Assessing the Impact of Autonomous Vehicles on Supply Chain Performance – A Case Study of Agri-Food Supply Chain

Authors : Nitish Suvarna, Anjali Awasthi

Abstract : In an era marked by rapid technological advancements, the integration of Autonomous Vehicles into supply chain networks represents a transformative shift, promising to redefine the paradigms of logistics and transportation. This thesis delves into a comprehensive assessment of the impact of autonomous vehicles on supply chain performance, with a particular focus on network design, operational efficiency, and environmental sustainability. Employing the advanced simulation capabilities of anyLogistix (ALX), the study constructs a digital twin of a conventional supply chain network, encompassing suppliers, production facilities, distribution centers, and customer endpoints. The research methodically integrates Autonomous Vehicles into this intricate network, aiming to unravel the multifaceted effects on transportation logistics including transit times, cost-efficiency, and sustainability. Through simulations and scenarios analysis, the study scrutinizes the operational resilience and adaptability of supply chains in the face of dynamic market conditions and disruptive technologies like Autonomous Vehicles. Furthermore, the thesis undertakes carbon footprint analysis, quantifying the environmental benefits and challenges associated with the adoption of Autonomous Vehicles in supply chain operations. The insights from this research are anticipated to offer a strategic framework for industry stakeholders, guiding the adoption of Autonomous Vehicles to foster a more efficient, responsive, and sustainable supply chain ecosystem. The findings aim to serve as a cornerstone for future research and practical implementations in the realm of intelligent transportation and supply chain management.