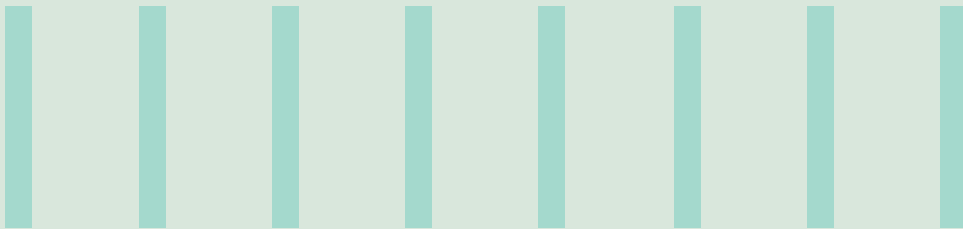




5 MUST-HAVE CAPABILITIES FOR RESILIENT SUPPLY CHAINS IN RETAIL

Keeping lights on





In 2020, the novel corona virus outbreak resulted in supply chain disruptions – freeze in production, labor shortages, and bottlenecks in the delivery of finished goods and raw materials. Further disruptions were caused by natural disasters, geopolitics, economic sanctions, and changes in international trade agreements. These disruptions created various supply chain challenges depending on the nature of business, product and geographical diversity, supply and production sources, supply chain network complexity, logistics network, and operational capacity.

The key challenges that businesses faced included demand uncertainty, managing inventory levels, a lack of visibility in product scheduling and capacity constraints, in managing the supplier ecosystem and identifying alternate suppliers, a shift to remote working, and blocked working capital and cash flow.

These disruptions revealed the brittle side of global supply chain practices and capabilities. Retailers should incorporate resilience into supply chains by investing in digital supply chain capabilities to sense, predict, learn, and respond to disruptions:

In the first place, establish end-to-end visibility of supply and demand data across the value chain.

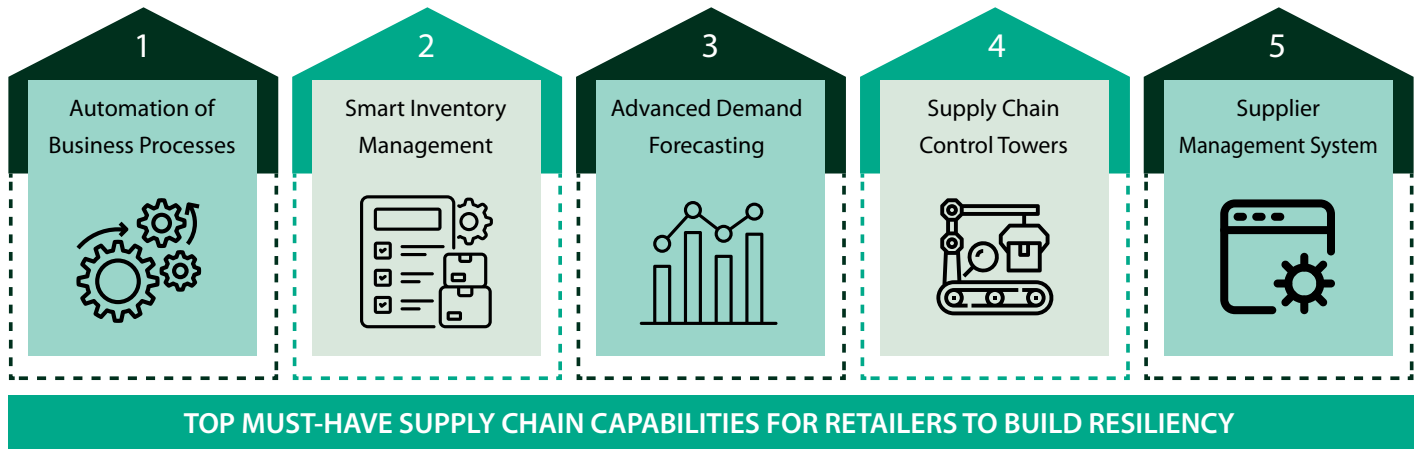
Second, effectively monitor risk with early detection and rapid response systems, real-time scenario analysis, and intelligently evaluate alternatives to troubleshoot exceptions.

Third, automate all business operations and transactions with accurate data to boost productivity and decision making.

