AI IN SUPPLY CHAIN AND LOGISTICS

HOW AI WILL RESHAPE THE LOGISTICS AND
TRANSPORTATION INDUSTRY

January 2018

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KEY POINTS

- **Major logistics providers have long relied on analytics and research teams to make sense of the data they generate from their operations.** But with volumes of data growing, and the insights that can be gleaned increasingly varied and granular, these strategies are becoming outdated.

- **Companies have therefore started turning to artificial intelligence (AI) computing techniques, like machine learning, deep learning, and natural language processing, to streamline and automate various processes.** The unique abilities of AI systems to identify patterns in massive data sets and quickly deliver insights based on new information make them more effective for certain functions in supply chain and logistics than more traditional forecasting and analytics tools.

- **The current interest in and early adoption of AI systems is being driven by a few key factors.** These include increased demands from shippers, recent technological breakthroughs, and significant investments in data visibility by the largest players in supply chain and logistics.

- **AI has a wide breadth of potential applications in the supply chain and logistics field.** It can be used to create more optimized freight and delivery routes, improve forecasting and asset utilization, mitigate the impact of risks like supply shortages and natural disasters, and provide customers with a more convenient delivery experience.

- **However, there are several obstacles keeping organizations from deploying AI at scale.** Finding the right data to train AI systems to deliver actionable insights is a common challenge in the industry, and companies are struggling to find skilled employees who can launch AI projects. Additionally, these organizations must figure out new workforce strategies as AI systems start to take on specific roles formerly performed by humans.

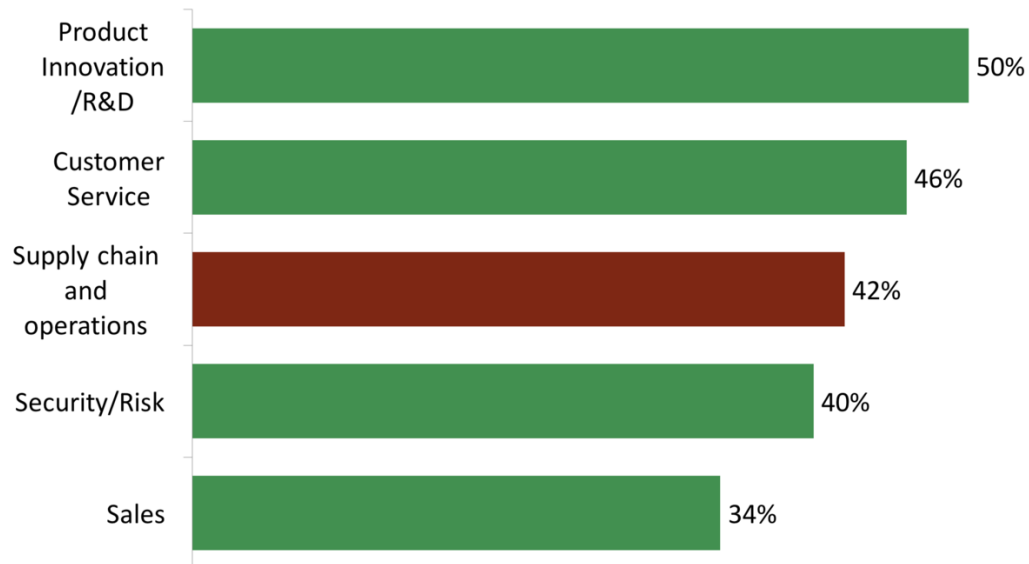Download the charts and associated data in Excel »

INTRODUCTION

The supply chain and logistics space is constantly flooded with data. That includes information around individual shipments, such as pricing, routing, storage location, and destination, and the entities involved with those shipments, like the shipper, carrier, insurer, and customs and regulatory agencies. It also encompasses information about the vast number of variables including weather, traffic, and consumer buying habits that can impact any individual shipment. The growth of IoT technologies like connected sensors and vehicle telematics systems is only adding to the volume and complexity of this data with real-time information on the status of shipping containers, delivery vehicles, and warehouse workers and assets.

Major logistics providers have long relied on analytics and research teams to make sense of the data they generate from their operations. But with volumes of data growing, and the insights that can be gleaned becoming increasingly varied and granular, these companies are turning to artificial intelligence (AI) computing techniques, like machine learning, deep learning, and natural language processing, to streamline and automate various processes. These techniques teach computers to parse data in a contextual manner to provide requested information, supply analysis, or trigger an event based on their findings. They are also uniquely well suited to rapidly analyzing huge data sets, and have a wide array of applications in different aspects of supply chain and logistics operations.

AI's ability to streamline so many supply chain and logistics functions is already delivering a competitive advantage for early adopters by cutting shipping times and costs. A cross-industry study on AI adoption conducted in early 2017 by McKinsey found that early adopters with a proactive AI strategy in the transportation and logistics sector enjoyed profit margins greater than 5%. Meanwhile, respondents in the sector that had not adopted AI were in the red.

Top Areas Where Businesses Are Driving Revenue From AI Investments

Q: Which part of your organization is driving revenue from AI capabilities today?

