

A simulation model to analyse Sri Lankan Megacity logistics behaviour: Megapolis logistics of Sri Lanka

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Abstract

Colombo, the commercial capital of Sri Lanka is gradually being transformed into a Megacity with increasing urbanization and industrialization and investment in infrastructure development. Having experienced the consequences of unplanned and non-systematic nature of freight transportation in Colombo city, authorities have come up with a megacity development strategic plan, namely, The Western Region Megapolis Master Plan in order to reduce drawbacks associated with inland freight transportation in urban areas. It focuses on a two tier transportation network structure where the freight is consolidated and value added at hub locations via planned road network and transported to the port for shipping. In this scenario, the transportation structure which connects the consolidation hub with the port and different spokes of the network can be considered as the elementary operational unit of the logistics framework. For analysing operational feasibility of this scenario, simulation-based modelling can be utilized in order to predict the future operational performance of the proposed logistics plan. Having identified the elementary operational unit of functionality in the proposed logistics framework, a computer-based simulation model of the elementary unit is developed using Arena software by Rockwell Automation and validated in order to predict the performance of the two-tier transportation network. This quantitative model has the capability to provide strategic decision-making ability by analysing different scenarios, in terms of traffic congestion, road network utilization and the impact of different truck type combinations for optimum utilization of truck fleet.

Keywords: Computer simulation, Hub, Inland freight, Megacity logistics, Megapolis, Transportation network.