Fourth, undertake scientific management of inventory through AI modeled decision and optimization techniques powered by real-time data and cognitive analysis.

Finally, establish digitally connected supplier ecosystems to share data upstream and downstream, and detect supply risks at an early stage.

Retailers should invest in five key capabilities to build resilience via data-driven supply chains:



1. Automation of Business Processes

Digital inventory systems and demand data help retailers monitor consumer purchase behavior and adjust production schedules and distribution with better accuracy.

A simple business process notification can initiate automated action at periodic intervals, providing the system with a 'heartbeat' of automation.

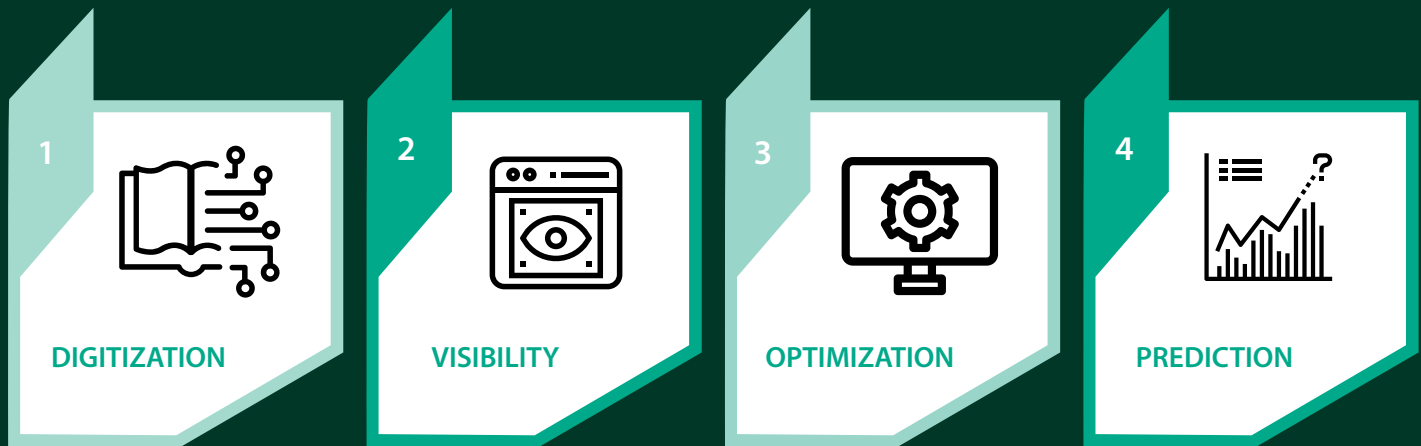
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Automation of activities and workflows in procure-to-pay, document management, accounts payable, transportation, and warehouse management functions reduces errors, improves efficiency, supports decision making, and delivers significant cost savings.



Goals of automation

Automation enables enterprises to achieve four goals:



Digitization

All analog tasks in the web of interconnected supply chain activities should be digitized. Digitization integrates discrete processes in a supply chain, which improves to improve coordinated responses to disruptions. Candidate tasks for digitization can be identified through a holistic and detailed Level 8 process decomposition of the value chain. Digitization may involve extension of existing system capabilities, systems integration, or deployment of point applications within the process landscape.

Typical use cases for supply chain digitization include:

- Supplier onboarding
- Contracts lifecycle management
- Invoice generation, validation and processing
- Approvals in order-to-cash and procure-to-pay processes
- Monitoring quality of goods
- Document processing – waybills, invoices, contracts, etc.
- Production and validation of product samples
- Inventory stock counts
- Task management
- Customs validation and clearance
- Integration of transportation and warehouse management
- Automation of warehouse operations – inbound, palletization, picking, put-away, and outbound

Visibility

Automation improves visibility across inventory categories, manufacturing schedules, consumer demand, and location of goods, among others. Visibility of accurate data across the value chain is crucial to rationalize resources linked with material, people and working capital. Real-time process visibility enabled by AI / ML and robotic process automation (RPA) shrinks timelines in procure-to-pay processes and financial reconciliation, while enabling informed decisions to minimize inventory holding, delivery lead times, shipping costs, and price markdowns. Visibility requirements can be established by determining the data required to improve each process output. This can be achieved through persona analysis, process mining, and value stream analysis.

