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Lean Logistics Towards Net Zero

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Abstract

This report explores the role of Lean Logistics in advancing Net Zero goals in the logistics sector, using Coloplast as a case study. The report explains the concept of logistics and Net Zero, and the report will look at how Lean Logistics makes supply chain processes run more smoothly while minimising waste and lowering greenhouse gas emissions. The report will define Lean strategies, including optimising transport routes and minimising unnecessary shipments. Drawing on recent academic literature and industry data, the report evaluates the benefits and challenges of applying lean practices with environmental sustainability objectives whilst assessing their impact on Coloplast's progress towards Net Zero. By looking at Coloplast's sustainability actions and industry standards, the report shows the main benefits and challenges of using lean logistics.

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Introduction

Logistics is about figuring out how to get things from where they start to where they are supposed to end up. It means planning and coordinating the movement. Also, storage and delivery of goods to keeping track of all the information that comes with that. This covers everything from the moment something is produced till a customer receives it (Mangan, Lalwani and Calatayud, 2021, p.274a). Logistics has evolved into an important contributor to greenhouse gases, and this is what makes sustainability one of the most prevailing challenges in business. This has led an increasing number of organisations to commit to Net Zero targets, where they balance the emissions that they produce with those that can be absorbed from the atmosphere, resulting in net zero total emissions. The UK Government's Net Zero Strategy target is 2050 to achieve the Net Zero progress, but with an emphasis on reducing emissions within the transport and logistics sector by working more effectively and creatively (Gov.UK, 2021a).

Afum, Agyabeng-Mensah and Baah (2024, p.1564a) define lean logistics as when a logistics company has the ability to create, use and run systems that reduce wasted time and save resources. Furthermore, they offer that some of the key practices include Kaizen, JIT (just in time) and value stream mapping, getting employees to red flag problems and working with partners to remove waste. They conclude that it comes to lean logistics, the main goal is process optimisation, cost saving and an increase in productivity, making operations more efficient.

Using the company Coloplast Ltd as a case study, this report will investigate to what extent and lean logistics can contribute to reaching the turning point of Net Zero within logistics operations. Terms and concepts related to lean will be introduced, the advantages and disadvantages of lean logistics for sustainability will be explained. And how this has influenced Coloplast's Net Zero journey will be discussed.

1. Literature Review

2.1 Global Policy and Net Zero Commitments

An international agreement that has prompted this movement to Net Zero in transport is an ambitious international contract, the Paris Agreement, which brought together 196 countries and commenced in 2015 (United Nations, 2015a). The aim of this agreement is to keep the global average temperature increase well below 2°C with an effort to achieve a warming limited to 1.5°C above pre-industrial levels (United Nations, 2015b). Following this global commitment, the UK is enshrining into law a pledge to be net zero by 2050 (Gov.UK, 2021b). And this is important for innovation and efficiency in the transport and logistics industry. This pledge encourages UK companies to follow the commitments of the Paris Agreement to lower their carbon emissions. To achieve the targets laid out, companies are encouraged to use technology, work more efficiently and process environmentally friendly supply chains.

2.2 Concept of Lean Logistics

Lean logistics adapts lean manufacturing principles to supply chain operations. This aims to reduce waste and enhance value to the customer. The focus is upon improving the flow of goods, information and resources to create value and eliminate unnecessary activities. (Chable, Fierro, Martinez and Campos, 2024, p.72)

Lean logistics exists within the lean manufacturing philosophy and comprises continuous improvement (Kaizen), just-in-time (JIT), value stream mapping, employee involvement, and waste reduction in the supply chain. Ongoing development is a review of logistics processes to locate areas for progress in efficiency and effectiveness. JIT is an inventory management strategy that delivers products at the exact time they are required, reducing inventory levels and storage costs, and resulting in less waste (Mangan, Lalwani and Calatayud, 2021, p.39b).

Lean logistics has been closely related to environmental sustainability in recent years (Afum, Agyabeng-Mensah and Baah, 2024, pp.1556-1557b). And Afum, Agyabeng-Mensah and Baah (2024) further explain that when companies reduce waste in key areas

such as transportation, packaging and storage, they use less fuel and energy, which helps reduce carbon emissions.

