Modern technologies in logistics

Lecture 4

Agenda

- Introduction
- Artificial intelligence
- Augmented intelligence
- Digital twins
- Supply Chain Visibility (SCV) system
- Internet of things
- Computer vision

Introduction

Increasing technology innovations are making big waves across industries, and logistics and the supply chain may be one of the most impacted sectors.

Recent years have seen massive advancement for the logistics industry in areas like artificial and augmented intelligence, advanced analytics, and automation,

Top technologies that are becoming a priority in logistics

N-iX

Source: GEODIS

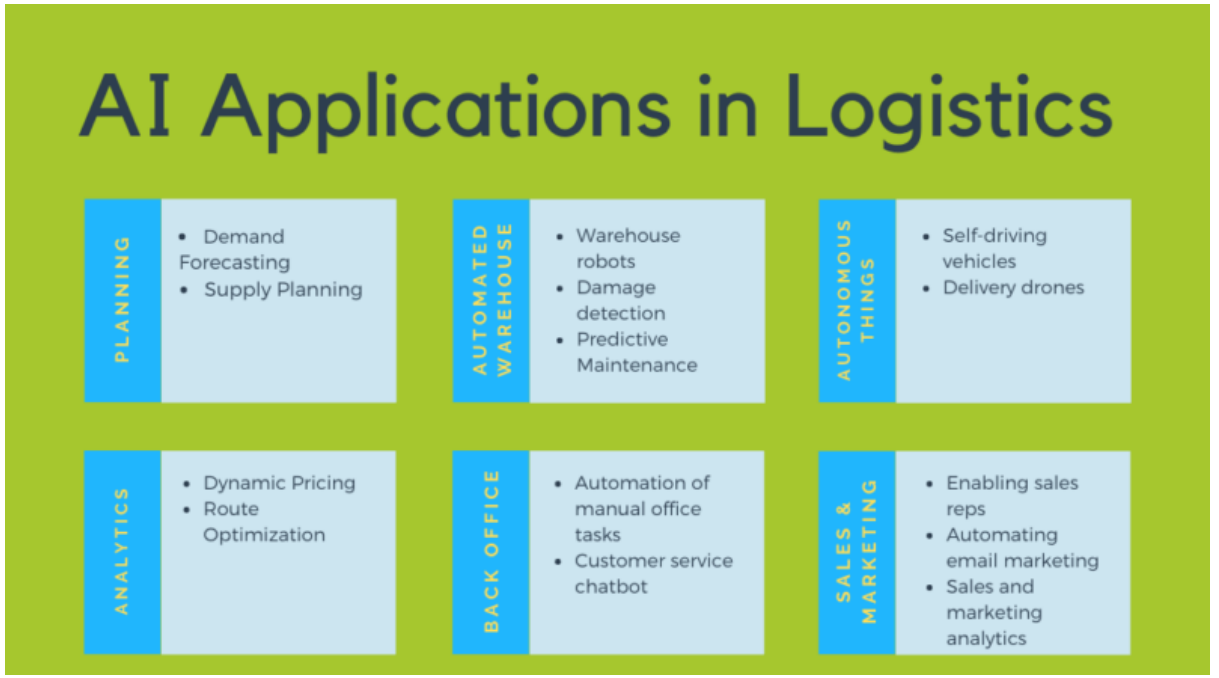
Artificial intelligence

Over the past several years, the logistics industry has started to integrate Artificial Intelligence solutions including intelligent transportation, route planning, and demand planning in their operations — but this is only just the beginning. From last-mile delivery robots and sustainability solutions, to warehouse automated picking systems and predictive optimization software, AI is already making a huge difference in logistics.

Artificial intelligence is a set of technologies that work together to allow machines to sense, interpret, learn, and act at human-like levels

In logistics, AI unlocks Big Data's true potential.

Using the power of Big Data, logistics companies will be able to make accurate predictions and improve their performance. It can also be used for enhanced predictive analytics and improved automation to drive strategic decisions.