Typical use cases for supply chain visibility are:

- Monitoring and tracking products from the source to destination, using blockchain technology, IoT devices and cloud-hosted monitoring tools
- Real-time inventory data at supply chain nodes
- Real-time shipment tracking
- Quality management

Optimization

While visibility ensures real-time communication and data to reduce process cycle time and errors, the other key automation goal is optimization - optimized decisions across supply chain design through planning and execution for peak performance.

Use cases for optimization can be identified through in-depth value stream analysis. Automation-led optimization reduces waste, minimizes fixed costs, improves process metrics, and grows revenue. Typical use cases include:

- Optimizing the raw material supply chain through rationalization of suppliers and identification of alternative suppliers using ML-driven evaluation methods accounting for price, demand, supply risk, and delay.
- Optimizing inventory levels at supply chain nodes, replenishment cycles, and reorder points based on predicted demand by building discrete simulation models.
- Optimizing production schedules and capacity based on consumer demand, supply conditions, raw material prices, labor capacity, etc.
- Optimizing cost-to-serve by redesigning the supply chain and logistics networks of factories and distribution centers considering lead times, transportation and storage costs, fleet utilization, inventory holding capacity, and costs.
- Optimizing warehouse layout and productivity by applying AI-driven order batching, spatial clustering, and pathfinding algorithmic logic.
- Warehouse and distribution center workforce optimization, including temporary staff, by applying linear programming.
- Optimization of the logistics network and transportation routes through network modeling and route planning.

Prediction

Predictive automation engines can drive rule-based automation of repetitive, predictable processes by detecting data, events, or conditions within enterprise systems and any external device, system, using APIs. Typical use cases include:

- Predicting demand by building self-learning mathematical models that analyze historical datasets and causal and deterministic variables such as sales volumes and shifts in supply.
- Predicting raw material supply requirements, impact of cancelled orders, and supply chain bottlenecks based on sales forecasts, production capacities, cost-benefit analysis, production plans, and delivery schedules.
- Predictive equipment monitoring to schedule preventive maintenance repairs to avoid production breakdowns and revenue loss losses.
- Predictive fleet and route monitoring to anticipate delays in routes and shipments due to unfavorable weather, social hazards, traffic congestion, and vehicle breakdown.
- Predictive risk assessment for prompt mitigation, such as supplier risk identification to expedite or reroute supplies, and environmental risk identification to suspend unsafe operations.
- Predictive alerts of events such as driver availability, unloading of shipping containers, and delivery schedules.



2. Smart Inventory Management

Managing and controlling inventory of a widely distributed product portfolio amidst dynamic demand and supply shifts, new consumer preferences and macro-economic factors, is highly complex with several interconnected decisions and hand-offs. Unlike the traditional reactive approach, a smarter approach is inevitable for proactive and efficient inventory control.



Smart inventory management involves the use of real-time data and intelligent analytics to enhance decision making by analyzing current as well as future constraints and predicting outcomes.

Smart inventory techniques and control procedures synchronize inventory across channels and supply chain nodes by capitalizing on real-time visibility, optimization techniques and predictive alerts. Instances of smart inventory management include:

- i. Determining and maintaining inventory to achieve targeted service levels
- ii. Optimizing inventory allocation at the store level
- iii. Determining the most efficient method of inventory distribution and allocation across supply chain nodes
- iv. Determining the accurate optimal reorder point
- v. Controlling stock levels by various methods based on the product type and demand archetypes
- vi. Determining the health of each product – ageing, physical condition, revenue, margin, etc.
- vii. Tracking raw materials and finished goods inventory in real time

The goals of a resilient Smart Inventory solution should cover: -

- Reducing process errors
- Providing a 360-degree view of real-time inventory data
- Predicting inventory required to fulfill demand
- Minimizing errors in forecasts
- Fine-tuning service levels based on the inventory budget
- Optimizing inventory investment in products, supply chain nodes, and markets
- Reducing stock-outs, excess stock and obsolescence
- Boosting productivity inventory productivity
- Enabling loss prevention and waste reduction
- Streamlining product planning and scheduling
- Reducing inventory storage, handling and transportation costs
- Measuring the impact of inventory decisions on KPIs
- Improving cash flow and increasing working capital

Retail enterprises can avoid supply chain disruptions by leveraging smart inventory management to -

