Chapter 8
Greening the Supply Chain:
AI's Role In Reducing Carbon Emissions In Logistics

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ABSTRACT

The modern logistics sector, crucial to worldwide trade, is also a major source of carbon emissions. The environmental impact is significant, from transporting goods over long distances to the energy-intensive activities in warehouses. With the pressing necessity to cut down greenhouse gas emissions and address climate change, the logistics industry is at a crucial point. Introducing artificial intelligence (AI), an impressive technology that has the ability to transform logistics and greatly reduce its environmental impact.

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INTRODUCTION

Industries all throughout the world are being urged to reconsider their operations and lessen their environmental impact in light of the fast changing climate and growing environmental concerns. Supply chain management, an essential part of international trade and logistics that has historically contributed significantly to carbon emissions, is one of the most urgent areas for innovation. There is increasing pressure on businesses to decarbonize their operations and lessen the environmental impact of their logistics networks as they attempt to meet sustainability goals. (McKinsey & Company, 2022)

Then comes artificial intelligence (AI), a game-changing technology that has the power to completely change supply chains by increasing productivity, making the best use of available resources, and promoting environmentally friendly behavior. (Wamba-T et al., 2020). Beyond simple automation, artificial intelligence (AI) helps the supply chain become greener by facilitating better decision-making, predictive analytics, and real-time monitoring, all of which provide innovative ways to lower carbon emissions. AI is assisting logistics organizations in identifying inefficiencies, reducing waste, and minimizing fuel use through predictive maintenance and route optimization, all of which improve the bottom line.

The global carbon emissions are greatly impacted by the logistics industry, as road freight alone accounts for 7% of greenhouse gas emissions. Major factors include ineffective transport routes and unused capacity. Energy consumption in warehouses, especially from fossil fuels, also contributes to emissions. The final stage of delivery, known as the "last mile," is inefficient and emits a high level of emissions. Establishing objectives and putting in place AI-powered logistics planning is essential in decreasing the industry's environmental impact.

The logistics and transportation sector is crucial to the global economy but significantly contributes to greenhouse gas emissions. Sustainable logistics aims to reduce environmental damage through efficient supply chain management, including optimized routes, reduced fuel use, and energy-saving practices. Companies are adopting AI to improve planning, cut emissions, and lower costs, enhancing sustainability, customer retention, and their environmental impact despite challenges.

This chapter examines how AI-driven innovations are helping businesses create greener, more efficient supply chains by studying the relationship between AI and sustainability in logistics. The main uses of AI in lowering carbon emissions will be discussed, along with the potential and difficulties associated with putting these technologies into practice. It becomes evident when we examine supply chain management's future that artificial intelligence (AI) is not only a tool for enhancing operations but also a vital component of a more carbon-conscious and sustainable global economy.