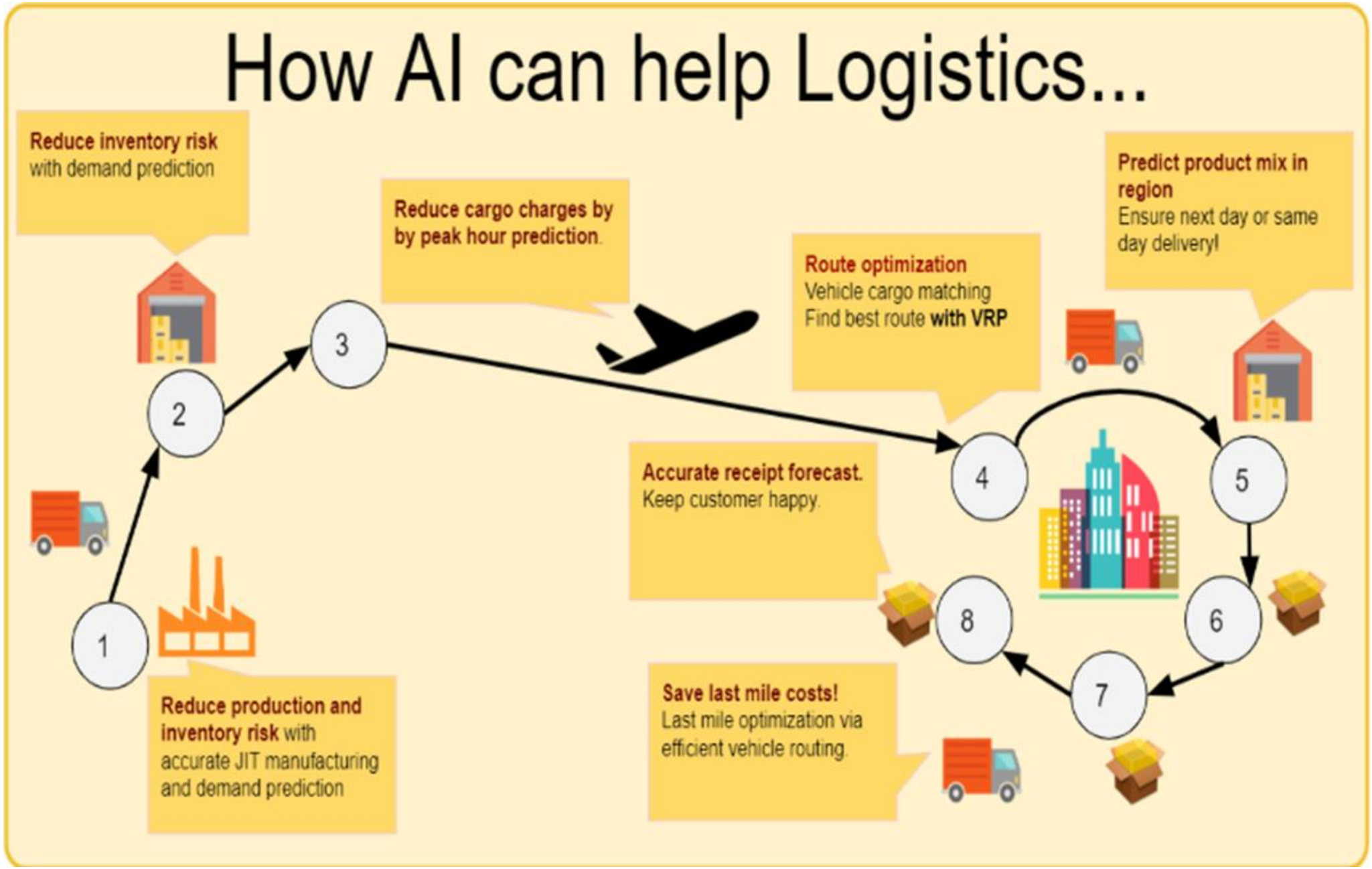
Robots can be used to replace workers in the logistics industry.

Artificial intelligence in logistics has a positive impact on the management of warehouse operations. Robots can identify, move, sort, and track inventories, enhancing the modern workforce's capabilities.

The use of artificial intelligence in logistics encourages the use of self-driving cars.

The popularity of self-driving cars is growing at a dizzying pace. One of the causes for this is artificial intelligence's contribution to outperforming human driving abilities. With the use of sensing technologies that work together to create a three-dimensional picture of the vehicle's environment, including traffic signals and laws, recognizing barriers, interpreting road signs, and so on, AI enables the vehicle to sense and forecast changes in its environment.

How AI can help Logistics...



Enhanced Customer Experience

Enhancing customer experience is another wonderful benefit of AI in logistics achieved through personalization and product recommendations based on consumers' purchasing habits and personal preferences. Consequently, customers become more loyal to the brand if they receive a more personalized service.