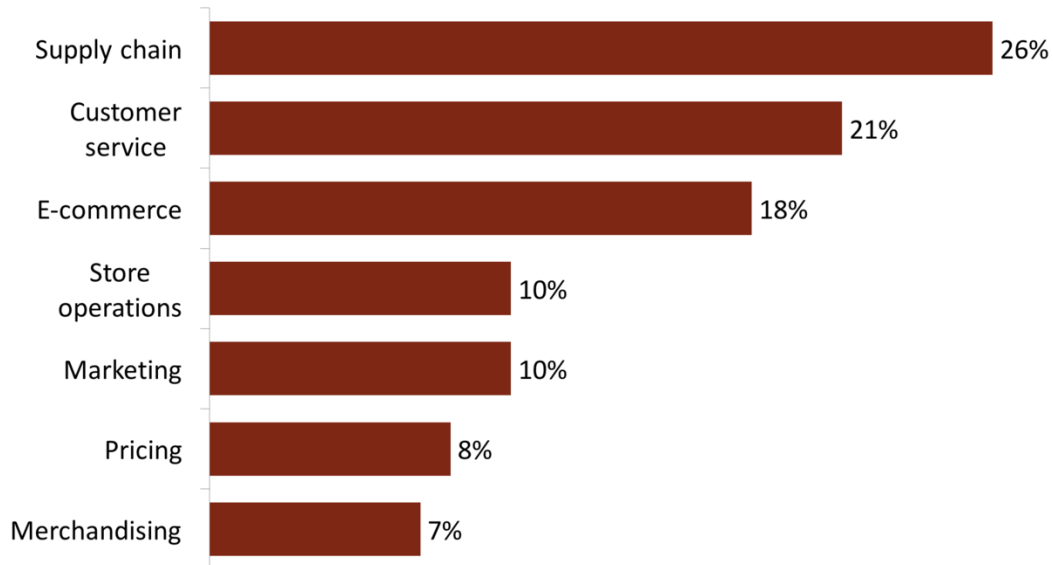| Area	Percentage
Product Innovation/R&D	50%
Customer Service	46%
Supply chain and operations	42%
Security/Risk	40%
Sales	34%

Source: Teradata, Vason Bourne, 2017, n=209 IT and business execs

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Additionally, many companies in other industries that rely heavily on their supply chain and logistics functions are seeing similar benefits from AI. Among retailers included in McKinsey's survey, early AI adopters enjoyed profit margins more than 10% higher than nonadopters' margins. And a survey released early last year by RetailWire and IBM found that 26% of the executives from retailers and retail vendors surveyed said their supply chains — more than any other area, including marketing and e-commerce — were where AI could have the biggest impact on their businesses. Companies across a variety of industries are already starting to see that impact; a survey released last year by enterprise business intelligence company Teradata found that the supply chain was one of the leading parts of an organization where businesses were driving revenue from their AI investments.

AI's Biggest Impact In Retail
Q: Where does AI have the potential to make the biggest impact on retailers?

Category	Percentage
Supply chain	26%
Customer service	21%
E-commerce	18%
Store operations	10%
Marketing	10%
Pricing	8%
Merchandising	7%

Source: IBM, RetailWire, 2017, n=179 execs from retailers and retail vendors

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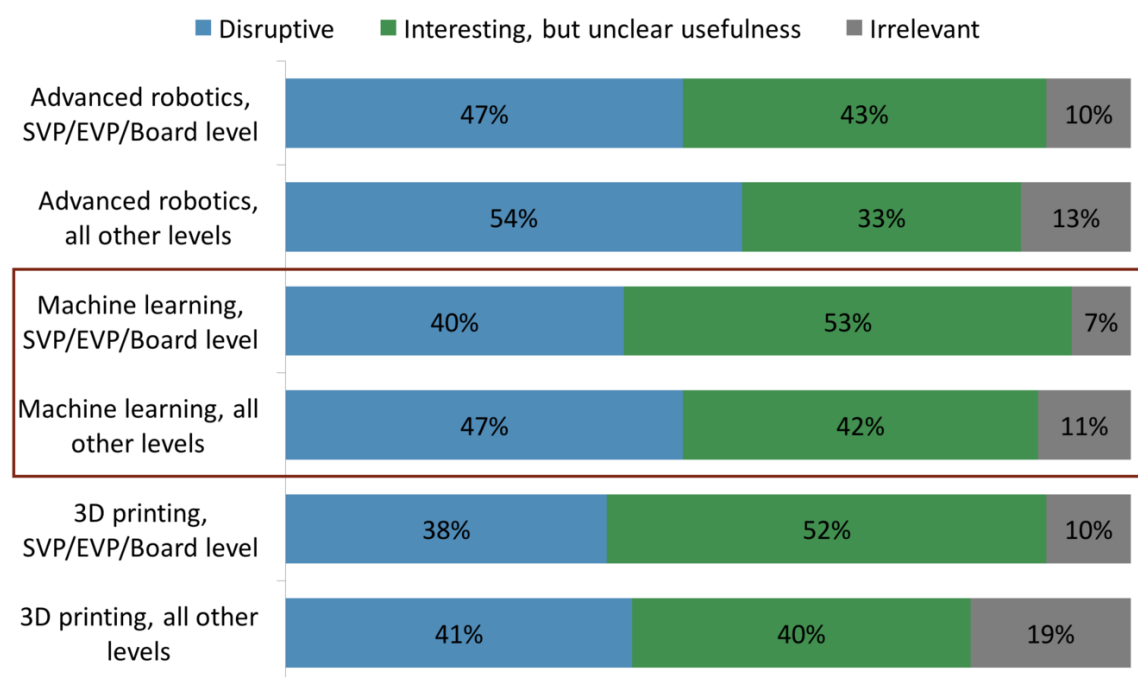**However, these significant benefits have yet to drive widespread adoption.**
Only 21% of the transportation and logistics firms in McKinsey's survey had moved beyond the initial testing phase to deploy AI solutions at scale or in a core part of their business. The challenges to AI adoption in the field of supply chain and logistics are numerous and require major capital investments and organizational changes to overcome.

In this report, BI Intelligence explores the vast impact that AI techniques like machine learning will have on the supply chain and logistics space. We detail the myriad applications for these computational techniques in the industry, and the adoption of those different applications. We also share some examples of companies that have demonstrated success with AI in their supply chain and logistics operations. Lastly, we break down the many factors that are holding organizations back from implementing AI projects and gaining the full benefits of this disruptive technology.

