**How To Improve Supply Chains With Machine Learning**

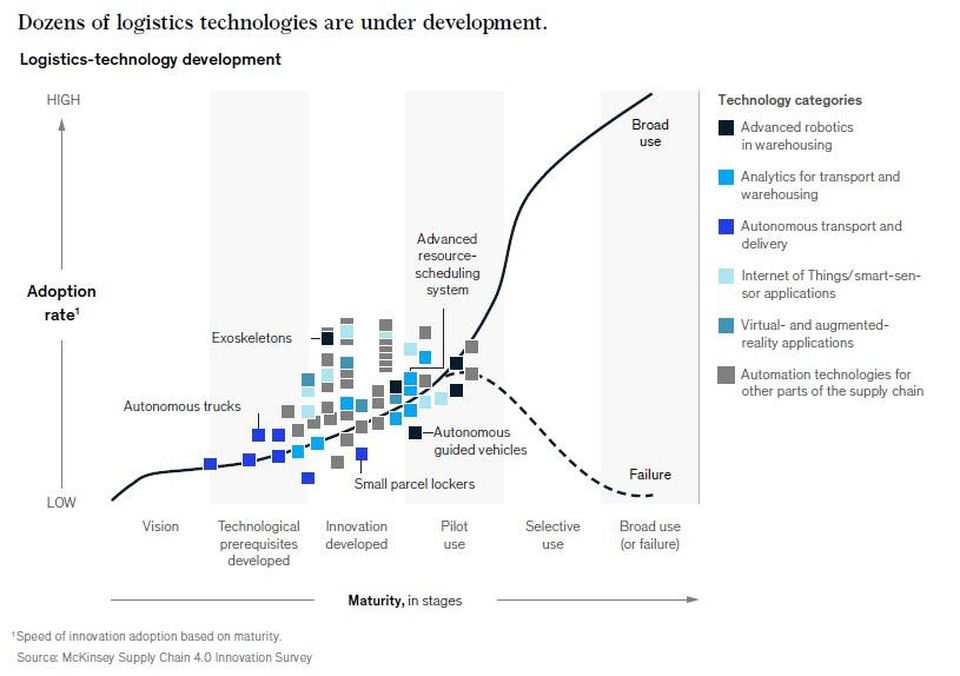
<https://www.forbes.com/sites/louiscolumbus/2019/04/28/how-to-improve-supply-chains-with-machine-learning-10-proven-ways/#365966fe3f3c>

**Bottom line:** Enterprises are attaining double-digit improvements in forecast error rates, demand planning productivity, cost reductions and on-time shipments using machine learning today, revolutionizing supply chain management in the process.

Machine learning algorithms and the models they’re based on excel at finding anomalies, patterns and predictive insights in large data sets. Many supply chain challenges are time, cost and resource constraint-based, making machine learning an ideal technology to solve them. From [Amazon’s Kiva robotics relying on machine learning to improve accuracy, speed and scale](https://spectrum.ieee.org/automaton/robotics/industrial-robots/interview-brad-porter-vp-of-robotics-at-amazon) to [DHL relying on AI and machine learning to power their Predictive Network Management system](https://www.logistics.dhl/content/dam/dhl/global/core/documents/pdf/glo-artificial-intelligence-in-logistics-trend-report.pdf) that analyzes 58 different parameters of internal data to identify the top factors influencing shipment delays, machine learning is defining the next generation of supply chain management. [Gartner](https://www.gartner.com/) predicts that by 2020, [95% of Supply Chain Planning (SCP) vendors will be relying on supervised and unsupervised machine learning](https://www.gartner.com/document/3875876) in their solutions. [Gartner](https://www.gartner.com/) is also predicting by 2023 intelligent algorithms, and AI techniques will be an embedded or augmented component across[25% of all supply chain technology solutions](https://www.gartner.com/document/3873793).

