

Port Infrastructure Investment Analysis through Integration of Economic and Transportation Models

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ABSTRACT

Increased competition, booming in international maritime trade and the associated port congestion is crucial in ports rethinking how to bolster capacity and improve service quality, to maintain current and attract new business. The increased competition adds to the pressure for infrastructure investment. In response to these opportunities and challenges, most ports have started to or plan to redesign and reorganize their operations and have come up with a long-term investment plan. This paper presents an approach which may assist transportation planners in assessing port performance and evaluating alternative investment strategies.

The paper presents a mathematical programming model to analyze the port authority investment problem. The methodology is unique in that it examines the port within the context of the intermodal transportation system considering the complex interactions among players in this system and accounts not only for the direct impact of ports, but also for the effect on the inland transportation system. Methods that are well founded in the economic theory are used to formulate this problem. The paper introduces the criteria for comparing alternative investment strategies, defines the net social benefit and investment cost within the context of the intermodal system and presents the mathematical formulation of the Port Authority's investment problem.

This approach is used to facilitate the Port Authority's investment decisions on critical links, meaning links that are highly utilized and may require future investment in capacity expansion. It allows transportation planners, managers and decision makers to make predictions of the behavior of the market before implementing any short or long term decisions.