AI OVERVIEW AND ADOPTION DRIVERS

Major players in the supply chain and logistics space have historically relied on different analytics tools to optimize their storage and transportation processes for speed and cost. Machine learning is simply an extension of the industry's use of data analysis to achieve greater optimization. Despite rather low adoption, organizations in the field of supply chain and logistics are increasingly seeing the disruptive potential of machine learning: It was considered the second-most disruptive emerging technology in supply chain and logistics — behind only advanced robotics — in a 2016 survey of more than 1,400 industry executives by SCM World.

Executive Sentiment About Emerging Technologies In Supply Chains

Legend: Disruptive | Interesting, but unclear usefulness | Irrelevant

Category	Disruptive	Interesting, but unclear usefulness	Irrelevant
Advanced robotics, SVP/EVP/Board level	47%	43%	10%
Advanced robotics, all other levels	54%	33%	13%
Machine learning, SVP/EVP/Board level	40%	53%	7%
Machine learning, all other levels	47%	42%	11%
3D printing, SVP/EVP/Board level	38%	52%	10%
3D printing, all other levels	41%	40%	19%

Source: SCM World, JDA Software, 2016, n=1,415

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The current interest in and early adoption of AI systems is being driven by increased demands from shippers, recent technological breakthroughs, and significant investments in data visibility by the largest players in supply chain and logistics.

Rising Delivery Expectations

Companies are increasingly under pressure to deliver goods faster and cheaper. Retailers are being forced to cut their delivery times while limiting the growth of logistics costs, for example, due to Amazon's free, two-day Prime shipping benefit. Growing demands for fast and free shipping are, in turn, straining retailers' supply chain partners to move goods from factories and processing plants to distribution centers more quickly and cheaply.

This trend is pushing companies to adopt technologies that can help them streamline logistics and supply chain operations for speed and cost through better decision-making. Both Target and Walmart, for example, acquired logistics technology companies in early 2017 to gain better tracking and management of their last-mile e-commerce deliveries. AI systems can help companies achieve their goals around fast, low-cost deliveries in a number of ways, including better supply and demand forecasting, improved asset utilization, and more optimized routing.

Accelerated AI Development

AI's recent advancements have been driven by increased research and development, the explosion of data generated by the proliferation of digital devices, and significant leaps in computing power. Training speeds of deep learning algorithms improved by five- to six-fold in both 2015 and 2016, according to McKinsey. This has been enabled by major leaps in graphics processing units (GPUs) — computing chips originally designed for video gaming that can quickly process and analyze enormous volumes of data — and exponential growth in data that can be used to train algorithms.

These advancements have driven enormous investment in AI in recent years.
In fact, global enterprise investment in AI research and development totaled
between $26 billion and $39 billion in 2017, McKinsey estimates. The vast majority
of that funding has gone into machine learning algorithms, which have grown
increasingly sophisticated. This has enabled major improvements in other areas of
AI, like natural language processing and computer vision, by helping computers
better identify words and images. IDC predicts that global spending on AI systems
will grow to $57.6 billion by 2021.

Data Volumes And Visibility

The growth of data that can be used to train computing systems has been crucial in
recent technological advances. Logistics and supply chain operations are ripe with
data, but that data isn't always readily accessible. Much of the industry has long
captured and stored data on paper documents and spreadsheets, and a great deal
of operational data resides in legacy systems, making it difficult to extract.

**These practices have begun to change in recent years, as logistics providers
— particularly the largest players in this space — have started devoting
resources to make the data they collect on their shipments more accessible.**
DHL, for example, has launched several data visibility initiatives to help its
customers track their shipments, including a new platform called Ocean View,
launched last year, that provides near real-time updates on the location and
estimated arrival time of ocean cargo shipments. The logistics giant also partnered
with Huawei last year to develop IoT technologies that provide real-time tracking
and visibility of assets and inventory for warehouses, in-transit freight shipments,
and last-mile deliveries. Additionally, it provides asset-tracking solutions, like its
SmartSensor technology, for healthcare and pharmaceutical shipments. Both UPS
and FedEx also offer a variety of tools to provide tracking data and visibility into
customers' shipments. However, this trend toward data visibility has yet to spread to
smaller regional and local logistics providers.

The investments by larger organizations in opening up enormous data troves presents a significant new challenge to making sense of all this data. AI techniques like machine learning and deep learning are uniquely well suited to help tackle that challenge. AI algorithms can require huge data sets to train them how to identify patterns and glean insights from them. Once they've been trained, algorithms can then be continuously improved to deliver increasingly refined and granular insights more quickly by analyzing more and more data. The ability to deliver such insights from huge volumes of data is particularly useful for supply chain and logistics operations, as it results in more accurate details on individual shipments. This capability also enables firms to make rapid adjustments based on analysis of the many variables that can impact delivery times and costs.

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MAJOR AI APPLICATIONS

AI has a wide breadth of potential applications in the supply chain and logistics field. Some of the most impactful applications for AI include facilitating faster deliveries through better optimized routes and enhancing demand forecasting functions and asset utilization through improved predictive analysis. AI can also drive down costs related to supply chain risks and improve customer service.

Route Optimization

Route planning is one of the most fundamental operations for logistics companies, and machine learning algorithms can pay huge dividends in this area. There's been a massive explosion in digital mapping data in recent years that machine learning algorithms can leverage to constantly update their route recommendations with new data on road closures, weather, conditions, and address changes. These updates can help companies figure out fast and fuel-efficient routes for couriers, who often make dozens or even hundreds of deliveries per day. Traditionally, drivers have planned their own routes based on the deliveries they've been given to perform and their knowledge of local roads, but delivery companies large and small are increasingly relying on machine learning recommendations to cut delivery times and costs.