Real-Time Route Optimization

Artificial intelligence in logistics allows for real-time route optimization, increased delivery efficiency, and a reduction in the waste of resources. Companies such as Domino's and Nuro have begun to utilize autonomous delivery systems that use real-time route optimization to deliver items quickly and without the requirement of human labor.

Warehouse automation

AI is transforming warehousing processes such as data collection and analysis, as well as inventory processing.

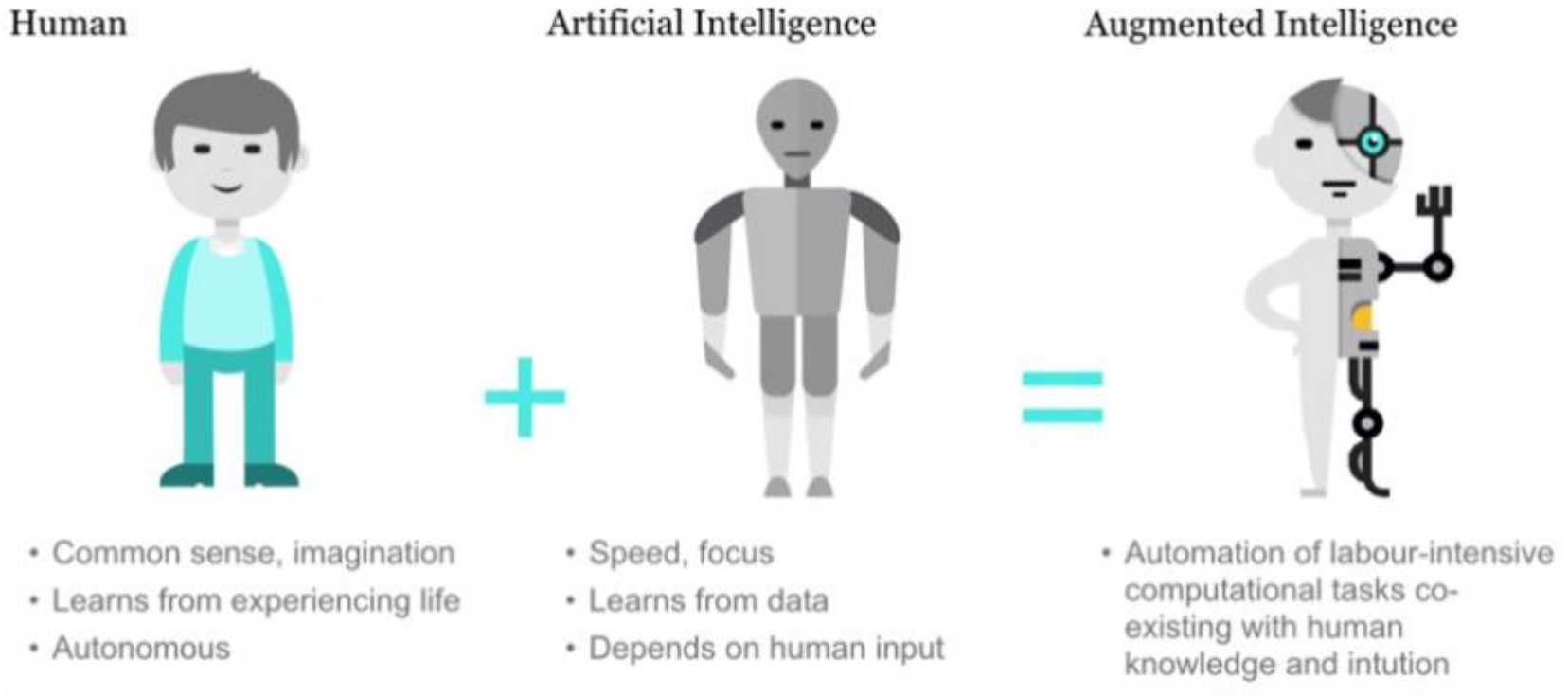
First, artificial intelligence is used to predict product demand. Following that, the company supplies high-demand commodities to regional warehouses, saving money on transportation.

Computer vision is commonly used in automated warehouses, too. This technology enables the goods to be identified and organized. Computer vision will help manage quality control in the future without the need for human intervention. Furthermore, if the supply chain includes multiple warehouses, artificial intelligence can connect them to determine the optimal option for transferring the inventory.

Augmented intelligence

Along with AI, Augmented Intelligence is also expected to spike in use. Augmented intelligence combines human intelligence with AI automated processes. For example, in logistics planning, using Augmented Intelligence can even be superior to using AI alone, since it can combine inputs from human planners (experience, responsibility, customer service, flexibility, common sense, etc.).

