

Supply Chain Trends and Best Practices to be Resilient

Procurement Intelligence | Thought Leadership Series

Overview of Supply Chain Trends

The recent pandemic, geopolitical tensions, and inflation have affected the entire value chain, from raw material sourcing to end customers. This has affected the operational, financial, commercial, and organizational resilience of most companies globally. The COVID-19 pandemic has highlighted risks and resiliency gaps for many supply chain organizations.

- As the effects of COVID-19 continue to impact the global supply chain, businesses are seeking to build resilient supply chains moving forward. Supply chain strategies are being rapidly deployed by leading organizations to help build resilience and agility in order to mitigate supply chain disruptions

Supply chain trends - Key focus areas/themes



Technology

According to PwC Digital Trends in Supply Chain Survey 2022, more than **one-third of companies** (244 operations and information technology leaders, C-suite executives, and other supply chain officers) are planning to invest at least US\$1 million in supply chain technology.



Resilience/Agility

According to KPMG 2021 CEO Outlook report, **67% of CEOs** (1,325 chief executives across 11 major markets) indicate that they will increase investment in disruption detection and innovation processes.



Visibility/Transparency

According to Capgemini Supply Chain Survey 2020, **only 9% of organizations** (a survey of 1,000 companies from the consumer products, retail, discrete manufacturing, and life sciences sectors) have built the capabilities around end-to-end supply chain visibility to be crisis-resilient.



Sustainability

According to 2021 United Nations Global Compact–Accenture CEO Study on Sustainability, **72% of CEOs** (1,232 CEOs across 21 industries) globally agree that sustainability remains an immediate priority as they deal with the fallout of the COVID-19 pandemic.

Supply Chain Organizations Adapting to New Technology

The changing global health situation, inflation, geopolitical tensions, and trade risks will require continued agility, resilience, and adaptability in supply chains. Adapting to new technologies such as supply chain digital twin, analytics - including ML and predictive and prescriptive analytics, and hyperautomation helps deliver resiliency, automation, and intelligence within the supply chain organization.

Digital supply chain twin technology

Digital supply chain twin is a digital representation of a supply chain. It is programmed to be dynamic and perform in real-time as well as be able to forecast future needs and adjustments based on its horizontal and vertical inputs (from manufacturers and suppliers to transportation providers and distribution hubs) throughout the supply chain

Implementing a digital twin improves supply chain resiliency and agility by incorporating numerous information sources into a single model, then predicting the cascading effects of various events. This allows companies to be prepared for eventualities and helps them make decisions faster to evaluate and forecast potential alternatives.

Digital twin technology helps companies meet sustainability goals by optimizing transportation routes to reduce carbon emissions and modeling the impact of different raw materials sourcing and suppliers' engagement based on their overall carbon footprint.

The key challenges in implementing digital twin technology include identifying both horizontal and vertical inputs throughout the supply chain to feed the data into the platform and significant upfront investment. Companies adapting and utilizing the digital supply chain twin technology routinely report an average savings of 8%-10%.



Average cost savings	Sourcing	Production	Transportation	Handling	Inventory
	7%–9%	8%–10%	8%–10%	5%–7%	9%–11%



Impact to the bottom line



1%–3% Revenue



8%–10% Operating cost

Digital twin technology helps in bringing together supply chain efficiency and supply chain resiliency and agility



Supply chain efficiency	Supply chain resiliency and agility
<ul style="list-style-type: none"> • Planning for demand • Network optimization • Automation • Routing optimization 	<ul style="list-style-type: none"> • Transportation and sourcing optimization and capacity planning in case of base/established supply networks • Network design and modes to support dynamism and transporting for small batches in case of flexible supply networks
Demand modeling and cost optimization	

Informed decision-making happens faster with the help of AI-powered insights driven by digital supply chain twin technology. For instance, the implementation of technology can help in making informed decisions within weeks of the chaos/panic compared to a year of time taken to make decisions in case of unprepared responses. Therefore, supply chain resilience is emerging as a competitive differentiator

