

SIMULATION LIBRARY FOR SUSTAINABLE TRANSPORT DECISIONS IN SUPPLY CHAINS

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The increase in international freight commerce is stressing the current Supply Chain limits. Supply Chains are complex systems responsible to move and deliver goods at a client as a response to a given request. In Supply Chains, the movement of goods between locations is done using a transport mode (such as road, railway or water transport). Existing transport resources are being used close to its current capacity posing a challenge for the managers. The managers are challenged to plan efficient transportation operations while taking into account government restrictions and guidelines. One of the guidelines is the reduction of CO2 footprint. The CO2 footprint can be reduced if a more sustainable transport mode choice is made by the Supply Chain manager whenever it is possible, without the risk of not delivering the cargo at the destination on time. In this paper, the authors present a simulation library for the construction of generic transport networks within a Supply Chain to guide managers to make efficient and sustainable decisions when planning transportation operations. The library is composed of components that captures the dynamic of facilities (namely distributions centers, warehouses and factories) and the dynamics of transport connecting locations (namely road, railway and water transport). The application to the Atlantic Corridor within the Trans-European Transport Network (T-NET) is used to illustrate the numerical results. As future research, the authors intend to extend the library i) to tackle the transport of different cargo typologies, such as the transport of perishable goods, and ii) to address the implementation of cooperation strategies between the agents involved in Supply Chains.

Keywords: supply chain, simulation, transportation, intermodality, sustainability