


Chapter 18

The Use of Artificial Intelligence in Supply Chain Management and Logistics

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ABSTRACT

There are multiple changes with supply chain management and logistics industry post covid. Keeping the right level of inventory can be challenging, as it involves balancing the cost of carrying inventory against the risk of stockouts. Forecasting demand accurately and managing inventory across multiple locations are also key challenges. Factors such as transportation mode, route optimization, and carrier selection can all impact the efficiency and cost of transportation. As consumers become more environmentally conscious, sustainability is becoming an increasingly important issue in the supply chain. Companies need to consider the environmental impact of their operations and products and find ways to reduce waste and carbon emissions. The use of technology is becoming more widespread in the supply chain, with tools such as automation, artificial intelligence, and the internet of things (IoT) becoming increasingly popular. Overall, the use of AI in supply chain management and logistics can help organizations make more informed decisions, reduce costs, and improve customer satisfaction.

1. INTRODUCTION

Artificial Intelligence (AI) in supply chain management and logistics is becoming an increasing trend, providing businesses with a way to automate complex processes while improving operational efficiencies. AI-powered systems can assist companies in optimizing inventory and delivery routes, improving warehouse operations, and lowering labor costs. Furthermore, these AI systems can identify potential equipment issues in advance and conduct preventive repairs, improving safety.

Artificial intelligence (AI) is becoming increasingly popular in supply chain management and logistics as it has the potential to enhance decision-making, optimize processes, and increase efficiency. This

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paper will share examples in which AI is being used in supply chain management and logistics. To start with, AI algorithms can analyze past data and use it to predict future demand. This can help organizations plan their inventory and production schedules more accurately. AI algorithms can also analyse traffic patterns, weather forecasts, and other data to optimize delivery routes and reduce transportation costs and time. AI-powered robots can be used to automate tasks in warehouses, such as picking, packing, and sorting, which can help reduce labour costs and increase efficiency. AI algorithms can be used to monitor equipment and predict when maintenance is needed, which can help reduce downtime and increase equipment lifespan. AI algorithms can be used to track products and shipments throughout the supply chain, providing real-time visibility into their location and status.

2. LITERATURE STUDY

Dash et al. (2019) found four key areas of AI in supply chain mainly identifying target customers, demography, defining the price, and designing the right message Toorajipour et al. (2019) study aimed to determine the current and potential AI techniques that can enhance both the study and practice of SCM. 2. Modgil et al. (2022) found five critical areas where AI can contribute to enhanced supply chain resilience; (1) transparency, (2) ensuring last-mile delivery, (3) offering personalized solutions to both upstream and downstream supply chain stakeholders, (4) minimizing the impact of disruption and (5) facilitating an agile procurement strategy. Study by Belhadi et al. (2021) is among the first to provide empirical evidence on maximizing the benefits of AI capabilities to generate sustained SCP. Güven et al. (2020) used product variety and sales forecasting had been performed by using artificial intelligence to minimize error rate, in the retail garment industry. Huber et al. (2020) found that AI models provide more accurate forecasts and also suitable for applications in a large-scale demand forecasting scenario in the retail industry. Abduljabbar et al. (2019) provides an overview of the AI techniques applied worldwide to address transportation problems mainly in traffic management, traffic safety, public transportation, and urban mobility. Nikitas et al. (2020) provided a novel conceptual contribution that thoroughly discusses the scarcely studied nexus of AI, transportation and the smart city and how this will affect urban futures. Sultana et al. (2020) described the application of reinforcement learning (RL) to multi-product inventory management in supply chains. Lukinskiy et al (2023) approach allows making reasonable management decisions based on the identification of the demand type to improve the efficiency and reliability of the supply chain. Albayrak et al. (2023) provide a comprehensive and up-to-date review of Artificial Intelligence (AI) applications used in inventory management through a systematic literature review. Hellingrath (2019) has shown that the AI showed the potential to contribute significantly to the digitalization of supply chains.

3. USE CASES WITH A PROFOUND IMPACT IN SCM AND LOGISTICS

3.1 Demand Forecasting

Demand forecasting is an integral component of supply chain management and logistics, helping companies make informed decisions for product launches, inventory planning, warehousing, marketing, production and logistics decisions as well as reduce risks by identifying impending risks to operations.

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