Lean logistics can be improved with IoT (Internet of Things) and data analysis by viewing the current position of shipments. By using this information, allocate resources more efficiently. In addition, by utilising these tools, organisations can optimise better paths, eliminate delays and react promptly, minimising economic and environmental impacts. With the result of minimising both economic and environmental impacts (VP and Kutty, 2025, p.573a). Both are critical factors in companies such as Coloplast, who may wish to consider employing lean principles to lower their carbon footprint to support Net Zero ambitions.

2.3 Benefits and Challenges

Ugarte, Golden and Dooley (2016, p. 99) offer that waste reduction and enhanced energy efficiency are the main benefits of utilising lean logistics methodologies. They continue that reducing unnecessary transport, packaging and inventory pays off by saving money, reducing wastage, saving fuel and reducing carbon emissions.

Just-in-time inventory, as well as value stream mapping, can both help cut waste and costs, which can then be reinvested in greener schemes or upgrading technology (Solorzano, Quispe and Endara, 2025, p.4). Lean logistics encourages a close collaboration between suppliers and partners. Partners, working together to maximise sustainability across the supply chain through continuous improvement initiatives, working together for environmental performance, and sustainability across supply chains (Ghasemibojd, Franchetti and George, 2025, p.13a). McKinsey & Company (2024) support this theory, adding that global companies strongly support Net Zero goals, and by adopting lean and digital tools can cut emissions by up to 30%.

Implementing lean logistics can be challenging for companies with limited resources, because it requires investments in staff training and technology (VP and Kutty, 2025, p.579b). Lean practices can have potential trade-offs, especially when it has not been managed carefully, because repeated smaller shipments can raise emissions (Ugarte,

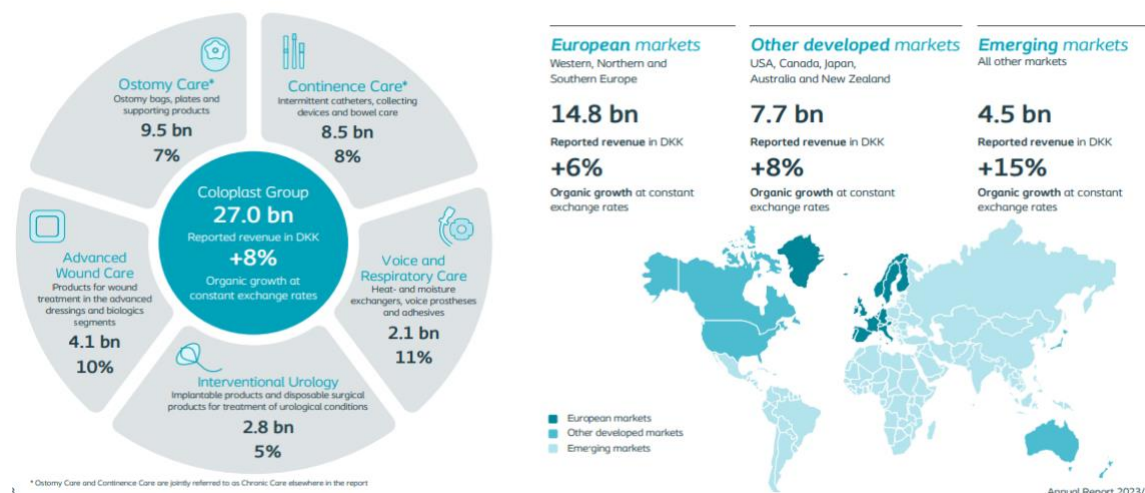
Golden and Dooley, 2016, p. 106). Additionally, it can be difficult for one to measure the environmental impacts of a lean effort, especially in a global supply chain, where data may not be available (Ghasemibojd, Franchetti and George, 2025, pp.7-10b). This indicates that lean thinking needs to be complemented by sustainability strategy and digital thinking to achieve Net Zero goals.

2. Case study: Coloplast and Lean Logistics

Coloplast is a global medical device manufacturer with mainly plastic components. The company has a responsibility not only to deliver safe products to customers but also to explore new technologies and materials that support sustainability (Coloplast, no date). Coloplast is continuously working to improve sustainability within production, transportation and distribution to improve service for the customers. As shown in Figure 1, Coloplast's global revenue amounts to around DKK 27 billion. The annual rate of organic revenue growth is around 8%. Major product lines include Ostomy care, continence care, advanced wound care, interventional urology and voice and respiratory care. 70% of sales are in Europe, and emerging market sales grew by 15% in 2009. At an international level, Coloplast had to have both efficient and sustainable logistics systems to deliver their products (Coloplast, 2024a).

