opportunities to transform the business, not about finding ways to use technology. This is important both in communication to employees and in selecting partners.

Leading electronics companies are using AI-infused and blockchain solutions to proactively predict, assess and mitigate supply-chain disruptions and risks. They are improving their ability to meet increasingly complex customer requirements and demonstrate unparalleled levels of integrity and trust through transparent operations. Will your company be looking for ways to compete with these leaders, or will you be one of them?

Notes and sources

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