Companies like UPS are already using these algorithms to save both time and money. UPS has earned accolades for its On-Road Integrated Optimization and Navigation (ORION) algorithm, which plans the daily routes for its 55,000 drivers in North America. The algorithm was initially rolled out on a limited basis in 2013, and UPS completed the nationwide rollout in 2016. The enormous project to develop and roll out the algorithm took more than a decade and around $250 million. However, UPS estimated that ORION had already saved it $320 million as of December 2015 — before its nationwide rollout was even completed — and forecasts that it will eventually save the company $300 million to $400 million annually.

To chart more efficient routes, the algorithm leverages UPS' proprietary mapping data, derived from its fleet telematics and other sources, with more than 250 million address locations. The system then figures out the most efficient course for each individual driver to make more than 100 average daily drop-offs based on delivery locations, drop-off instructions, and other factors. UPS also [patented](#) a process for using its own big data infrastructure to quickly update the maps that ORION uses, allowing the algorithm to update a given route within 30 seconds to account for address changes, road closures, and other new information. The optimized routes ORION delivers daily to its drivers have cut UPS' miles driven by about 100 million miles per year, and have reduced its fuel consumption by more than 10 million gallons annually.

Although many companies still rely heavily on manual route planning, several startups, like Routific and Paragon, have sprung up to help optimize routes with their proprietary algorithms. Routific's algorithm, inspired by the way that beehives [plot](#) their routes to food sources, creates a plethora of possible routes for scheduled deliveries. It then evaluates those options, devoting extra computational power to the most promising routes, allowing it to quickly find a highly optimized route that fits the deliveries' specific requirements. The startup is specifically targeting smaller businesses — it [helped](#) Boston-based meal-delivery company The Foodery lower its delivery costs by 28%, and helped Netherlands-based courier service Red je Pakketje cut its same-day delivery times down to one hour, eliminating the company's previous 1 p.m. cut-off time for same-day delivery orders. Meanwhile, UK grocery chain Sainsbury's used Paragon's system to optimize its grocery-delivery routes, [improving](#) its on-time deliveries by 17% and cutting its total miles driven by 3.8%.

Demand Planning And Asset Utilization

Forecasting supply and demand is another central function to supply chain and logistics operations, allowing companies to plan their resource allocation to match customers' needs. However, traditional forecasting tools struggle to capture all of the constantly changing variables impacting supply and demand for companies because they rely heavily on historical data. This limits their usefulness — IHS Markit estimates that the global supply chain industry has more than 500 million booking revisions per year, demonstrating the crucial need to be able to rapidly adjust supply and demand planning to account for constantly changing shipping schedules and conditions.

Demand Planning

Predictive AI systems can improve the accuracy of these forecasts by taking into account the massive number of variables that can affect any individual shipment, allowing companies to make smarter decisions regarding staffing and inventory levels, as well as where to position containers based on vehicle capacity. Such smarter planning can, in turn, help companies avoid shipping delays and excess costs that can hurt customer satisfaction and profits. Additionally, improved demand forecasting can have a major impact on companies' bottom lines — retailers lose more than $1 trillion per year because they can't properly estimate future demand, leading to out-of-stock items or excess inventory they have to then sell at markdown.

AI systems can quickly make adjustments and run through thousands of possible outcomes to find an accurate prediction of how changing conditions will impact supply and demand. German multinational pharmaceutical giant Merck KGaA deployed a new system for its supply and demand forecasting that leveraged machine learning and sensor data, and said it proved 80% more effective than the forecasts its operations team previously produced. And German e-commerce marketplace Otto has used a deep learning algorithm to predict with 90% accuracy which items on its platform will be sold in the next 30 days. The company now automates the ordering of more than 200,000 items per month from its third-party sellers, allowing it to cut its surplus inventory by one-fifth and save on costs associated with storing that inventory. Additionally, the algorithm has helped the company reduce returned items by more than 2 million per year by allowing it to better predict the correct sizes and variations of products that customers will order. Meanwhile, French multinational food brand Danone gained a 20% reduction in forecasting errors and a 30% reduction in lost sales through a machine learning partnership with supply chain software provider Tools Group.
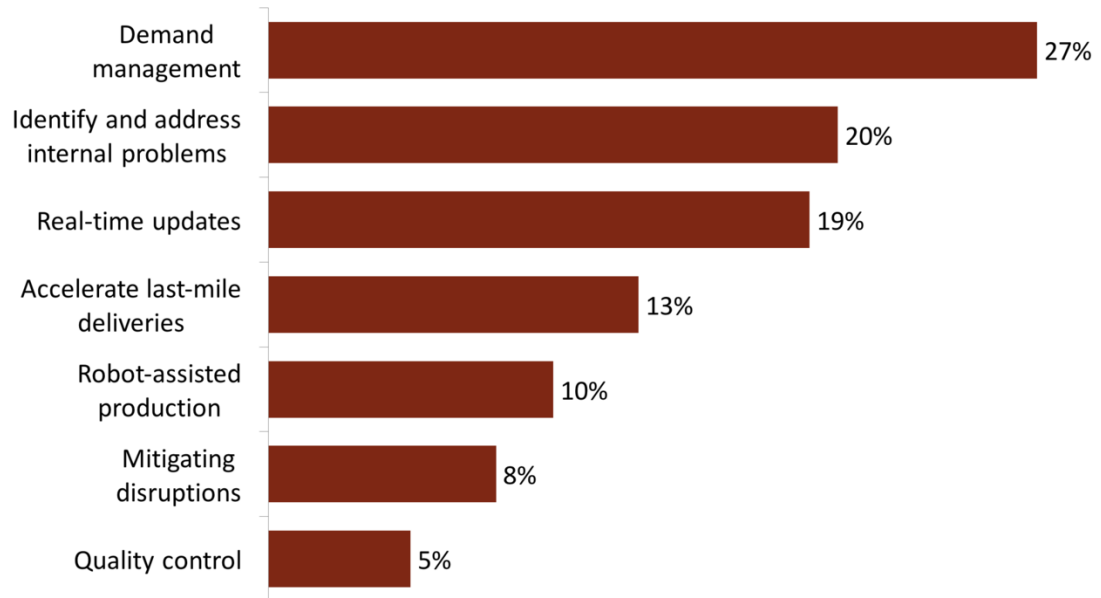
Asset Utilization