Figure 1:

Coloplast across regions and business areas



(Source: Coloplast, 2024)

Since 2020, Coloplast has made commitments toward targets which support the Paris Agreement's aims to cap global warming at 1.5 degrees Celsius and therefore limit greenhouse gas emissions per year. Coloplast are setting science-based targets and

publishing reports on how it will increase the use of renewable energy in logistics to reduce carbon dioxide (CO₂) emissions through a product's life cycle (Coloplast, 2024a).

Lean logistics is one part of Coloplast's efforts to meet Net Zero objectives. This includes reducing energy consumption and associated emissions from inventory management using just-in-time logistics, as well as inventory and storage reduction. In addition, Coloplast uses digital technologies as including IoT and data analytics to track deliveries in real time (improve delivery routes and make immediate responses). Through collaboration with both logistic providers and suppliers, Coloplast works to ensure the environmental expectations are being met throughout the entire supply chain (Coloplast Charter, 2024a).

Customers are also encouraged to support the company's commitment to sustainability. For instance, the company cautions clients to only order as much as they need, and to avoid waste and overflow inventory. Also, around 75% of Coloplast's packaging material is currently recyclable, and Coloplast has partnered up with DPD to make their transports more environmentally friendly (Coloplast Charter, 2024b).

As per Coloplast's UK (Carbon Reduction Plan), the company is committed to reaching net zero for Scope 1 and Scope 2 emissions by 2040 with specific improvement goals for logistics and supply chain. The company will pursue this objective through greater utilisation of renewable energy, optimising transport and collaborating with suppliers to deliver sustainability targets (Coloplast, 2023).

Coloplast's vision is similar to many major organisations trying to achieve Net Zero. For example, the Greener NHS program, which recognises the need for partnership across the supply chain to achieve the aims of net zero in the long term (NHS England, 2020).

3. Discussion

The findings suggest that lean logistics can be an effective strategy for advancing Net Zero goals in the logistics sector. The literature review and the case study of Coloplast highlight that lean logistics can support Net Zero goals through process improvements and waste reductions. In addition, lean practices such as JIT delivery, route optimisation and suppliers working together, as used by Coloplast, may also reduce carbon emissions, as the UK Government's Net Zero Strategy suggests (Gov.UK, 2021c).

One possibility is that lean processes like just-in-time (JIT) inventory, value stream mapping, and digital monitoring can do more than reduce costs and they can also lower emissions. For example, Coloplast use JIT and real-time tracking to cut out in-process inventory and generate the benefit for delivery efficiency that directly reduces emissions (Coloplast, 2024b).

As shown in Figure 2 from Coloplast's annual report 2024/25, the company achieved a 41% reduction in Scope 1 and 2 emissions and increased recyclable packaging to 76%. At the same time, Scope 3 emissions per product increased by 1%, showing ongoing challenges in reducing emissions (Coloplast, 2025a).

Figure 2

Sustainability highlights and ratios

Strive25 ambitions	Unit	2025 Ambition ¹⁾	2024/25	2023/24	Change
Improving products and packaging					
Recyclable packaging ²⁾	% of total	90%	76%	74%	2%-p
Renewable materials in packaging ²⁾	% of total	80%	71%	68%	3%-p
Production waste recycling	% of total	75%	83%	77%	6%-p
Reducing emissions					
Scope 1 and 2 emissions ³⁾	% reduction	100% reduction by 2030 ^{4) 5)}	41%	22%	19%-p
Renewable energy use ⁶⁾	% of total	100%	88%	83%	5%-p
Electric company cars ²⁾	% of total	100% by 2030	16%	11%	5%-p
Scope 3 emissions ^{2) 7)} (by 2030)	% reduction per product	50% reduction by 2030 ^{4) 5)}	-1%	3%	-4%-p
Business travel by air ²⁾	% reduction	10% reduction ⁴⁾	61%	50%	11%-p
Goods transported by air ²⁾	% of total	< 5% of total	3%	2%	1%-p
Responsible operations					
Lost time injury frequency	Parts per million	2.0	1.7	2.1	-0.40
Code of Conduct training ²⁾	% of white collars	100%	99%	99%	0%-p
Female senior leaders (VP+ level) ²⁾	% of total	40% by 2030	26%	28%	-2%-p
Diverse teams ²⁾	% share of total teams	75%	57%	56%	1%-p
Employee satisfaction ^{2) 8)}	Engagement score	Above Benchmark	8.2	8.1	0.10