- i. Classify items into demand segments based on sales, size, demand variability, delivery lead time, supplier lead time, days of supply, etc.
- ii. Establish a 360-degree inventory position of each product - from the raw material stage through manufacturing and return to determine its health, fixed and variable costs.
- iii. Analyze inventory position and orchestrate sales and purchase orders based on pre-defined rules.
- iv. Determine the optimal reorder point and generate sales orders when customer or supplier inventory falls below y% of monthly consumption.
- v. Generate purchase orders when in-house stock is less than x% of monthly volume or create inter-company orders to transfer stock from one branch to another branch based on the inventory position.
- vi. Allocate end-customer orders from shipping warehouses that maximize operational benefits such as minimum lead time, inventory ageing, cost-to-serve, or profitability.
- vii. Track inventory health at nodes using intuitive dashboards that share real-time inventory metrics, including average days of supply, expiring or -close-to-expiry date stock, excess inventory, planned vs actual inventory, etc.
- viii. Trigger alerts for over-stock and under-stock inventory.
- ix. Obtain long-term recommendations for inventory policies, forecasting methods and suppliers, and short-term recommendations on order allocation and inter-plant, inter-warehouse or inter-store stock transfers.
- x. Track real-time inventory location and quantity of products in the manufacturing process to detect bottlenecks and underperforming nodes or machines.
- xi. Monitor performance of store-level and distribution node-level inventory.

3. Advanced Demand Forecasting

Deterministic demand forecast models do not capture real-time demand signals and cannot predict disruptions. Inaccurate demand data can adversely impact order batching, buying, replenishment, and order allocation decisions, which in turn may delay delivery times, reduce inventory turns, cause stock out or excess stock and shrink profit margins.



Advanced ML-based demand forecasting models can be designed to recalibrate demand and adapt to disruptions.

Advanced demand forecasting solutions enable retail chains to -

- i. Optimize buying and assortment planning by predicting and shaping consumer demand for product items and categories
- ii. Maximize sales by ensuring availability of stock at distribution or fulfillment nodes
- iii. Streamline product planning and scheduling based on anticipated demand
- iv. Ensure reliable supply of raw materials and finished goods from existing or new suppliers
- v. Modify the marketing mix to influence advocacy and sales across product lines
- vi. Optimize product pricing based on market conditions
- vii. Refine the fulfillment strategy, carrier selection and shipping method based on forecasted demand, capacity, cost-to-serve, lead time, etc.

The accuracy of demand forecasting solutions can be increased by customizing it for:

- Product categories and items and the acceptable margin of forecasting error
- Demand drivers and the distribution of demand across internal and external drivers
- Period of short-term and long-term forecasts and goals for each product category

An advanced demand forecasting solution should incorporate robust capabilities:

- i. Aggregate data and shape demand across channels by considering dependent variables such as historical sales, cost of goods sold, average market selling price, and stock in-hand, as well as independent variables and causal factors such as weather events, health hazards, political issues, oil price fluctuations, price index, exchange rates, and supply risks.
- ii. Ingest internal and external inventory data and change inventory requirements based on demand signals and impact on key business indicators.
- iii. Predict trends, future sales and inventory values by analyzing micro-demand patterns and demand drivers along with causal variables.
- iv. Capture voice of the consumer from social channels and platforms to gauge consumer preferences, product affinity, and shifts in purchase behavior.
- v. Identify hidden data patterns through market basket analysis to support product recommendations, cross-selling and up-selling.
- vi. Shape demand and alter short-term forecasts by analyzing the impact of price changes, promotions, change in product mix, and marketing strategies.
- vii. Update demand forecasts based on near real-time data and the output of multiple forecasting models.
- viii. Generate what-if simulation scenarios to compare baseline forecasts
- ix. Automatically reconfigure demand plans and inventory requirements across products, including new launches.

4. Supply Chain Control Tower

Supply chain control towers are emerging as strategic tools to manage local and global supply chains. Operating on agile cloud platforms, the towers can seamlessly integrate with internal ERP, WMS and TMS solutions and external systems of suppliers, manufacturers, and logistics and or fulfillment partners. Supply chain control towers aggregate and analyze real-time data across the supply chain and provide a unified view of demand and supply as well as supply chain metrics.