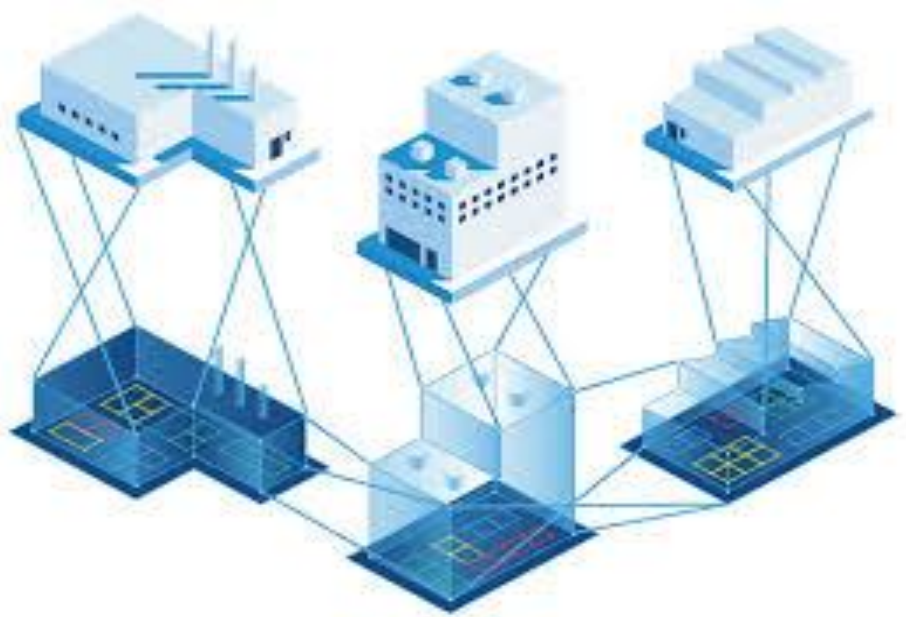
Logistics companies can be expected to implement more Augmented Intelligence solutions, which ultimately allow logistics professionals to do their job more quickly while reducing mistakes and creating cost savings



Digital twins

Digital twins are possibly one of the most exciting logistics technology trends to keep an eye on in 2021. As many logistics professionals know, products are never exactly the same as their computer models. Modeling in its current state doesn’t take into account how parts wear out and are replaced, how fatigue accumulates in structures, or how owners make modifications to suit their changing needs. However, digital twins technology is changing this once and for all: Now, physical and digital worlds can be melded into one, thus allowing us for the first time to engage with the digital model of a physical object or part just like we would with their physical counterparts.

The potential use cases for digital twins in logistics are vast. In the shipment sector, digital twins can be used to collect product and packaging data and use that information to identify potential weaknesses and recurring trends to improve future operations. Warehouses and facilities can also use the technology to create accurate 3D models of their centers and experiment with layout changes or the introduction of new equipment to see their impact, risk-free. Furthermore, logistics hubs are able to create digital twins and use those to test out different scenarios and increase efficiency.



Supply Chain Visibility (SCV)

Supply Chain Visibility (SCV) is no longer just a great thing for logistics companies to have. In 2021, it needs to take another step forward – becoming real-time. This real-time data is now more in demand by customers and carriers than ever, which means logistics and supply chain enterprises need to focus on implementing cutting-edge SCV solutions into their operations. New supply chain visibility startups are providing technology that promotes quick response to change by allowing companies to use real-time data. Such data includes traffic patterns, weather, or road and port conditions which are used to take action and reshape demand or redirect supply and optimize routes. Logistics companies that fully use integrated supply chains are now reported to see 20% more efficiency than those without integration.

Internet of Things

IoT is a huge thing in the digital world. It helps the companies enhance the visibility of their supply chains. Some companies fit their fleet with sensors to achieve real-time tracking updates on shipment and delivery. They can also improve the location and route management. In warehouses, IoT solutions can improve visibility into inventory management, storage conditions, and predictive maintenance. With an introduction of 5G, this tech trend seems to be the most promising.

Computer Vision

Barcode scanning remains the dominant method of item tracking throughout the logistic chain. By enabling computers and scanners with an ability to perceive information from graphic resources like images or video, companies can significantly improve the processes. CV solutions offer far better results, compared to traditional laser scanners. They can read labels that are damaged, fuzzy, warped, or poorly printed with more accuracy. By combining CV with other technologies, businesses can unlock even more value.