

OPTIMAL TRANSPORT MODE FOR LOGISTICS BASED ON THE CARBON FOOTPRINT, COST AND TIME VALUE

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ABSTRACT

This study analyzes the carbon footprint and cost of logistics of goods shipped at cold and room temperatures. The research includes two routes, one from Taiwan to China and the other one from Taiwan to Germany. The variables of operating cost, time cost, and carbon tax are studied in this research for cost evaluation and the carbon footprints for goods at different temperature are also calculated from cradle to gate. The transport mode scenarios include majority by ship as well as by intermodal methods. In total, 18 scenarios are studied. The findings show: (1) Whether at cold or room temperature, intermodal transport is more beneficial to the environment. (2) Large vessels are more beneficial to the environment. (3) In Taiwan, intermodal rail transport is superior to the others, especially for long distances. (4) Intermodal waterway transport has disadvantages for cold temperature logistics, due to its low speed and high time cost. (5) The implementation of a carbon tax would be an effective policy to promote intermodal transportation. (6) Overall, the inland, intermodal rail transport is more beneficial to the environment than the others and is less costly.

Keywords: Cold chain logistics, Carbon footprint, Time cost, Environmental benefit, Carbon tax.