

Impacts of Integrated Railway-Based Containerized Cargo Transport Network to Connect the Port of Colombo and Free Trade Zones in Sri Lanka

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Currently, in Sri Lanka, the road (truck) has always been the dominant transport mode for moving import/export containerized cargo to/from Colombo port. According to the past literature, there are a lot of road-based containerized cargo transportation issues in Sri Lanka. This study introduces a dry port-based containerized import/export cargo transportation method using a railway network to connect the port of Colombo and the Board of Investment (BOI) Export Processing Zones (EPZ). A dry port is an inland intermodal terminal, directly connected by a railway line to the Colombo port. The study mainly focuses on two dry port-based networks under several alternative network configurations. The locations of the proposed dry ports are Orugodawatta's current customs clearing yard and cargo inspection center in Kerawalapitiya proposed by the Asian Development Bank (ADB). In this study, mathematical models were developed to analyze and compare the cost, environmental, and time benefits of the proposed networks between major BOI EPZs and Colombo port considering current freight demand. The results highlighted the advantages of the proposed network under several scenarios from economic and environmental and travel time perspectives. Then the study estimates the import/export BOI freight demand for 2050 and analyzes the potential of the proposed railway-based cargo transport system for 2050. These figures can be further reduced by optimizing the dry port location. Therefore, a simulation-based approach was considered to optimize the dry port location by Greenfield analysis method with "Supply Chain Guru" software. Through simulation results, the study shows the new dry-port location compatibility for the proposed system. The findings of the study have demonstrated a systematic approach to decision-making by optimizing the local cargo handling process. By adopting this system, Sri Lankan inland logistic operations will become more efficient and the total transportation costs, environmental pollution, and transportation time will decrease significantly.

Keywords: *greening supply chains, dry port, imports, exports container transportation, railway-based cargo transportation, Port of Colombo*