WORLDWIDE EXPRESS®

How Technology is Driving the Freight Shipping Industry

From robotic warehousing to radio-frequency identification (RFID) sensors to self-driving trucks, we're reporting recent trends in technologies that are disrupting the freight shipping industry. Keeping our finger on the pulse lets us create solutions to help small and mid-size businesses navigate their supply chain operations.

Read on as we share how advances in technology can help your product move more efficiently through the global supply chain.

How data and technology make freight shipping more efficient

Data, artificial intelligence (AI) and smart devices are the foundations of technological advancements in supply chains. When these are connected by the Internet of Things (IoT) — a network of various devices that communicate over the internet — the data in smart devices feeds into AI and meaningful applications are created.

Businesses are finding ways to leverage connected data and technology for shipping efficiency. Robots perform mundane tasks in warehouses to increase productivity, efficiency and quality control. Algorithms accurately predict issues in a company's supply chain and prescribe solutions to take care of those issues. Computer vision makes self-driving vehicles possible.

> **Here are ways AI and the IoT work together to create a better supply chain system for your business.**

Blockchain systems provide transparency to all members of the supply chain

Some logistics experts say blockchain is the most important trend in development. In a fully functioning blockchain system, all participants in a supply chain have a complete view of every transaction, from point of origin (the parts needed to manufacture the product) to distribution.

All the data and transactions are synchronized across the supply chain network to enable efficient cross-checking among the businesses, partners and suppliers. The expectation is to have a highly transparent, decentralized system that engages all members of the supply chain to ensure product integrity, reliability and trust.

Some blockchain developments include track-and-trace solutions that can be used to monitor the internal conditions of a package, identify counterfeit products and call out companies that are not in compliance of fair labor practices, for instance.

Demand planning enables scalability and more accurate forecasts

Demand planning, or demand forecasting, is used to determine the minimum required inventory in a supply chain. Scalability is the goal so as to avoid having too much or too little inventory at a given time. As opposed to traditional inventory forecasting, which relies mainly on historical data, demand planning takes into account both internal and external conditions. Weather patterns, seasonality, labor force issues, news events and so on, are considered along with previous years' inventory patterns. To make accurate, value-based predictions, a demand planner relies on AI to gather data from all possible sources in a non-linear, always-on approach.
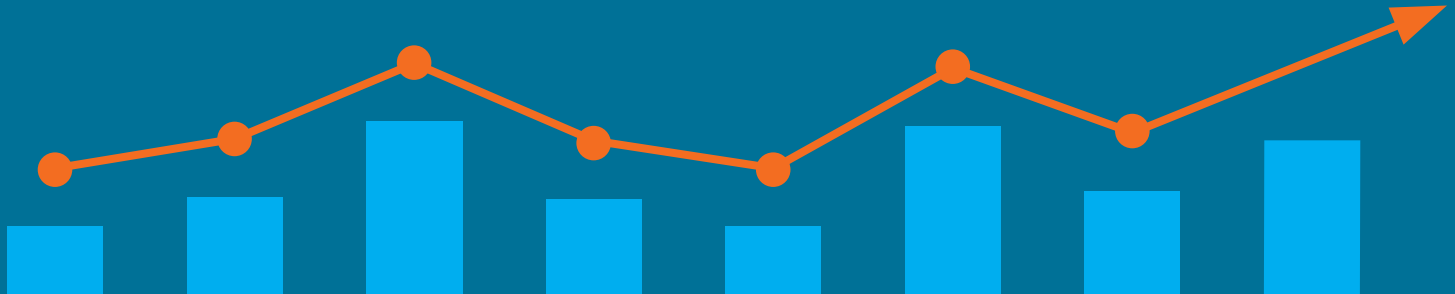
# Distributed order management uses AI to improve fulfillment processes

Businesses with access to multiple warehouses and suppliers may use distributed order management (DOM) software and AI to optimize their fulfillment process and save on freight shipping costs. With DOM, orders that come in are sorted, split and rerouted to warehouses based on supply and proximity to the end user. Inventory forecasting, reordering and management are also orchestrated through DOM.

RFID devices connects users to goods in real time

Radio Frequency Identification (RFID) technology uses radio waves to read digital data coded on tags and handheld devices and transmits the information in real time into a database. While RFID has been around for decades, it's becoming more common in a number of industries for location tracking, inventory management, added security, equipment service monitoring and so on.