Logistics companies can operate an enormous number of assets that help move their goods and require heavy maintenance costs. Combined, UPS and FedEx operate more than 1,000 planes and 200,000 vehicles worldwide, in addition to more than 4,000 warehousing and sorting facilities. Getting the most out of these assets is a must for optimizing costs in their networks. However, shipping delays, seasonal fluctuations, and a host of other factors mean that warehouses, planes, and shipping containers often have empty, unused space, while forklifts, trucks, and worker crews may be sitting idle, waiting for an assignment. In the commercial trucking space, for example, fleets average around 50% capacity utilization, meaning only about half of a total fleet's hauling capacity is being used at any given time to actually move goods for clients. That's because of trucks sitting idle thanks to delays or repairs, and because the average truck on the road is only 70-75% full. This creates obvious cost inefficiencies and lost revenue opportunities that could be captured if fleets could better utilize their capacity.

AI can help by predicting where and when assets will be needed. European parcel courier company Speedy, for example, increased its fleet utilization rate from 72% to 82% by working with Transmetrics, an AI startup that's developed a predictive algorithm targeted at asset utilization in the logistics space. That has led to a 7-9% reduction in Speedy's total costs by consolidating shipments and canceling unnecessary hauls. Transmetrics' algorithm analyzes data from a company's transportation management solution to forecast — typically with greater than 90% accuracy — its demand and supply for shipments over the coming weeks, according to CEO Aspuruh Koev. That allows logistics planners to plot how much total shipping capacity they will need at different locations ahead of time, helping them to maximize capacity by moving more goods with fewer vehicles. While Transmetrics is currently focused on improving fleet utilization for parcel companies delivering e-commerce orders, Koev says the company is also working on improving utilization of fixed assets like shipping containers, and warehouse assets like forklifts.

How AI Will Impact Retailers' Supply Chains And Logistics

Q: Where will AI have the most impact in the next 5 years?

Category	Percentage
Demand management	27%
Identify and address internal problems	20%
Real-time updates	19%
Accelerate last-mile deliveries	13%
Robot-assisted production	10%
Mitigating disruptions	8%
Quality control	5%

Source: IBM, RetailWire, 2017, n=179 executives from retailers and retail vendors

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Risk Management

Shipping problems can result in heavy costs from booking new transportation and shifting resources to solve delays and other issues. The British Standards Institute released a report in 2016 that estimated global losses from supply chain risks topped $56 billion in 2015. The majority of those costs stemmed from natural disasters, with the top five natural disasters in the world that year accounting for $33 billion alone. Much of the rest came from stolen shipments. Besides these steep financial losses, supply chain risks can also negatively impact customer satisfaction by leading to delivery delays and product shortages.

Several companies have turned to AI to try to reduce risks in their shipping operations. DHL introduced new machine learning and natural language processing capabilities to its Resilience 360 supply chain risk management platform, for example. The new AI capabilities, dubbed DHL Supply Watch, analyze information from 300,000 online and social media sources to identify potential risks to clients' supply chains, including impending weather events, labor disputes, and supply shortages. This can help provide early alerts to potential problems with suppliers, allowing companies to take quick actions to avert major delays and product shortages. Third-party logistics provider C.H. Robinson launched a similar service this past September that analyzes historical data to provide alerts about potential supplier disruptions down to the SKU product level.

Adoption of risk management AI solutions is still very low across nearly all industries, though, including the logistics and supply chain space. A cross-industry study of 220 risk managers by professional association GARP last year found that only 15% of the organizations involved were leveraging AI for risk management. However, 67% of the risk management professionals surveyed said AI would eventually create a "foundational change" in their organizations' risk management functions, demonstrating the massive potential AI systems have in this area.

Chatbots

Delivery providers are playing an increasingly important role in the e-commerce shopping experience. Shoppers want to know where their order is, when it will arrive, and want immediate notification of any delays, making fast and responsive customer service increasingly critical for these providers. Chatbots offer an automated mechanism for companies to provide such service and improve customer satisfaction.

Some companies have started using chatbots to provide customers with a convenient experience and more detailed information. UPS, for example, originally launched its chatbot via Facebook Messenger, Amazon's Alexa, and Skype in 2016 to allow customers to find UPS store locations, track orders, and get shipping rate information. Last year, it integrated the chatbot with its UPS MyChoice customer service program, allowing MyChoice members to get more detailed information about their shipments and reroute orders to different delivery locations. In the future, the company plans to add real-time alerts via Facebook Messenger and Skype to the bot's capabilities.

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Chatbots can also be used to automate some of the same order tracking and alert functions in business-to-business logistics. German enterprise software giant SAP has introduced a chatbot, called Procurement, to its Ariba supply chain management worldwide software, which was used by 2.5 million companies in early 2017. The bot allows companies to automate communications and management functions by learning an individual company's supply chain policies and procedures, and sending alerts and notifications to employees and suppliers about shipments and transactions. Such supply chain chatbots are still very nascent, but an increasing number of companies are starting to explore their use. A survey of 300 supply chain executives released early last year found that 51% said their organizations were at least exploring the use of chatbots, up from 21% in a similar survey in Q4 2016.