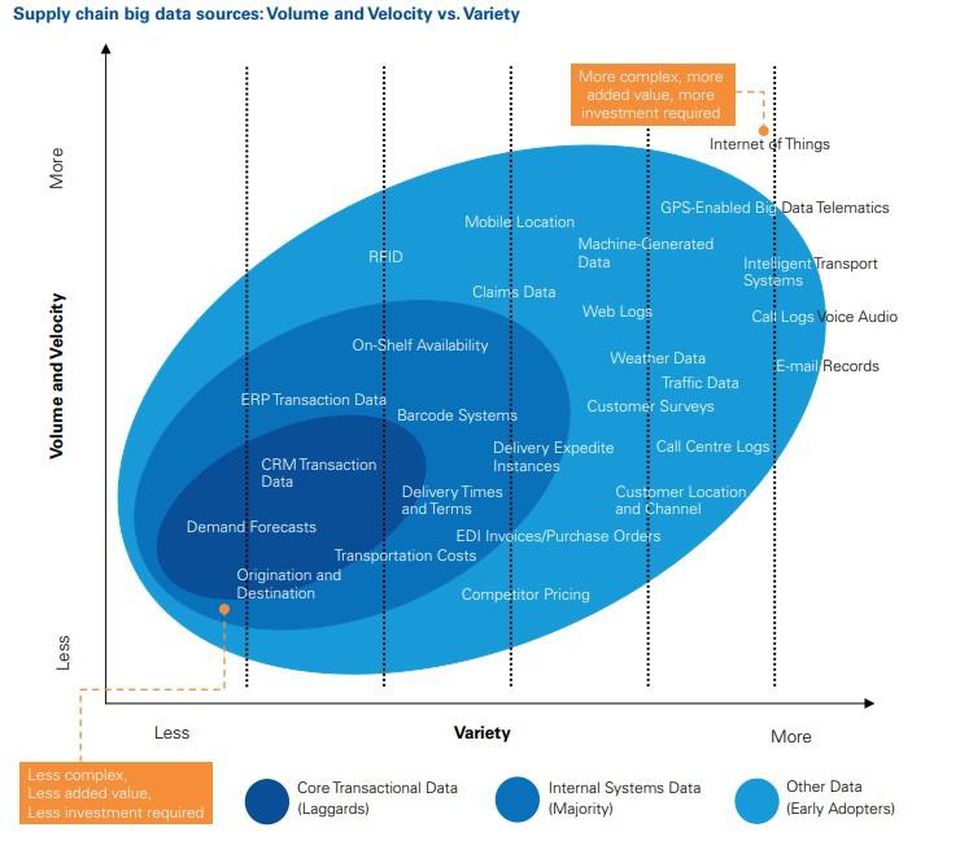
The ten ways that machine learning is revolutionizing supply chain management include:

* **Machine learning-based algorithms are the foundation of the next generation of logistics technologies, with the most significant gains being made with advanced resource scheduling systems.** Machine learning and AI-based techniques are the foundation of a broad spectrum of next-generation logistics and supply chain technologies now under development. The most significant gains are being made where machine learning can contribute to solving complex constraint, cost and delivery problems companies face today. McKinsey predicts machine learning’s most significant contributions will be in providing supply chain operators with more significant insights into how supply chain performance can be improved, anticipating anomalies in logistics costs and performance before they occur. Machine learning is also providing insights into where automation can deliver the most significant scale advantages. Source: McKinsey & Company, [Automation in logistics: Big opportunity, bigger uncertainty](https://www.mckinsey.com/industries/travel-transport-and-logistics/our-insights/automation-in-logistics-big-opportunity-bigger-uncertainty), April 2019. By Ashutosh Dekhne, Greg Hastings, John Murnane, and Florian Neuhaus

[](https://blogs-images.forbes.com/louiscolumbus/files/2019/04/Dozens-of-logistics-technologies-are-under-development.jpg)