(Source: Coloplast, 2025)

To get a fuller picture, it is useful to compare Coloplast's approach with other companies in the same sector. Hollister Ltd have also set a Net zero target for 2050 and reports similar challenges in reducing Scope 3 emissions. Their carbon reduction plan shows that transport and distribution alone account for around 1,965 tCO₂e of Scope 3 emissions (Hollister, 2024). This suggests that indirect emissions are hard to measure and is a wider industry problem. Both companies focus on renewable energy and efficiency, however Hollister places additional focus on ISO 14001 certification. This suggests that lean logistics is helpful, but probably not enough on its own. It must be completed by digital tools, clearer data systems to move closer to Net Zero progress.

While the Coloplast 2024/2025 Annual Report shows decreases in CO₂ emissions in logistics and an increase in the usage of recyclable packaging (Coloplast, 2025b). Consideration should be given to how much of this improvement truly comes from lean logistics. The report also notes ongoing issues and challenges in measuring Scope 3. Due to operational complexities, supplier collaboration is not always straightforward, and data clarity proves to be a challenge. All of this suggests that while lean logistics helps, real progress toward Net Zero will probably require a stronger combination of lean methods and digital tools.

Figure 3 from Coloplast's annual report 2024/25 climate change illustrates how climate risks and negative impacts show up across different parts of the company value and extend across short, medium and long-term horizons. This visual makes clear the complexity of managing emissions and what its impact on downstream partners and long-term impacts. Improvement in one area may not be enough if other parts of the value continue to generate risks. This supports the idea that lean logistics works best when combined with wider sustainability and digital strategies (Coloplast, 2025c).

Figure 3

		Value chain location			Time horizon for impacts		
		Upstream	Own operations	Downstream	Short	Medium	Long
Climate change adaption							
Increased costs or asset devaluation due to climate-related hazards on Coloplast facilities	Risk	●	●				●
Climate change mitigation							
Regulatory fines or market access restrictions due to high scope 3 GHG emissions	Risk	●		●		●	
Scope 1 & 2 GHG emissions impacting the climate	Act. neg. impact		●		●	●	●
Scope 3 GHG emissions impacting the climate	Act. neg. impact	●		●	●	●	●
Energy							
Energy consumption and energy intensity from own operations and value chain activities that impact the climate	Act. neg. impact	●	●	●	●	●	

(Source: Coloplast, 2025)

Lean logistics can be challenging, it requires investments in technology and staff training, which may be difficult for smaller companies to afford. When lean systems are used without proper planning, additional problems may arise, such as repeated smaller deliveries. This would lead the higher transportation emissions. This means that lean logistics must be integrated into the sustainability and digital strategy (Ghasemibojd, Franchetti and George, 2025, pp.13-14d).

Teamwork with the supply chain is very important. The literature review and the Coloplast case study make clear that collaboration with suppliers, delivery partners and customers works to improve results. Coloplast requests customers to order only what is needed, this minimises waste and supports lean logistics across the supply chain (Coloplast, 2024b).

4. Conclusion

This report has investigated how lean logistics can contribute towards Net Zero ambitions within the logistics industry, providing evidence by using the example case study of Coloplast. The results indicate that lean principles, including the use of just-in-time inventory, minimising waste and digitalisation, can help companies to increase efficiency as well as their green performance. Coloplast's experience shows that integrating lean logistics with sustainability initiatives and supply chain partnerships can lead to progress in reducing emissions.

But developing lean can also require investment in technology, staff training. In addition, even a change in corporate culture may be difficult for smaller companies. However, with an integrated approach, Coloplast's experience proves that lean logistics can indeed play a significant part in achieving Net Zero targets.

In conclusion, lean logistics provides a strategic pathway for aligning operational efficiency with sustainability objectives. Further progress to Net Zero will depend on continued innovation and sustainability targets.

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