Chatbot Adoption In Supply Chains

Q: Is your organization engaging with chatbots in any way?

Legend: ■ Yes ■ No

Q4 2016: Yes 21%, No 79%
Q2 2017: Yes 51%, No 49%
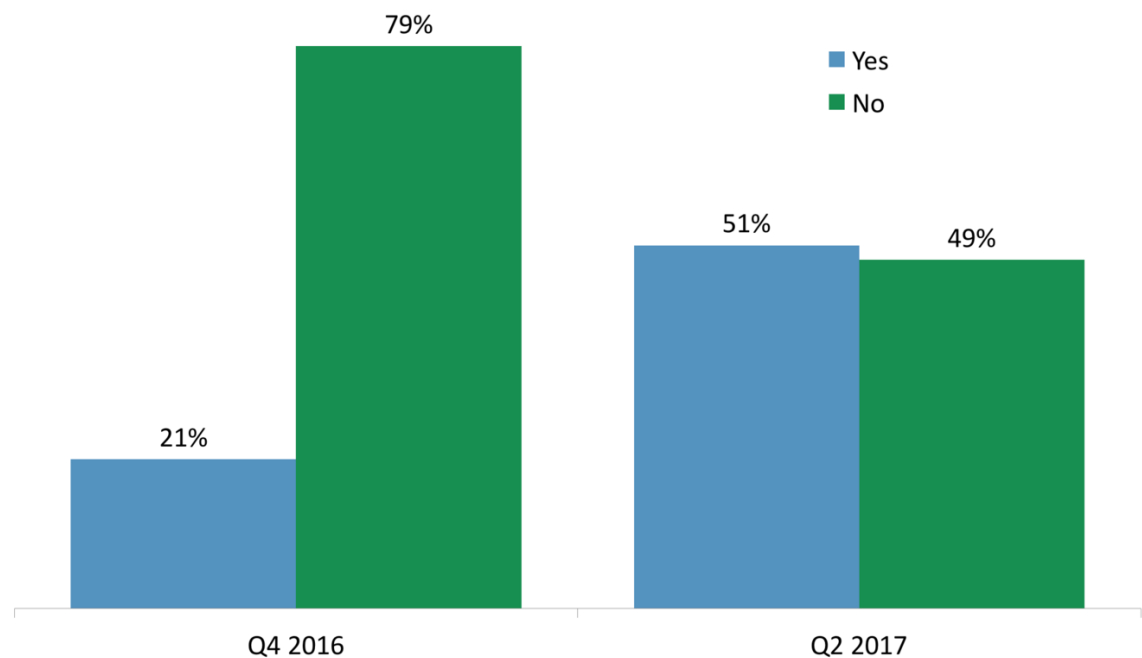
Source: eft, 2017, n=300 supply chain professionals

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OVERCOMING CHALLENGES

Although companies are starting to show clear benefits from their investments in AI systems, adoption remains low. This is because companies face difficult hurdles when implementing AI systems that require significant investments and creativity to overcome.

Data Accessibility

Getting the right data to train AI systems is a constant challenge that can hamper organizations' returns on AI investments. That is particularly true in the logistics and supply chain industry because of the prevalence of manual data collection and storage practices, especially among the many smaller players in the industry, which rely heavily on paper records and Excel spreadsheets. Additionally, a great deal of the digitized data generated by supply chain and logistics operations resides in legacy systems, making it difficult to extract that data for analysis. Lastly, about 80% of the data about any individual company's supply chain operations is in its supplier partners' systems, not its own. That makes digitizing manual data collection and storage practices, updating and finding ways to work around legacy systems, and breaking down internal and external data silos a crucial but complex challenge for companies looking to leverage AI to optimize the movement and storage of their goods.
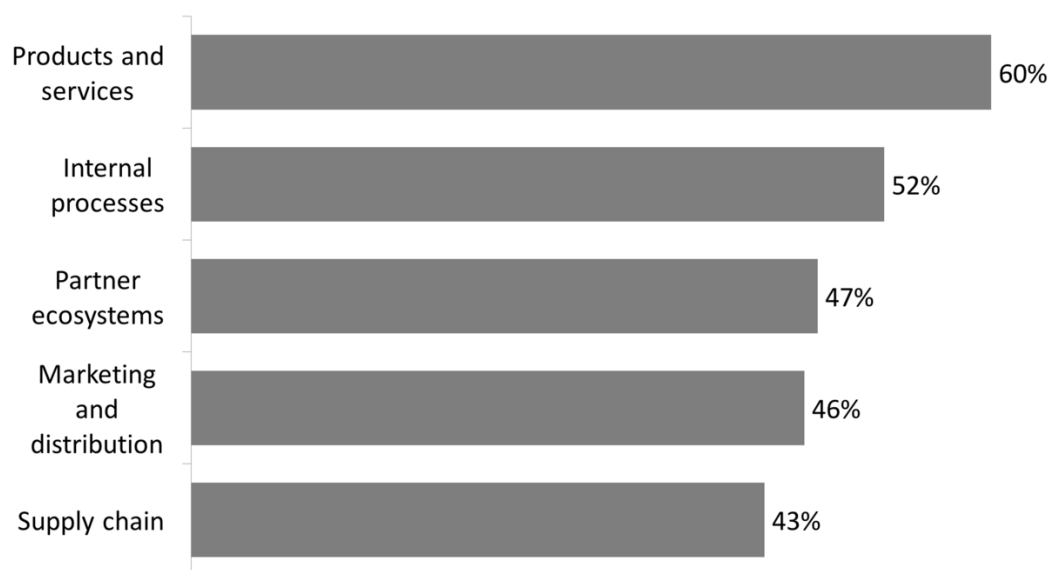
Digital transformations of logistics and supply chain operations can be extremely costly and time-consuming, creating a massive barrier to the use of AI. For example, UPS' ORION algorithm is built on top of its Package Flow Technology (PFT) system, a software and digitization initiative developed between 2003 and 2007 at the cost of $600 million. PFT provides the foundation for UPS' analytics initiatives by centralizing UPS' own operational data related to pickups and drop-offs, and aggregating with external data sources. This has given the company greater visibility into the deliveries it performs, and has streamlined its deployment and use of tools to analyze all of that data for operational insights.