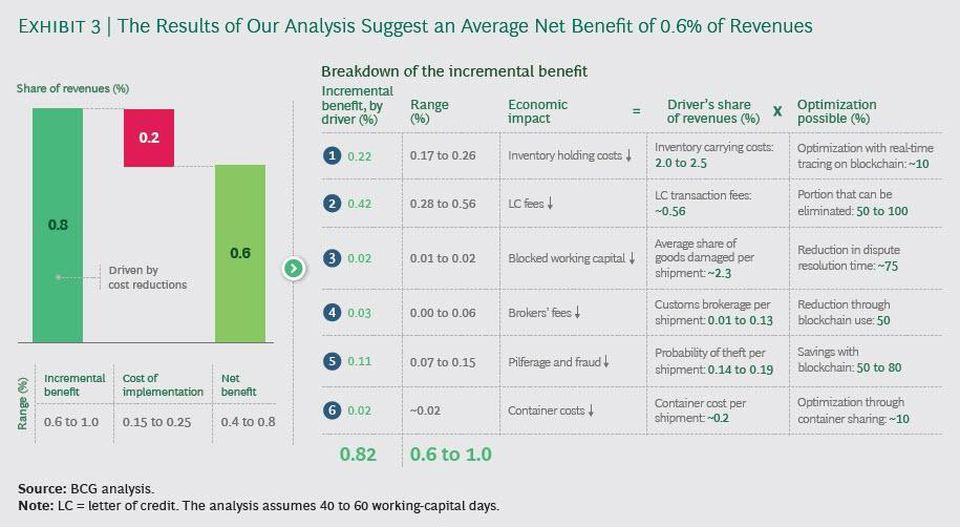
SOURCE: MCKINSEY & COMPANY, AUTOMATION IN LOGISTICS: BIG OPPORTUNITY, BIGGER UNCERTAINTY, APRIL 2019. BY ASHUTOSH DEKHNE, GREG HASTINGS, JOHN MURNANE, AND FLORIAN NEUHAUS

* **The wide variation in data sets generated from the Internet of Things (IoT) sensors, telematics, intelligent transport systems, and traffic data have the potential to deliver the most value to improving supply chains by using machine learning.**Applying machine learning algorithms and techniques to improve supply chains starts with data sets that have the greatest variety and variability in them. The most challenging issues supply chains face are often found in optimizing logistics, so materials needed to complete a production run arrive on time. Source: [KPMG, Supply Chain Big Data Series Part 1](https://advisory.kpmg.us/content/dam/advisory/en/insights/pdfs/2018/supply-chain-big-data-part-1-shaping-tomorrow.pdf)

