Data-Powered, Adaptive Supply Chain To Become Future Fit: A Focus On The Manufacturing Industry

The manufacturing industry is undergoing a rapid change. Manufacturing organizations are under immense pressure to transform into digital businesses, become increasingly agile and efficient, and reduce production costs to a minimum — while maintaining high quality. This affects not only the manufacturers but also suppliers and partners. To survive in this fast-changing digital world, manufacturers must address potential sources of error in the supply chain and reduce both costs and production times.

Most digital transformation initiatives in manufacturing supply chains are about improving operational efficiencies. But forward-thinking adaptive manufacturing organizations are increasingly turning to data-driven supply chain management. Why? COVID-19 has pushed manufacturing enterprises to build more resiliency and responsiveness in their supply chains. Data-driven supply chains help to automate business processes, reduce risks, produce new levels of intelligence, improve employee experience, deliver better customer experience, and ultimately fuel digital transformation.

Only half of manufacturing decision-makers report having a business continuity plan to address supply chain disruption during COVID-19.

The rise of data analytics tools, internet of things (IoT), cloud, process automation, and AI/machine learning (ML) adoption has become an important enabler for manufacturing firms to build visibility, scalability, and flexibility in supply chain management processes. To build operational efficiency, businesses must be able to acquire data from multiple sources, consolidate it, isolate events, analyze root causes, and identify next-best actions. The resultant transformed supply chains are agile, responsive, adaptive, and resilient.

Data-driven supply chain management has become a strategic priority; ensuring its support in the market will enable manufacturing enterprises to accelerate their innovation.

KEY FINDINGS

› A data-driven supply chain is key to digital transformation and business resiliency.

› Data analytics, IoT, and cloud adoption offer untapped potential to supply chain management.

› Antiquated processes and existing legacy systems are major barriers to supply chain transformation.

Infosys commissioned Forrester Consulting to leverage Forrester research and Business Technographics® data to explore the importance of the supply chain imperative, including the perceived challenges, drivers, and benefits of investments in supply chain management.

METHODOLOGY

The data and insights in this study are based on existing findings from Forrester's research on the supply chain.

The Business Technographics® data leveraged is based on the responses from decision-makers at organizations in the manufacturing industry with 500 or more employees.

For more details, please refer to Appendix A.

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The Value Of A Data-Driven Supply Chain

The global manufacturing industry has fundamentally shifted: Empowered customers are at the center of an ecosystem where products once were. Moreover, with the advent of B2B2C business models, manufacturers must not only serve both their partners/suppliers but also the end customers. Adaptive manufacturing decision-makers must rethink their firms' operations to continue delivering value.
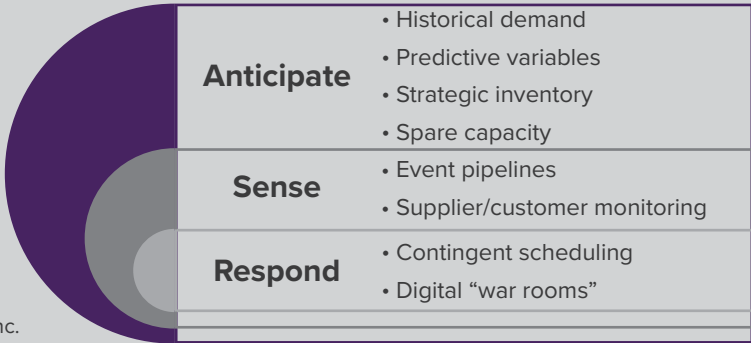
Three key factors drive demand for supply chain transformation (see Figure 1):

› **Improving ability to observe and analyze supply chain events in real time.** Manufacturing firms must improve supply chain visibility. Improved visibility drives a digital supply chain's effectiveness in sensing supply chain events and orchestrating supplier and fulfillment partnerships to meet anticipated customer demand. In the digital age, manufacturers (e.g., pharma, automobile, and electronic firms) often request short-notice orders from their supply chain partners while also expecting on-time and accurate delivery. Making delivery dates on a consistent basis requires clear visibility throughout the supplier network as well as real-time insight into potential problems that could complicate on-time delivery.