Analytics - including ML and predictive and prescriptive analytics

- Supply chain analytics helps make data-driven decisions based on reporting and interactive data visualization by uncovering patterns and generating insights through massive amounts of data generated in the supply chain activities
- The different types of supply chain analytics are as follows:
 - Descriptive analytics - Identify trends and provide visibility for both internal and external systems and data
 - Predictive analytics - Mitigate disruptions and risks by understanding the most likely outcome/future scenario and its business implications
 - Prescriptive analytics - Mitigate disruptions and generate value for business through problem-solving and collaboration
 - Cognitive/augmented analytics - Improve forecasting, drive innovation, identify inefficiencies, and respond better to customer needs by applying cognitive technologies such as AI/ML to the supply chain process
- It is estimated that more than 50% of the supply chain organization will have invested in advanced analytics and artificial intelligence by 2024. Furthermore, advanced analytics with AI can help transform data into deeper insights as a part of the supply chain digital twin

Key use cases

- Proactive risk management
- Supplier evaluation and performance review
- Demand planning and forecasting
- Cost and overhead tracking
- Production and operational efficiency

Predictive analytics is widely used to foresee supply chain challenges and build more resilient supply chains that can quickly adapt to unexpected chaos/panic. Advanced analytics helps in determining optimal inventory levels, forecasting demand, improving production scheduling and planning, and optimizing logistics fleet routing and scheduling for effective supply chain management.

The future supplier relationship management strategies will heavily rely on analytics and machine learning. Supply chain organizations, with the help of analytics, can collect and evaluate reliable qualitative data such as audits, evaluations, and assessments from suppliers. Advanced analytics with supplier data will increase procurement transparency and execute predictive and intelligent supplier selection activities as well as provide additional prospects for long-term partnerships.

10%–20%

Expected ROI for supply chain analytics investments

Forward looking information for next 3–12 months

Supports early and proactive management

Key benefits:

- Achieve the lean supply chain
- Better understand risks
- Reduce costs and improve margins/profitability
- Future-proofing



Analytics - including ML and predictive and prescriptive analytics

MONSANTO



“Improving process efficiency and meeting sustainability goals using analytics”

- Monsanto’s (Bayer Crop Science) supply chain organization uses analytics to improve its own efficiency and processes
 - The company reduced seed loss from 5,400 bushels to 30 bushels by installing cameras to monitor conveyor belts at two seed production facilities
 - It also installed temperature sensors to improve the protection of 5,000 loads of seed across more than 500 corn trucks

The company achieved logistics network optimization through a combination of real-time monitoring, analytics-based decision making, automation of processes, and standardization of tools and processes, along with the Transportation Management Solution. *The solution helped in meeting their carbon neutrality goals by reducing the CO₂ emissions of more than 2,500 tons by lowering 1.4 million total vehicle miles in Brazil*



PEPSICO

“Utilization of prescriptive analytics for supply chain resilience during COVID-19”

- PepsiCo utilizes prescriptive analytics to gain insights into optimizing the supply chain during the COVID-19 pandemic. It employs software that draws on multiple sources of data from across the company as well as externally to create a digital twin of the supply chain and offer the most efficient and environmentally friendly strategy
- The COVID-19 pandemic led to a reduction in operational hours due to border closures across Europe and work-hour limitations
- PepsiCo was able to draw on the team's experience to conduct dynamic modeling against anticipated difficulties as a result of possessing the technology as an in-house capacity. This provided data-driven insights, which resulted in the creation of models and algorithms that were critical for the reaction, and ensured the company's decision-making and contingency planning agility

XPO Logistics

“Focusing on customer-centric supply chain planning using analytics”

- XPO Logistics Inc, which is a logistics company in the US, uses predictive analytics to resolve crucial issues such as workforce management to ensure business continuity. In terms of workforce capacity, the company can check the manpower levels and the number of pallets used on the day in the past and estimate the labor it will require in the coming weeks
- This helps in effective planning as well as prevention of both overstaffing and understaffing
- It is also critical for firms to understand the market and react swiftly for analytical models to run correctly. The companies should collaborate closely with their customers to identify demand changes, track changes in consumer behavior by utilizing internal and external data sources, and feed this information back into S&OP processes and analytical models

Hyperautomation/intelligent process automation

- Visibility across the supply chain is becoming more critical for managing risk and productivity, especially in managing optimal inventory levels, locating origins of raw materials, understanding supply limits, directing delivery changes, and overseeing regional impacts. Hyperautomation technology allows organizations to bridge the gap, especially where systems and processes intersect
- Hyperautomation brings together several components of process automation, integrating tools and technologies (RPA, AI, and ML) that amplify the overall ability to automate business processes. It is estimated that 80% of organizations (a survey of 600 CIOs and IT decision-makers) will have hyperautomation on their technology roadmap by 2024