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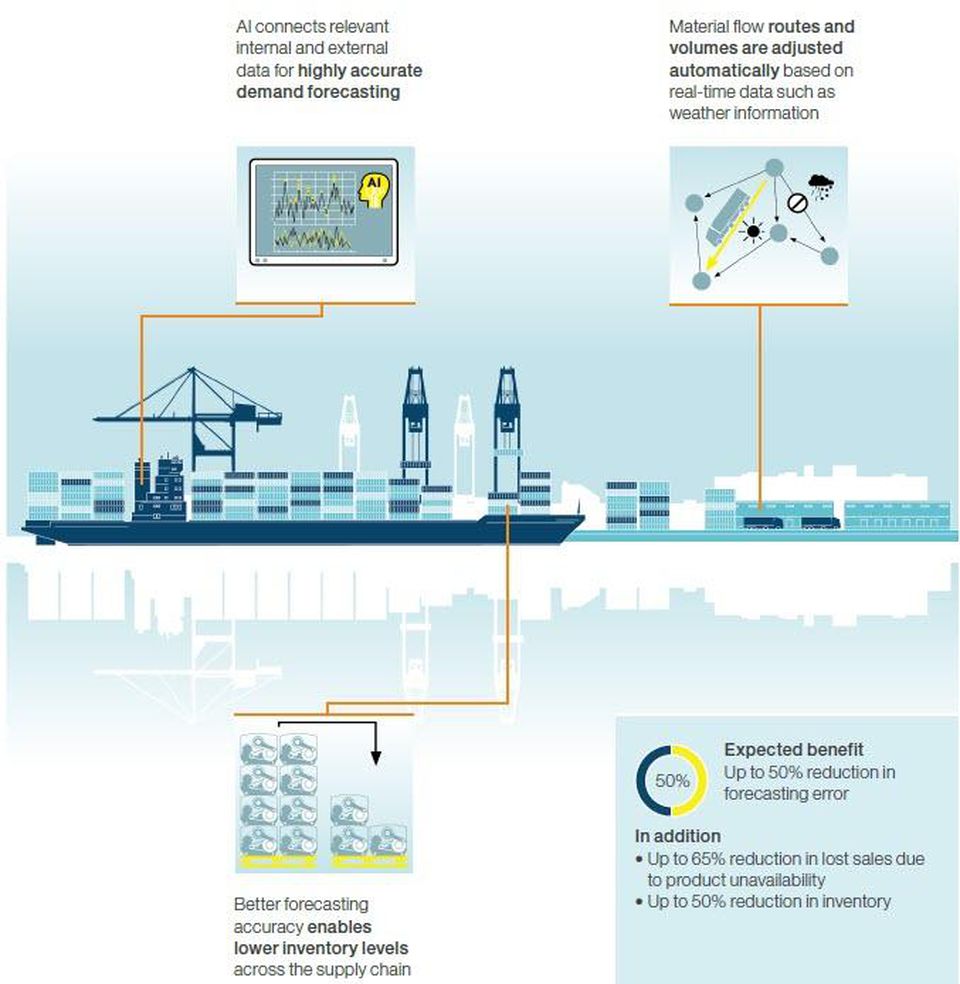
SOURCE: KPMG, SUPPLY CHAIN BIG DATA SERIES PART 1

* **Machine learning shows the potential to reduce logistics costs by finding patterns in track-and-trace data captured using IoT-enabled sensors, contributing to $6M in annual savings.** BCG recently looked at how a decentralized supply chain using track-and-trace applications could improve performance and reduce costs. They found that in a 30-node configuration when blockchain is used to share data in real-time across a supplier network, combined with better analytics insight, cost savings of $6M a year is achievable. Source: Boston Consulting Group, [Pairing Blockchain with IoT to Cut Supply Chain Costs](https://www.bcg.com/publications/2018/pairing-blockchain-with-iot-to-cut-supply-chain-costs.aspx), December 18, 2018, by Zia Yusuf, Akash Bhatia, Usama Gill, Maciej Kranz, Michelle Fleury, and Anoop Nannra

[](https://blogs-images.forbes.com/louiscolumbus/files/2019/04/BCG-Net-Benefits.jpg)

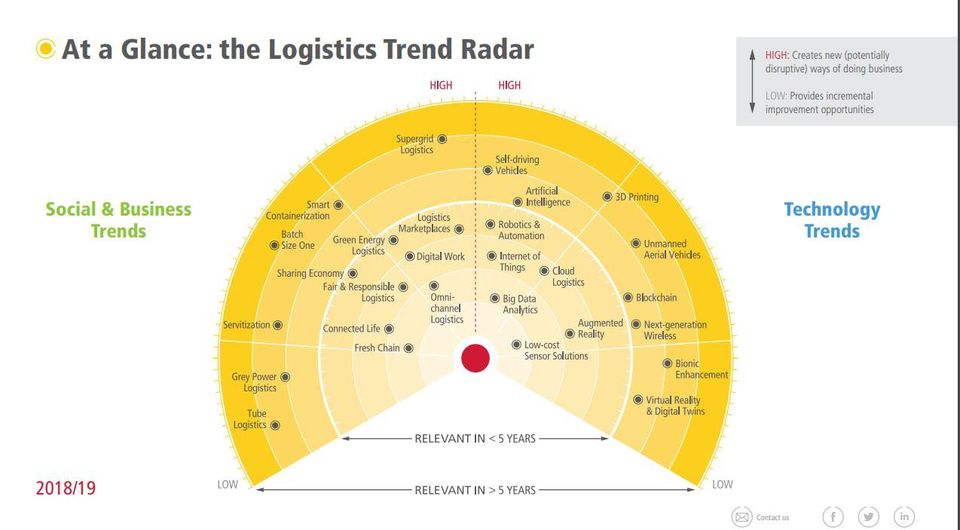
BOSTON CONSULTING GROUP, PAIRING BLOCKCHAIN WITH IOT TO CUT SUPPLY CHAIN COSTS, DECEMBER 18, 2018, BY ZIA YUSUF , AKASH BHATIA , USAMA GILL , MACIEJ KRANZ, MICHELLE FLEURY, AND ANOOP NANNRA