The cost and complexity of these digital transformations means that logistics and supply chain operations are often the least digital parts of organizations.
A cross-industry study of companies' digital strategies released early last year by McKinsey found that supply chains were perceived as the least digitally mature parts of the businesses involved in the survey. Only 2% of the survey's 1,700-plus respondents said supply chains were a major focus of their companies' digital strategies. While huge companies have been able to invest heavily in digital transformation projects to lay the foundation for their use of analytics and AI, the vast majority of companies simply haven't been able to dedicate the resources that such major operational transformations require. For smaller companies, these digital transformations will require a shift toward increased use of cloud services and Software-as-a-Service (SaaS) applications to help them digitize their operations and open up data for analysis, according to Suresh Acharya, head of JDA Labs, supply chain software giant JDA's innovation lab.

Parts Of Companies Ranked By Digital Maturity

Q: How would you rate the digital maturity of these parts of your business?

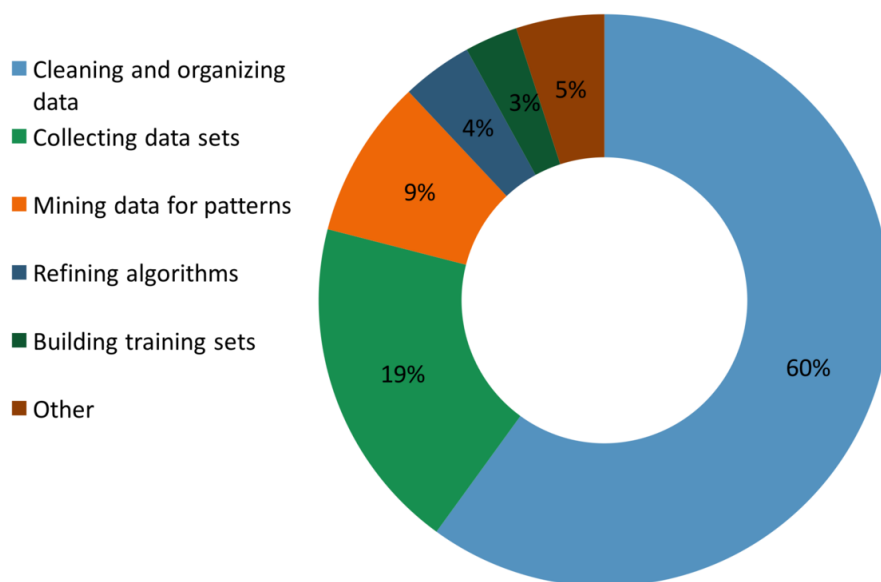| Part	Value
Products and services	60%
Internal processes	52%
Partner ecosystems	47%
Marketing and distribution	46%
Supply chain	43%

Source: McKinsey, 2017, n=1,788

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Although costly, these digital transformations deliver real value by enabling greater visibility and tracking in logistics and supply chain operations, even without the addition of analytics tools. UPS was able to cut its overall fuel consumption by 8.5% just through its investment in PFT. Additionally, McKinsey's research found that companies that aggressively digitize their supply chains increased their annual growth of revenue before interests and taxes by 3.2% — more than if they digitized any other part of their operations. That said, even once data becomes accessible, companies could still encounter setbacks. The data may have to be cleaned or reformatted for analysis, and historical data sets may be incomplete. That can require companies to interpolate or extrapolate data from insufficient data sets, or buy or license additional data from external sources, Stefan Weitz, EVP of technology for bpost Parcels and Logistics Americas, formerly e-commerce fulfillment company Radial, told BI Intelligence. The work of collecting and cleaning data for analysis takes up the vast majority of most data scientists' work days, limiting the amount of time they can spend training systems and fine-tuning their analysis to deliver more accurate insights.

How Data Scientists Spend Their Day
Global

Legend:
- Cleaning and organizing data
- Collecting data sets
- Mining data for patterns
- Refining algorithms
- Building training sets
- Other