› **Enhancing responsiveness in the supply chain.** Prior to the pandemic, many firms implemented a lean supply chain, which prioritized cost reduction, enabled just-in-time delivery, and minimized global product inventory buffers. The pandemic has exposed vulnerabilities in the lean supply chain approach, forcing firms to increase local inventory levels and diversify their suppliers. Instead of using a conventional linear supply chain, firms are deploying dynamic, integrated, and responsive supply networks, which provide organizations with real-time insight across the entire supply network and give supply chain stakeholders the flexibility to address unforeseen disruptions and environmental challenges that impact product supply and demand.

› **Optimizing mission-critical supply chain processes.** Adaptive manufacturing firms must evaluate gaps and challenges within their own supply chain processes. For example, stakeholders may lack visibility into inventory performance across multiple production sites. Firms need detailed, accessible data on inventory availability to optimize inventory based on demand forecasting, manage excess inventory in warehouses, and reduce stock-outs.
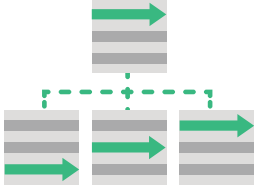
More than one-third of manufacturing decision-makers involved with digital transformation efforts in their organizations said they will focus on "supply chain transformation."

Figure 1: Enterprises Embed Anticipation, Sensing, And Responding Capabilities
Digitally Remaster Your Supply Chain

Anticipate	• Historical demand • Predictive variables • Strategic inventory • Spare capacity
Sense	• Event pipelines • Supplier/customer monitoring
Respond	• Contingent scheduling • Digital "war rooms"

Source: Forrester Research, Inc.

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Key Pillars For Successful Execution Of An Adaptive Supply Chain Strategy

Decision-makers must orchestrate supply and demand to gain full visibility of all the demand in the integrated business plan, including seasonal, promotional, or new product introduction demand and cannibalization effects where appropriate.

This study outlines three key technology capabilities and steps adaptive manufacturing firms should take to design an effective supply chain management:

1. **Applying advanced data analytics improves supply chain management.** Firm should be focused on data analytics; insights-driven organizations are better positioned to make swift business decisions, learn faster than competitors, and ultimately gather business intelligence into their supply chains.

   - **Integrating new sources of data and moving from silo intelligence to collective intelligence drive deeper insights.** Visibility into supply chains requires a mix of enterprise data from familiar sources, such as enterprise resource planning (ERP), customer relationship management (CRM), warehouse management, and various supply chain management and execution systems as well as relevant external data sources. Successful firms use new, broader data sets to get deeper insights and forecast demand more accurately.

   - **The supply chain control tower enables digital operational excellence.** The supply chain control tower boosts visibility and event orientation, simplifies collaboration, and enables the digital supply chain. Analytics-driven business decisions can fundamentally change supply chain operations. For example, rather than sending all shipments through a regional pool point, daily order and shipment optimization might route some through the pool point and the rest directly to customers. In this way, organizations can improve customer service levels, improve business operations, and reduce costs (see Figure 2).
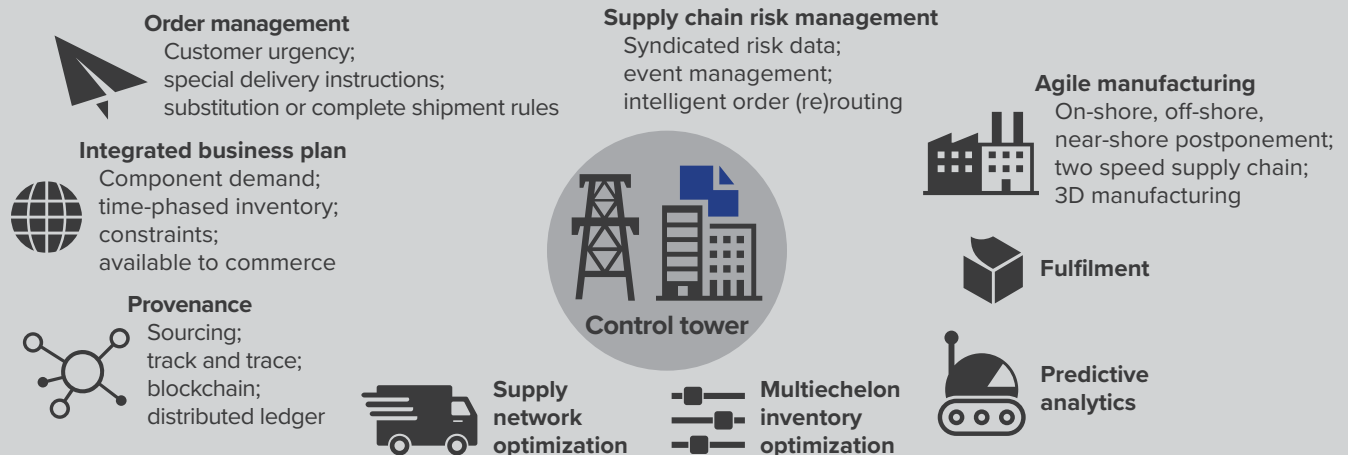
Two in five manufacturing decision-makers said that their focus is on applying data and analytics to accelerate their organizations' journeys toward digital transformation.