- The technology can loop humans into the process, and they can train automation tools to get to a state of AI-enabled decision-making. Some of the key potential areas of hyperautomation are as follows:
 - Workforce enablement - Minimizing manual tasks through process automation and focusing more on planning and strategy works
 - Digital agility - Move past the one-off benefits of a single technology to digital agility and flexibility at scale
 - System integration - Seamless communication of on-premise technology and disparate data systems
 - Employee upskilling - Benefit both tech and non-tech-minded employees from working on collaborative intelligence and technology
 - ROI - Track and realize the exact ROI based on process automation and department optimization using analytics

According to Gartner, “CSCOs must start setting up a multi-year strategy now to adopt hyperautomation in order to realize an autonomous supply chain over the next decade and beyond.”

RPA and AI are bridging the disparate systems and providing critical end-to-end visibility and scalability of the supply chain. With resilient planning, multiple scenarios can be created at the same time to model uncertainty



Companies adopting the technology

 **KEYSIGHT**

 **HDFC BANK**



30%*

Lower operational costs by combining hyperautomation technologies with redesigned operational processes

70%+*

Large global enterprises will have over 70 concurrent hyperautomation initiatives mandating governance

End-to-end Supply Chain Transparency

Companies are focusing on a fundamental shift toward end-to-end transparency and collaboration, to connect more easily and enable better exchange of information. Furthermore, the adoption of systems and processes such as supply chain control towers enable end-to-end supply chain visibility. Supply chains need to be transparent to achieve true resilience.

Tier-1 and tier-2 supplier assessment to gain visibility

- The visibility into the business practices of tier-1 and tier-2/tier-N suppliers is critical for the assessment of supply chain risk. End-to-end visibility requires the gathering of internal and external data sources to assess resilience metrics in seven areas: data security, finance, operations, organizational maturity, regulation, reputation, and structure



Resilience metrics

Financial	Regulatory	Data security	Structural	Operational	Reputational	Organization maturity
<ul style="list-style-type: none"> • Corporate liquidity • Poor credit history • Changing industry attractiveness 	<ul style="list-style-type: none"> • Degree of oversight • Potential changes in regulation 	<ul style="list-style-type: none"> • Poor cybersecurity • Insufficient data-protection protocols 	<ul style="list-style-type: none"> • Trade tensions • Climate catastrophes • National events 	<ul style="list-style-type: none"> • Visibility into tier-2 suppliers • Manufacturing and delivery performance • EHS performance 	<ul style="list-style-type: none"> • Indication of reputational issues 	<ul style="list-style-type: none"> • Strength of risk management capabilities • Risk management culture

- Companies are partnering with third-party organizations to make investments (often of less than US\$1 million) to map their value chains and set up risk monitoring systems. Furthermore, investing in digital and advanced analytics eliminate operational risks
- Supply chain organizations are setting up reliability rooms to track performance and risk metrics across end-to-end networks close to real-time to identify and resolve issues before they cause disruptions

ABB conducts an annual assessment of its complete supply base, including suppliers, materials, and single, dual, and multi-sourcing methods. Oerlikon performs a complete risk assessment of its supply chain twice a year. dormakaba reviewed its strategic suppliers and critical dependencies every four months prior to the COVID-19 pandemic.

TotalEnergies conduct a periodic review of suppliers to map the risks related to procurement by category of goods and services. The company has a targeted annual audit plan for its strategic suppliers and suppliers at risk every three years.

Adoption of control towers that enable end-to-end supply chain visibility

- Supply chain visibility can be greatly enhanced through supply chain control towers. Control towers capture and use data across the supply chain and provide enhanced visibility to organizations for short and long-term decision-making. An effective supply chain control tower has three important layers:
 - Data visibility - Captures supply chain data such as purchase order status, stock movements, shipping, customer demand, and inventory and demand management across the organization
 - Analytics - Monitors and analyzes the information using technologies such as AI and ML to provide insights into corrective actions
 - Actions/agility - Makes informed business decisions with a unified data view and insights

- The capacity of control towers to offer real-time information would have aided businesses in making better decisions, adjusting supplier allocations, and assuring more accurate demand planning during the present COVID-19 situation
- Setting up a supply chain control tower involves two distinct stages: the strategic stage and the implementation stage. The strategic stage requires 8-12 weeks and the implementation stage (design, implement, and run) requires 6-12 weeks

Lenovo

Lenovo partnered with IBM and adopted Sterling Control Tower Solutions to visualize, monitor, and gain real-time insights into supply chain activities. The control tower brings together siloed data, on-premise systems, and external data to assess supply chain disruptions. The supply chain control tower helps in reducing Lenovo's response time to supply chain disruptions (with respect to transportation) from days to minutes.