* **Reducing forecast errors up to 50% is achievable using machine learning-based techniques.**Lost sales due to products not being available are being reduced up to 65% through the use of machine learning-based planning and optimization techniques. Inventory reductions of 20 to 50% are also being achieved today when machine learning-based supply chain management systems are used. Source: Digital/McKinsey, [Smartening up with Artificial Intelligence (AI) - What’s in it for Germany and its Industrial Sector?](https://www.mckinsey.com/~/media/McKinsey/Industries/Semiconductors/Our%20Insights/Smartening%20up%20with%20artificial%20intelligence/Smartening-up-with-artificial-intelligence.ashx) (PDF, 52 pp., no opt-in).

[](https://blogs-images.forbes.com/louiscolumbus/files/2019/04/Digital-McKinsey.jpg)

SOURCE: DIGITAL/MCKINSEY, SMARTENING UP WITH ARTIFICIAL INTELLIGENCE (AI) - WHAT’S IN IT FOR GERMANY AND ITS INDUSTRIAL SECTOR? (PDF, 52 PP., NO OPT-IN).

* **DHL Research is finding that machine learning enables logistics and supply chain operations to optimize capacity utilization, improve customer experience, reduce risk, and create new business models.** DHL’s research team continually tracks and evaluates the impact of emerging technologies on logistics and supply chain performance. They’re also predicting that AI will enable back-office automation, predictive operations, intelligent logistics assets, and new customer experience models. Source: DHL Trend Research, [Logistics Trend Radar, Version 2018/2019](https://www.logistics.dhl/content/dam/dhl/global/core/documents/pdf/glo-core-trend-radar-widescreen.pdf) (PDF, 55 pp., no opt-in)

[](https://blogs-images.forbes.com/louiscolumbus/files/2019/04/Logistics-Trends-Radar.jpg)

SOURCE: DHL TREND RESEARCH, LOGISTICS TREND RADAR, VERSION 2018/2019 (PDF, 55 PP., NO OPT-IN)

* **Detecting and acting on inconsistent supplier quality levels and deliveries using machine learning-based applications is an area manufacturers are investing in today.** Based on conversations with North American-based mid-tier manufacturers, the second most significant growth barrier they’re facing today is suppliers’ lack of consistent quality and delivery performance. The greatest growth barrier is the lack of skilled labor available. Using machine learning and advanced analytics manufacturers can discover quickly who their best and worst suppliers are, and which production centers are most accurate in catching errors. Manufacturers are using dashboards much like the one below for applying machine learning to supplier quality, delivery and consistency challenges. Source: Microsoft, [Supplier Quality Analysis sample for Power BI: Take a tour](https://docs.microsoft.com/en-us/power-bi/sample-supplier-quality), 2018

[](https://blogs-images.forbes.com/louiscolumbus/files/2019/04/Supplier-Quality-Analysis-Final.jpg)