Figure 2: The Supply Chain Control Tower Manages The Many Elements Of A Digital Supply Chain
Master Digital Supply Chain For Age Of The Customer Operations Excellence

THE SUPPLY CHAIN CONTROL TOWER

Order management
Customer urgency;
special delivery instructions;
substitution or complete shipment rules

Supply chain risk management
Syndicated risk data;
event management;
intelligent order (re)routing

Agile manufacturing
On-shore, off-shore,
near-shore postponement;
two speed supply chain;
3D manufacturing

Integrated business plan
Component demand;
time-phased inventory;
constraints;
available to commerce

Provenance
Sourcing;
track and trace;
blockchain;
distributed ledger

Control tower

Supply network optimization

Multiechelon inventory optimization

Fulfilment

Predictive analytics

Source: Forrester Research, Inc.

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2. **IoT transforms supply chain management.** Supply chain management solutions connect suppliers, production locations, warehouses, distribution centers, and retail locations, ensuring delivery of the optimal combination of products to the right distribution, retail, and selling locations at the right time. IoT-enabled solutions help firms improve key processes throughout their supply chains. Adaptive manufacturers begin introducing IoT into the supply chain by focusing on specific processes, including fleet management, cold chain monitoring, inventory or warehouse management, and track-and-trace applications (see Figure 3).

   - **Inventory or warehouse management solutions track inventory and operations.** Inventory management and warehouse management applications concentrate on tracking materials and forecasting availability. These solutions are becoming more agile, flexible, and responsive and often integrate with supply chain management systems so firms can meet customer expectations for real-time insight into product availability. Linking inventory management with supply chain networks enables firms to deliver products to customers in a timely manner. The retail, wholesale, manufacturing, and production sectors benefit from these inventory management and supply chain management solutions.

A significant percentage of manufacturing leaders are either planning, implementing, or expanding IoT applications:

- Supply chain management (33%).

- Inventory or warehouse management (32%).

- Track and trace (27%).

- Fleet management (23%).

- Cold chain monitoring (21%).
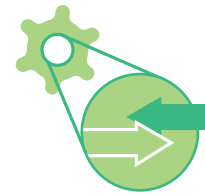
Three in five manufacturing decision-makers said they will invest in IoT as a part of their organizations' digital transformation efforts.

Figure 3: IoT Applications Enhance Processes Throughout The Supply Chain
IoT Transforms Supply Chain Management

Supply chain management

Inventory/warehouse management

Cold chain monitoring

Fleet management

Track-and-trace
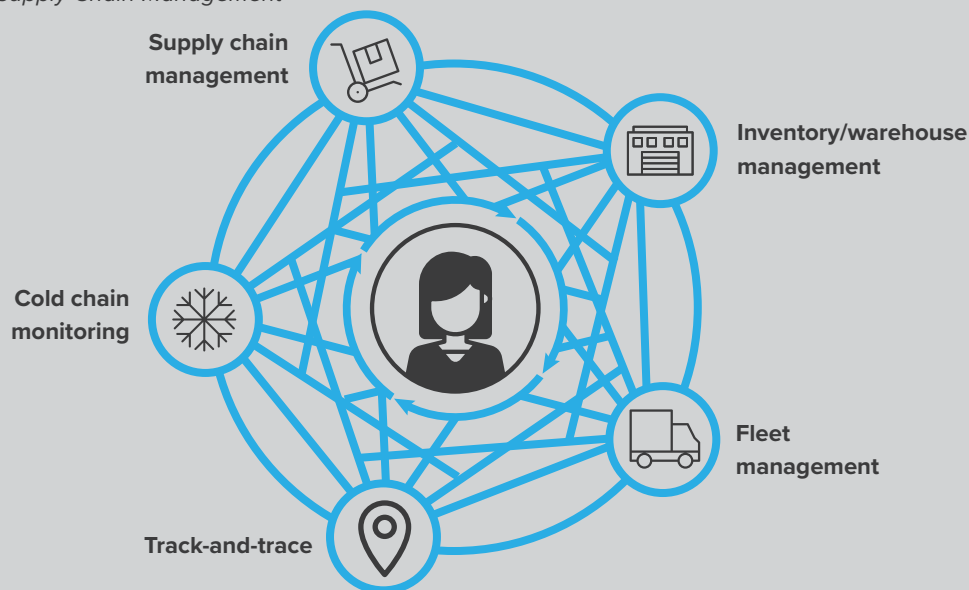
Source: Forrester Research, Inc.