In warehouses, RFID technology improves workflow efficiency and productivity. Because a single device can scan RFID tags in mass quantities and from distances of 20 to 100 feet (depending on the type of tag) without need for line of sight, it's used for inventory control and order fulfillment. On the road, RFID tags offer extra security and location monitoring. It can also be hooked up with a GPS tracking system where information from the device can be transmitted to end users via satellite station.
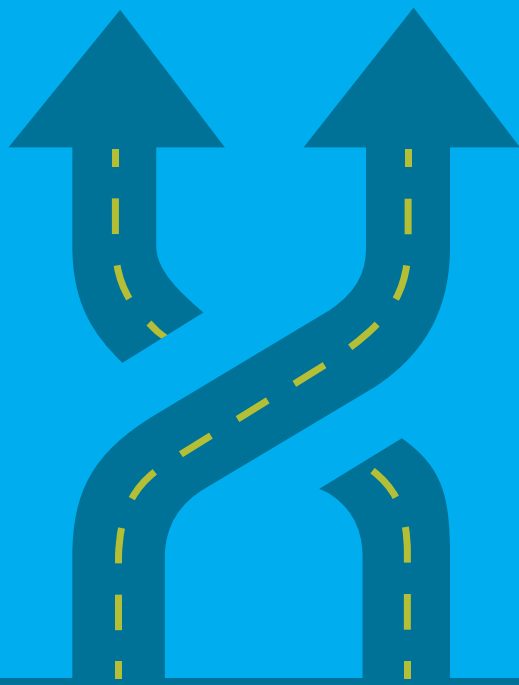
Synchromodality uses real-time conditions to determine the best routes for shipments

Using automated scheduling algorithms that monitor the supply chain, a shipment's route and transport mode can be dynamically switched based on real-time data and events. This is called synchromodality. By changing modes from ground to railway in snowy conditions, for instance, a shipment could reach its destination faster and safer. A correlated benefit is the cost a shipper could save by avoiding delays, disruptions and risks. Synchromodality can also trigger changes in route and mode so shipments use more sustainable and economic transport options, such as barge and railway, whenever possible.

Vehicle-to-everything (V2X) technology enables communication between entities for better road safety

V2X transportation technology improves road safety by enabling communication between vehicles, infrastructures and pedestrians. With the help of IoT, cloud storage and 5G technology, carriers can use V2X to monitor traffic in real-time and plan routes based on traffic patterns. Vehicle-to-vehicle (V2V) communication helps reduce traffic congestion and collision, and vehicle-to-infrastructure (V2I) provides added safety and speed management as the vehicle interacts with infrastructures, such as roadway traffic lights and toll machines.

Smart road technology uses sensors and real-time data to improve travel conditions

Putting the IoT to action, smart road technology enhances shipment transit by enabling safer, more efficient travel. Solar panels, for instance, melt ice and provide LED lighting on the roadways. When collisions and traffic jams occur or when a vehicle goes off the road, the movement triggers fiber optic road sensors, which in turn informs drivers and self-driving vehicles, and alerts authorities. Based on real-time traffic and weather data and road conditions, smart road technology automatically alerts key personnel of delays and plans alternate, more efficient routes.

Self-driving trucks will enhance shipping efficiency

Over the last couple decades, the trucking industry has been experiencing a fluctuating shortage of drivers. Whether the reasons are long transit times, lonely conditions, stricter drive-time regulations, higher age requirements for interstate travel, or retiring drivers and no replacements, all these — plus the havoc caused by COVID-19 — has resulted in higher freight shipping prices for reduced cargo space.

Autonomous trucks may be the answer. As computer vision capabilities improve through machine learning, self-driving trucks could be used to transport freight on the interstate portion of the journey. While regulatory approval could be another 10-15 years down the road, in this scenario a human driver would send off the truck at the entrance of the interstate and another human driver meets the trucks at the exist to take over the final leg of delivery. An added benefit: Autonomous trucks are the workaround to Electronic Logging Device (ELD) restrictions that limit truckers' driving time to 11 hours with a 14-hour window.

Worldwide Express: Bringing Your Business to the Forefront of Innovative Technology

Supply chain technology is constantly improving the freight shipping industry. Changes that could advance your business, boost your bottom line, and make your processes more efficient. But it's hard to stay current on all the opportunities when you have a business to run.

Count on us to keep you informed of technological advances that can help move your business forward.

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