

Supply chain engineering: Considering parameters for sustainable overseas intermodal transport of small consignments

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ABSTRACT

An increasingly environmentally conscious global economy is placing new demands on supply chain engineering, with a focus on sustainable approaches to modelling transport chain. In addition to the price and time efficiencies that characterize agile and lean supply chains, strategies for low-carbon and energy-efficient external transport must also be incorporated. This research therefore focuses on the challenges of organizing the supply of small overseas shipments to define how the relationship between land and sea transport in the selected intermodal chain affects environmental and energy performance. Understanding the input parameters and their impacts is a prerequisite for planning CO₂, NO_x, SO₂ and NMHC emissions, as well as energy efficiency (EE) of overseas transportation. The number of individual transport legs and their characteristics are crucial parameters for sustainable transport chains. The applicability of the proposed research framework is carried out on the example of outbound supply chains of the southern part of the Baltic-Adriatic Corridor using intermodal transport chains of small shipments via the ports of Koper and Genoa. The results of the case study show that an additional transport leg representing only 2 % longer land transport to the port of Genoa significantly affects the carbon footprint of the whole supply chain's compared to chains via the port of Koper. Moreover, other results also require special attention in supply chain modeling. The study enriches the field of supply chain engineering, as there is a lack of such studies. The study is part of the project "Green port – Developing a sustainable model for the growth of the green port", co-founded by the Slovenian Research Agency.

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