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3. **Cloud platforms have become the foundation of the new digital supply chain model.** Manufacturing firms are expanding their adoption of cloud to take advantage of scalability, lower capital costs, ease of operations, improved collaboration, and the resilience offered by the cloud.

   - Manufacturing decision-makers are aware that operational inefficiencies in the supply chain model have resulted in a lack of coordination. With cloud, firms want to improve performance and operational efficiency and save on costs. Cloud will reduce reliance on legacy infrastructure, improve manufacturing firms' ability to scale resources and manage costs, and ensure disaster recovery readiness.

   - Cloud-based services enable better collaboration and integration in the supply chain, providing a more strategic approach for inventory deployment.

In addition, firms can also leverage process automation, artificial intelligence and machine learning, blockchain, and other emerging technologies to jump-start their digital supply chain initiatives.

Key Recommendations

Overstock, understock, late shipments, broken equipment, poor-quality goods — the problems of supply chain managers are nearly endless, and they have severe business impact. As supply chain leaders look to resolve existing issues and expand their technology usage over the next few years, they must ensure that their supply chain ecosystems are secure, resilient, and adaptive. To succeed, supply chain professionals should:

Tap the power of data to fuel supply chain visibility and optimization. Traditional ways of running the supply chain must evolve. Evaluate the emerging technologies that require manufacturing to upgrade legacy technology and processes related to product data, inventory, orders, and the supply chain.

- Apply data analytics to the supply chain. An effective supply chain relies on accurate data. To delight customers, inventory accuracy must be very high at each node in the distribution chain.

- Evaluate IoT, cloud-native technologies, AI/ML, process automation, blockchain for driving success, and competitive advantage with supply chain management.

Choose and reengage with visionary and trusted partners. Given the pace of change and innovation across the supply chain, most decision-makers will need help crafting a strategic plan. Choose a partner that understands your business and can help you develop a suitable governance model. Also, look for their assistance to address the inevitable change management issues that arise from supply chain modernization projects.

Adopting advanced supply chain analytics begins with technology and ripples outward. While advanced supply chain analytics are created and delivered through technology platforms, it's the human elements — culture, processes, and employee skills — that are critical to turn a grand vision into reality. As in other lines of business that have been transformed by data insights, the people involved with supply chain management need proper training and skills enhancement to realize the full value of technological investments.

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Appendix A: Supplemental Material

RELATED FORRESTER RESEARCH

"IoT Transforms Supply Chain Management," Forrester Research, Inc., December 11, 2020

"The Forrester Tech Tide™: Smart Manufacturing, Q2 2020," Forrester Research, Inc., April 1, 2020

"The Forrester Wave™: Digital Operations Platforms For Manufacturing Businesses, Q3 2020," Forrester Research, Inc., September 30, 2020

"From Grease To Code: Industrial Giants Must Bet Their Futures On Software," Forrester Research, Inc., April 24, 2019

"Digitally Remaster Your Supply Chain," Forrester Research, Inc., September 18, 2020

"IoT Solutions Transform The Cold Chain," Forrester Research, Inc., May 2, 2019

"Master Digital Supply Chain For Age Of The Customer Operations Excellence," Forrester Research, Inc., July 9, 2018

Forrester Analytics Global Business Technographics Services Survey, 2020

Forrester Analytics Global Business Technographics Business And Technology Services Survey, 2020

Forrester Analytics Global Business Technographics Priorities And Journey COVID-19 Recontact, 2020 (April 29 - May 22)

Forrester Analytics Global Business Technographics Network And Telecom Survey, 2020

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