Supply Chain Control Towers provide integration, visibility, monitoring, and control under one platform, empowering retailers to respond promptly by sensing real-time demand and supply changes

The capabilities of a supply chain control tower can be classified into two broad categories:

Analytical

- Self-service dashboard that provides visibility into supply chain metrics and drill-down insights into events across the supply chain.
- Smart alert mechanism that allows managers to manage exceptions and take decisions by evaluating the impact of unforeseen and unplanned events on supply chain operations.

Alerts may be generated for exceptions such as:

- Supply risk or spike in demand
- Excess, shortage or ageing inventory
- Actual order exceeds forecast
- Delay in scheduled receipts and deliveries
- On-Time In-Full (OTIF) delivery
- Manufacturing capacity fault or error
- Fluctuations in energy consumption

Operational

- Self-correction capabilities that optimize decisions and automate transactions by studying the outcome on business metrics being evaluated.
- Self-healing supply chain that identifies discrepancies between planned and actual performance, and to automatically addresses address root cause(s) of exceptions.

For instance, a supply chain control tower avoids excess days of supply inventory by optimizing demand forecast and supplier lead time.

Types of supply chain control towers

- **Transportation control tower** - Enhances shipment operations from inbound logistics through freight consolidation to outbound logistics by providing 360-degree visibility into shipments, undertaking root cause analysis and enabling auto-correction of exceptions.
- **Fulfillment control tower** - Streamlines distribution and fulfillment facility operations by expediting distribution of orders and improving last mile delivery efficiency.
- **End-to-end supply chain control tower** - Boosts supply chain operations spanning suppliers, manufacturers, trading partners, logistics service providers, distribution centers, and fulfillment nodes.
- **Inventory control tower** - Rationalizes inventory of raw materials and finished goods by preventing over-stocking and stockouts.

A retail enterprise can adopt the most appropriate control tower based on an evaluation of -

- Existing data and visibility gaps
- Degree of granularity required
- Processes or decisions that need to be optimized or self-corrected
- Supply chain metrics to be improved
- Velocity of change in response to conditions



5. Supplier Management Platform

Supplier management has emerged as a priority area to mitigate legal, financial and supply chains risks. A Supplier Management Platform improves resilience by streamlining procurement practices, ensuring compliance with ESG mandates, and facilitating collaboration with suppliers.

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Sourcing and procurement functions play a key role in mitigating supply chain risks and supporting recovery while continuously adding value from the supplier base to source high quality products, maintain cost-effectiveness, and ensure regulatory compliance.

Supplier or vendor management portals offer a one-stop platform for managing all tasks, from supplier discovery, bid management, contract approvals and renewals, supplier performance monitoring, spend analysis in addition to risk prediction and mitigation. Self-service tools in the platform boost supply chain productivity, responsiveness, and agility by integrating processes, reducing redundancy, and digitizing information.

Supplier management platforms help retailers to -

- Accelerate procurement cycles through automated workflows
- Eliminate manual administrative tasks by digitizing processes
- Rationalize the supplier mix
- Improve supplier relationship through efficient collaboration and increased transparency
- Gain visibility into suppliers, their production and warehousing facilities, inventory level, and order status
- Reduce bias in supplier selection
- Improve contract management
- Enhance contingency planning

Capabilities of an advanced supplier management platform

- Intuitive search and discovery of suppliers
- E-bidding and intelligent proposal evaluation and ranking
- Supplier segmentation and profiling based on competency, location and risks
- Self-service tools for screening potential suppliers
- Supplier alerts for expiring certificates, delays, risks, etc.
- Automated workflows for approvals
- Supplier performance reports and analytics
- SKU-level risk and compliance management
- Supplier risk assessment and profiling
- Real-time supplier information update
- Spend analytics, dashboards and diagnostic reports



Conclusion

Supply chains operate in a dynamic landscape of socio-economic, political, and climatic disruptions. Retailers face a Hobson's choice to build resilience into diverse supply chain systems, processes and networks or brace for impact. Resilience modeling is a business priority - SOPs, resiliency matrices, performance metrics, adoption of tools and techniques, and hiring of resilience experts.

These five capabilities empower retail enterprises to address disruptions and reduce churn - anticipate, absorb, adjust, and recover promptly. These capabilities allow retailers to manage systemic and network fault lines while boosting observability, productivity, connectivity, and responsiveness.



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