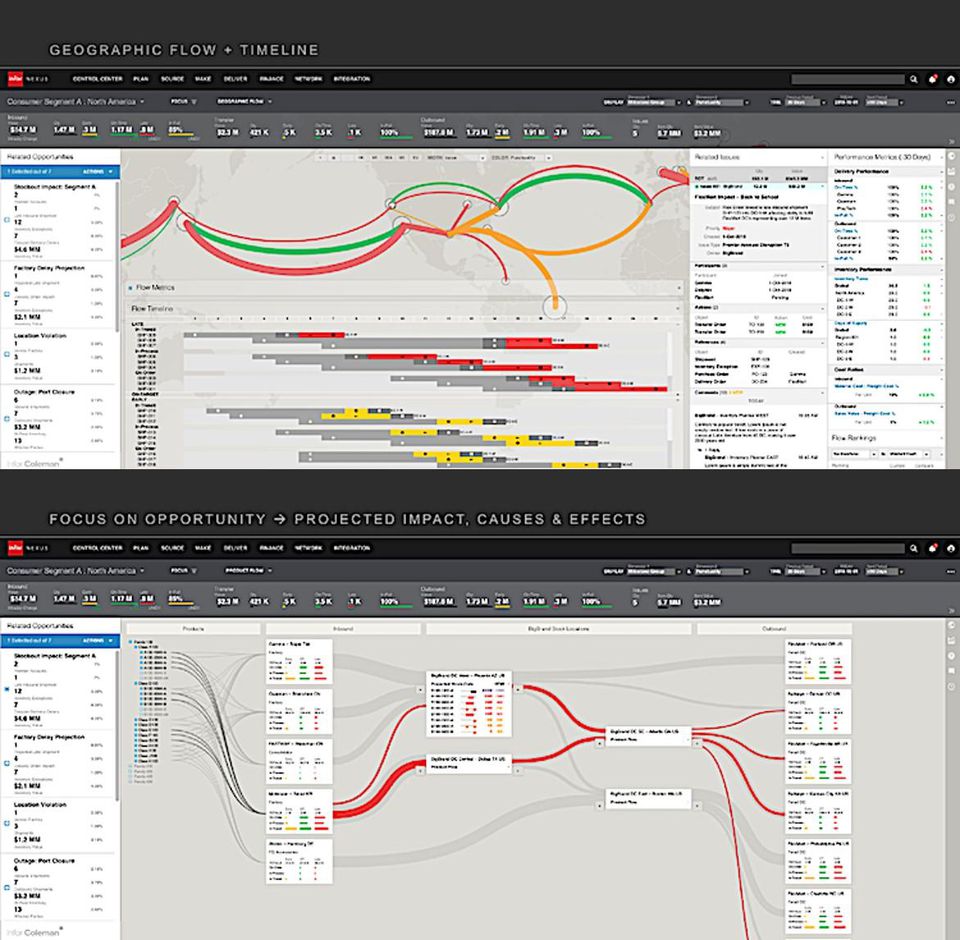
SOURCE: MICROSOFT, SUPPLIER QUALITY ANALYSIS SAMPLE FOR POWER BI: TAKE A TOUR, 2018

* **Reducing risk and the potential for fraud, while improving the product and process quality based on insights gained from machine learning is forcing inspection’s inflection point across supply chains today.** When inspections are automated using mobile technologies and results are uploaded in real-time to a secure cloud-based platform, machine learning algorithms can deliver insights that immediately reduce risks and the potential for fraud. [Inspectorio](https://www.inspectorio.com/" \t "_blank) is a machine learning startup to watch in this area. They’re tackling the many problems that a lack of inspection and supply chain visibility creates, focusing on how they can solve them immediately for brands and retailers. The graphic below explains their platform. Source: Forbes, [How Machine Learning Improves Manufacturing Inspections, Product Quality & Supply Chain Visibility,](https://www.forbes.com/sites/louiscolumbus/2019/01/23/how-machine-learning-improves-manufacturing-inspections-product-quality-supply-chain-visibility/#2f26ef644397) January 23, 2019