Technologies such as AI help in connecting supplier and carrier data and defining actions in different situations. Analytics aids in generating predictive insights by pinpointing relevant disruptions. NLP provides seamless interaction between the analysts and system. Blockchain assists in providing end-to-end visibility of the supply chain.



In 2014, Shell implemented a control tower, which is an Integrated Operational Center focused on asset and production management. Later, the company incorporated the supply chain aspect such as inventory and transport and developed a dashboard into a virtual control tower. A virtual control tower helps in gathering information, detecting risk, and making strategic, tactical, and operational level decisions.



Saudi Aramco's Supply Chain Control Tower is an integral part of the Fourth Industrial Revolution Digital Transformation Center. The center leverage disruptive technologies and advanced analytics to transform Saudi Aramco's supply chain toward digitalized operations and provide end-to-end value chain visibility.

Supply chain disruption caused by the pandemic has forced companies to shift from the JIT inventory approach to the JIC model. Growing concerns around greenhouse gas emissions and climate change are motivating companies to focus on creating a collaborative response to address supply chain issues.

Increasing adoption of Just-in-Case (JIC) inventory management

- Just-in-Case inventory management is gaining popularity among companies due to the increasing occurrence of supply disruptions. The JIC inventory management model focuses on storing surplus inventory to prevent running out of stock. In this model, companies stock inventory based on expected sales and purchase supplies proactively to meet any level of demand, within defined parameters
- The model increases supply chain resiliency by mitigating challenges such as supplier delays, unexpected increases in demand, and spikes in the cost of a material or component by holding stock in reserve. It helps businesses increase production or revenues by mitigating a range of potential risks related to production or supply chain, brand, and market competition

Post pandemic, the automobile industry has witnessed a sharp surge in demand, and production has been affected due to the shortage of semiconductors. Chip crunch has forced manufacturers to reconsider their supply chain strategy from the Just-in-Time (JIT) inventory approach to the JIC model.

According to McKinsey's survey report published in November 2021, around 61% of companies increased their critical products inventory, and about 55% made sure that they had at least two sources of raw materials.

Growing sustainability initiatives in supply chain management

- Companies are focusing on sustainability in supply chain management to lower the impact of operations on the environment. Sustainable or green supply chain management is the concept of integrating technologies or processes that ensure the production and distribution of products in an eco-friendly manner
- Supply chains contribute around 60% of all carbon emissions globally. Companies in the oil and gas industry are focusing on creating a collaborative response to address supply chain issues by sharing insights and resources. Resource pooling/collaboration helps in the proper utilization of assets, logistics networks, and service crews

According to Accenture's survey report published in January 2022, 72% of CEOs indicated that post-pandemic sustainability is a major priority and around 26% of CEOs indicated that supply chain disruptions (such as loss of critical suppliers or output capacity) pose a top-three major risk to their business or industry shifting to a low-carbon economy.

Companies that adopted collaborative technology to meet sustainability goals



Schlumberger
aramco 

Collaboration across the oil and gas industry value chain helps reduce greenhouse gas emissions by 10%-25%.

Recommendations

Establish a supply chain resilience strategy

Establish

- Measure the current level of supply chain resilience in terms of agility, visibility, diversification as well as contingency planning
- Account for end-to-end supply chain costs to accurately identify trade-offs and establish resilience



Build the capabilities needed to anticipate disruptions

Anticipate

- Adopt systems and processes (such as supply chain control towers) that are required to enable end-to-end supply chain visibility
- Implement digital twin technology to improve supply chain resiliency and to predict the cascading effects of various events
- Establish a schedule for testing and upgrading Business Continuity Plans and assessing tier-1 and tier-N suppliers on a regular basis



Build the capabilities needed to resist disruptions

Resist

- Utilize analytics to focus on customer-centric supply chain planning and to ensure contingency planning agility
- Diversify the supplier base gradually and focus on localization and regionalization to increase the reliability of supply chains



Build the capabilities needed to recover rapidly from disruptions

Recover

- Make informed business decisions with unified data from disparate data sources
- Collaborate and share data to help build strong relationships with ecosystem partners
- Increase agility through hyperautomation/intelligent process automation with critical end-to-end visibility and scalability of the supply chain



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