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## Establish a smarter, adaptive supply chain: Harness the power of AI for end-to-end visibility and control

Today's globalized supply chains have evolved to become highly interlinked and continue to grow in complexity. Widespread disruptions such as COVID-19 have elevated the need for autonomous, agile and resilient supply chains that provide end-to-end visibility and better operational control.

In addition to leveraging customer insights for marketing and promotions, organizations now also need to accelerate their exploration of analytics to create flexible digitally-enabled supply chain models. I believe there is significant value that can be realized to drive customer experience, revenue acceleration, risk prediction, and cost optimization. Artificial Intelligence (AI) and Machine Learning (ML) must be integrated with operations to draw actionable insights, predict events, and prescribe relevant actions.

I'm listing below some salient use cases on how AI-powered software can quickly process large volumes of data and define trends at granular level. These insights can then be fed to robotics and immersive digital technologies to create customized, scalable and secure Digital Supply Chains.

### Beyond neurons: A cognitive pull based supply chain

Gartner predicts that by 2024, 50% of supply chain organizations will invest in applications that support artificial intelligence and advanced analytics capabilities. Forward-looking organizations can deploy adaptive Digital Supply Networks (DSN) that are equipped to deal with uncertainties and can analyse vast quantities of fast-moving data from connected systems. This will enable informed, timely and optimal decision-making leading to a smart value-driven network.

It is necessary to identify and include data sources that are closer to consumption. That's because traditional forecasting techniques associated with time-series methods are no longer sufficient to derive actionable insights. The recent Chip shortage incident is an example where improper demand planning caused a tremendous ripple effect across the supply chain – a variety of products from cars to gaming consoles and refrigerators were impacted. AI-driven Demand Sensing can increase visibility, accuracy and reliability across the value network by estimating dips and spikes in customer demand using near real-time information such as ecommerce or Point-of-Sale (POS) data across short time horizons to create accurate demand forecasts. Thus, granular insights into customer behaviour and preferences can be derived.

Leveraging advanced AI and ML in this manner enables SKU rationalization by considering numerous factors like service levels, price point, bills of material and unit costs – to better anticipate demand. These techniques can also use external data sources such as economic indicators, weather patterns, competitive pricing and customer behaviour to create daily forecasts that reflect current market trends and realities – thus delivering high service levels with optimum inventory. Demand Sensing can allow strategic item placement and storage in Forward Stocking Locations' (FSLs) or other pockets of inventory near customers, optimizing last-mile delivery for superlative customer experience.

An AI charter also leads to proactive risk management. It harmonizes supply chain data and applies self-corrections or learnings to both implement and enhance human intelligence. Automated solutions and prognostic AI models allow proactive risk assessment and business impact analysis by simulating what-if scenarios in real time – such as identifying vulnerabilities and failure points in an organization's infrastructure. Using AI, supply chain organizations can make smart predictions about sourcing raw material, work-in-progress components, inventory reconciliation, invoice exceptions or errors, field maintenance, scheduling and tracking shipment and transportation activities, to name some.

### Using AI for warehouse optimization

Well-organized supply chain planning is usually synonymous with warehouse management and inventory organization. Accurate and faster warehouse item picking is essential for efficient order fulfilment. Significant digital transformation efforts are ongoing in this area. A key use case that supply chain professionals are interested in is route optimization within the warehouse to ensure most efficient item picking routes. By leveraging techniques such as visual analytics, RFID (Radio Frequency Identification) technology, advanced cameras on omnidirectional forklifts, and analyzing the weight and size of the items picked – innovations can be directed towards providing smooth navigation in complex warehouse facilities.

Another use case that is becoming critical for warehouse managers is asset management and prediction of failures in advance, especially in case of forklifts. Having Internet-of-Things (IoT) – enabled sensors on the forklifts that can analyse the torque, sharp turns, sound patterns, etc. will dramatically improve the failure prediction rates as well as optimize the drivers' handling of warehouse equipment. This capability has the potential to directly influence customer experience. Warehouse Robotics has also gained traction in recent years as robotic arms can move, turn, lift and manoeuvre items, assisting human workers and increasing workplace productivity.

### Managing suppliers and global sourcing risks

AI can be a strategic tool for proactive supplier risk management and for driving responsible sourcing in global supply chains. Successful sourcing of data given geopolitical risks, natural disasters, strikes and black-swan events like COVID-19 plays a critical role in ensuring business continuity. The traditional methods of just using supplier on-time delivery and historical performance is not adequate in black-swan events. AI-powered supplier risk modules support supplier lifecycle management – including supplier selection, supplier profiling, and supplier categorization based on geography, reach, criticality, pricing options and other standard business metrics. This enables firms to rank suppliers on the basis of risk, efficiency and overall performance. For instance, during the pandemic, suppliers in most affected geographies will be assigned a "high risk" level. AI-enabled organizations can also work through contingency planning to mitigate possible issues and develop alternative sourcing strategies, should their primary suppliers become unavailable. Another use-case that supply chain organizations can leverage for improved supplier management is keeping a log of companies' historical bids and creating predictive models for competitive pricing strategies.

### Applying AI to logistics and transportation

AI can drive efficiencies in the logistics and transportation realm in two major categories. First category is about driving efficiencies such as route optimization, aligning demand forecasting with optimal origin-destination pair, reducing dead miles, and reducing waiting times during loading/unloading. Dynamic programming can be used to identify the best routes. This helps categorize regions that attract the most demand. AI enables load optimization and time-definitive last mile delivery by considering vital factors such as ideal order-destination pair or lane, cross-docking information, product size and weight, due date of delivery, priority etc. Another use case of AI is related to enhancing in-transit visibility and traceability in shipping operations. There occurs a significant amount of wastage when shipment deadlines are missed and deliveries are to be rescheduled. Building AI enhanced order fulfilment models can ensure delivery of the right product or part in right quantities at right time, location and price, ensuring enhanced Customer Experience (CX).

The second category is about service order lifecycles. AI is reshaping sales order and service lifecycle operations by using dispatch algorithms and predictive analytics – driving better field automation, order re-filling, asset utilization, tech performance, Service Level Agreement (SLA) adherence and automated appointment scheduling – leading to better revenue recognition, customer experience and cost savings.

### A future with artificial intelligence

Resolute supply chain professionals are and will continue working through rapidly-evolving situations and challenges. While one cannot predict what might happen tomorrow, forward-looking organizations can build a responsive, future-ready and sustainable global supply chain by leveraging AI supported by emerging technologies such as Blockchain, IoT, Digital Twins, 5G, and Edge Computing. AI-led supply chain optimization can yield insights to drive systemic changes and monitor compliance and data quality standards. Smart decisions at every step of the supply chain are enabled by unlocking the power of data through AI. Sense, hear, envision, and respond swiftly to changes in the marketplace with AI and digital for exceptional customer experiences and greater supply chain resilience.



The article has been written by Amit Gautam, Co-Founder and CEO, Innover



Posted by: DQINDIA Online

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