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THE 'LAST MILE'

FOR E-COMMERCE



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In recent years, the rise of e-commerce has strongly impacted supply chain management strategies, forcing companies to look for solutions that will make delivery systems more sustainable and efficient. The steady increase of Business to Consumer (B2C) e-commerce has intensified as a result of the COVID19 pandemic, heavily increasing the amount of home deliveries. In terms of energy and emissions, the environmental implications of B2C e-commerce are considered to be one of the most pressing challenges currently faced by retailers. Artificial Intelligence (AI) systems offer solutions for making delivery operations more efficient and hold the potential of reducing CO2 emissions during 'last mile' deliveries.

The 'last mile'

The term 'the last mile' refers to the last part of the supply chain, from the last distribution centre to a consolidation point. This last stretch of delivery is very costly to organise and carry out, generally accounting for 13 – 75 percent of total delivery costs. The exact amount varies depending on case-specific factors such as consumer service levels, type of delivery, geographical area, type of urban development, market penetration, warehouse location, and other environmental factors. Transportation accounts for the largest share of emissions in the entire supply chain, and the small scale of home deliveries have the highest environmental impact in terms of CO2 emissions. Failed deliveries and product returns imply extra costs and extra kilometres of vehicle emissions. For these reasons, 'the last mile' is considered to be the most expensive, inefficient, and polluting part of the supply chain.



This issue has only been heightened by the retail promise of short-term deliveries, namely next day or even same day deliveries. E-commerce consumer demand has pushed the market towards offering express deliveries in order to compete with in-store purchases. It offers the chance of reducing physical stock and fulfil demands directly from a warehouse, reducing in-store costs. Therefore, companies are being forced to find the most time-efficient delivery methods in short-term notice, resulting in decisions that might not entail the most environmentally friendly practices. An example of such decisions is the use of standardised box sizes that might be too big for the packaged product, decreasing transport space efficiency, resulting in a rising number of CO2 emissions per metric ton. Another example might entail the use of third-party delivery services that can guarantee delivery dates and times, while still using heavy transport to travel long distances for a single delivery. As a consequence, 'the last mile' delivery of a product ends up being 5 to 23 times more expensive than in-store purchases.

AI for a sustainable supply chain

By optimising routes for urban freight distribution, companies can save time, reduce distance travelled, optimise vehicle use, decrease waiting times, and minimise CO2 emissions. It is clear that optimal transportation planning and management are crucial in the environmental impact of the entire supply chain process. But these tasks cannot be performed by human staff with the efficiency, precision, and quick response times that the market currently demands. At the same time, it is relevant to have a complete understanding of the distribution network design and the environmental impact of choices within that network structure. This calls for highly precise real-time analysis of large sets of complex data that are carried out by AI, also called big data analytics.

In order to decrease the environmental impact of 'last mile' deliveries, AI analyses historical trends, predicts patterns and determines which specific order should be processed and how it



will be delivered. It can also help direct supply and even use that data to overcome fluctuations on demand during holiday periods. AI holds the potential to perform all these tasks while accounting for environmental factors such as use of energy efficient transportation, weather changes, and other geographical characteristics that can have an influence on delivery times and environmental impact.

The next step for e-commerce

AI offers solutions that can help tackling climate change by reducing CO2 emissions while maintaining a certain degree of trust between stakeholders. Streamlining delivery orders can save costs while optimising the delivery process, efficient control of such interactions is very important within large-scale network systems such as supply chains. AI technologies can also carry out business layer functions such as courier management, merchant management, scheduling detection and distribution monitoring, even adjusting distribution

networks in real time. By using AI for supply chain management, companies can not only achieve their sustainability goals but increase their value and competitiveness with minimal human input.

Large companies such as Amazon and Alibaba are already further implementing AI in their supply chain by incorporating electric and/or autonomous vehicles for 'last mile' deliveries. They are able to make supply chains even more efficient while reducing the environmental impact. Drones are also being implemented for light deliveries in highly urbanised areas with highly optimised routes and virtually zero emissions. These e-commerce giants setting the high customer expectations in terms of delivery speed, service quality, and sustainability. The market trend for fast, cost-effective and safe deliveries is only expected to grow, and AI offers the tools to fulfil market demands while offering sustainable solutions.

Yet, the question remains: how far are we willing to let AI help us achieve our sustainability goals?