[](https://blogs-images.forbes.com/louiscolumbus/files/2019/04/Inspectario.jpg)

SOURCE: FORBES, HOW MACHINE LEARNING IMPROVES MANUFACTURING INSPECTIONS, PRODUCT QUALITY & SUPPLY CHAIN VISIBILITY, JANUARY 23, 2019

* **Machine learning is making rapid gains in end-to-end supply chain visibility possible, providing predictive and prescriptive insights that are helping companies react faster than before.** Combining multi-enterprise commerce networks for global trade and supply chain management with AI and machine learning platforms are revolutionizing supply chain end-to-end visibility. One of the early leaders in this area is [Infor’s Control Center](https://www.infor.com/products/supply-chain-management). Control Center combines data from the Infor GT Nexus Commerce Network, acquired by the company in September 2015, with [Infor’s Coleman Artificial Intelligence (AI)](https://www.infor.com/products/coleman) Infor chose to name their AI platform after the inspiring physicist and mathematician [Katherine Coleman Johnson](https://www.nasa.gov/content/katherine-johnson-biography), whose trail-blazing work helped NASA land on the moon. Be sure to pick up a copy of the book and see the movie [Hidden Figures](http://www.hiddenfigures.com/) if you haven’t already to appreciate her and many other brilliant women mathematicians’ many contributions to space exploration. [ChainLink Research](http://www.clresearch.com/home/" \t "_blank) provides an overview of Control Center in their article, [How Infor is Helping to Realize Human Potential](http://www.clresearch.com/research/detail.cfm?guid=B840D7DB-3048-78A9-2FB3-4F86A2A2337A), and two screens from Control Center are shown below.

[](https://blogs-images.forbes.com/louiscolumbus/files/2019/04/Infor-Control-Center.jpg)

CHAINLINK RESEARCH, HOW INFOR IS HELPING TO REALIZE HUMAN POTENTIAL,

* **Machine learning is proving to be foundational for thwarting privileged credential abuse which is the leading cause of security breaches across global supply chains.**By taking a least privilege access approach, organizations can minimize attack surfaces, improve audit and compliance visibility, and reduce risk, complexity, and the costs of operating a modern, hybrid enterprise. CIOs are solving the paradox of privileged credential abuse in their supply chains by knowing that even if a privileged user has entered the right credentials but the request comes in with risky context, then stronger verification is needed to permit access.  [Zero Trust Privilege](https://www.centrify.com/education/what-is-zero-trust-privilege/) is emerging as a proven framework for thwarting privileged credential abuse by verifying who is requesting access, the context of the request, and the risk of the access environment.  [Centrify](https://www.centrify.com/) is a leader in this area, with globally-recognized suppliers including Cisco, Intel, Microsoft, and Salesforce being current customers.  Source: Forbes, [High-Tech's Greatest Challenge Will Be Securing Supply Chains In 2019](https://www.forbes.com/sites/louiscolumbus/2018/11/28/high-techs-greatest-challenge-will-be-securing-supply-chains-in-2019/#45eb9a275c84), November 28, 2018
* **Capitalizing on machine learning to predict preventative maintenance for freight and logistics machinery based on IoT data is improving asset utilization and reducing operating costs.** McKinsey found that predictive maintenance enhanced by machine learning allows for better prediction and avoidance of machine failure by combining data from the advanced Internet of Things (IoT) sensors and maintenance logs as well as external sources. Asset productivity increases of up to 20% are possible and overall maintenance costs may be reduced by up to 10%. Source: Digital/McKinsey, [Smartening up with Artificial Intelligence (AI) - What’s in it for Germany and its Industrial Sector?](https://www.mckinsey.com/~/media/McKinsey/Industries/Semiconductors/Our%20Insights/Smartening%20up%20with%20artificial%20intelligence/Smartening-up-with-artificial-intelligence.ashx) (PDF, 52 pp., no opt-in).

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