Values: 60%, 19%, 9%, 4%, 3%, 5%

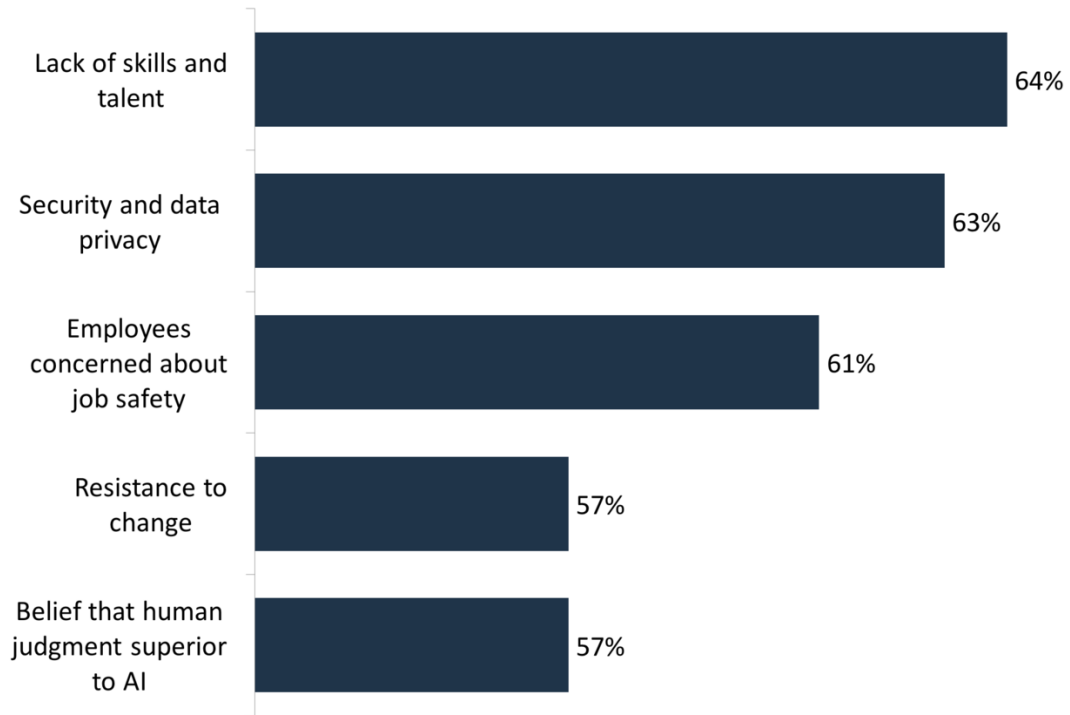*Source: CrowdFlower Data Scientist Report, 2016*

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Talent Shortage

Nearly every industry is struggling to find and keep employees with the skills necessary to launch AI projects. This was the single biggest challenge to implementing AI, according to a Capgemini survey released early last year that surveyed 939 companies that had done so. This has led to intense wage competition over data scientists; companies worldwide have collectively budgeted $650 million to fill more than 10,000 vacant AI-related positions, according to a study released last year by Paysa.

While the largest companies have been able to shell out heavy investments to build teams of data scientists, the vast majority of companies can't compete with current wage growth for such talent. Tech giants betting their future on AI innovations have dedicated enormous sums to acquiring and keeping AI talent: Amazon has budgeted over 600 times more than the average company in Paysa's study to fill AI positions, and Google has set aside 300 times more. Meanwhile, smaller providers will have to turn to partnerships with tech companies and startups to tap into their teams of AI specialists to access the skills necessary for implementing AI effectively.

Biggest Challenges To Implementing AI

Challenge	Percentage
Lack of skills and talent	64%
Security and data privacy	63%
Employees concerned about job safety	61%
Resistance to change	57%
Belief that human judgment superior to AI	57%

Source: Capgemini, 2017, n=939 companies that have implemented AI

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Workforce Changes

None of the companies we spoke to for this report predicted that there will be massive workforce reductions in the near future caused by the introduction of AI systems. Most companies see AI as a technology tool that can enhance employees' efforts in different functions. However, as AI starts to take on different tasks within organizations, employees' roles and daily workflows will change. Companies will need to develop strategies for redeploying employees and resources to other functions and gaining employee buy-in for such organizational changes.

AI implementation may prove difficult if employees resist the operational changes. Employees' fear for the safety of their jobs, organizational resistance to change, and employees' belief that their judgment is superior to AI's insights were three of the top five challenges to implementing AI among the companies surveyed by Capgemini. Gaining employee buy-in can be difficult because they may have to follow decisions based on AI-driven insights that could run counter to their own preferences or judgments. Shippers might have a historical preference for a certain carrier or port, for example, but an AI system may parse the data and find that another carrier or port would be more suitable for them, according to Sean Linehan VP of product at Flexport. UPS' senior director of change management, Jack Levis, cited such issues as one of the biggest challenges UPS faced when rolling out ORION. Overcoming that challenge required extensive testing to prove the system's value and gain employee buy-in, as well as careful integration with existing workflows to minimize the disruption of employees' day-to-day tasks.

Companies need to make AI-driven alerts and insights as easily accessible as possible for the employees responsible for acting on them. This will require the adoption of user-friendly interfaces inspired by the consumer smartphone space. These interfaces will provide data visualizations and notifications that are both attractive to younger workers and easy for older workers to see and understand, notes Mike Maris, the North America lead for transportation, distribution, and logistics for enterprise tech provider Zebra Technologies. By taking steps to get employees onboard with the use of AI, companies can not only ensure successful implementation, but also up their ability to draw maximum benefits out of the technology.

THE BOTTOM LINE

- The unique abilities of AI systems to identify patterns in massive data sets and quickly deliver insights based on new information make them more effective for certain functions in supply chain and logistics than more traditional forecasting and analytics tools.

- AI can deliver enormous benefits to supply chain and logistics operations, including cost reductions through reduced redundancies and risk mitigation, improved forecasting, faster deliveries through more optimized routes, improved customer service, and more.

- Few companies in this space have adopted AI systems, though, because legacy players face many obstacles to implementing them.

- Organizations must grapple with significant challenges to make the most of AI's benefits, including opening up and cleaning massive operational and transactional data sets, acquiring AI talent, and managing changes to their workforces as AI takes on new tasks.

- The largest companies in this space have started to address some of the inherent challenges by implementing digital transformation initiatives and spending heavily on teams of data scientists.

- Although AI implementations are unlikely to result in large-scale workforce reductions in the near term, companies still need to develop strategies to address how workers' roles will change as AI systems automate specific functions.

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