

Abstract

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Modelling Container Logistics Processes in Egyptian Container Terminals: A Case Study in Alexandria

Purpose: This study aims to optimize the logistics processes of container terminals, especially Egyptian container terminals, in order to be able to gain a higher share of the anticipated increase in container traffic. **Research approach:** Because there is a lack of research into terminal logistics processes from both a pipe flow and a dynamic operational perspective, this is a case study that selects an Egyptian container terminal with a view to describing its logistics processes and modelling the container and information flows of the case company. This study identifies the problems facing the company and applies suitable techniques to solve such problems and thus improve and optimize the overall performance of the logistics processes. The methodology used in this research includes both qualitative and quantitative methods. The research follows a descriptive methodology by which data is dealt with according to sequential processes. Data was collected in terms of primary as well as secondary data. The most used data collection method was interviewing, whereby various interviews were conducted with different employees from the case company. Collected data was then presented in the form of a pipe flow model to show the interrelations between the various resources of the company. Data analysis was also represented by means of simulation as a suitable modelling tool where Simul8 software was used to develop the model. **Findings and Originality:** An operational level simulation model has been built which covers the entire logistics processes of container flows in an Egyptian container terminal (both import and export flows). It shows, to a great extent, the actual inbound and outbound flows of containers from the entry point to the exit point. The model has been validated and is able to reproduce the case company's historical scenario. **Research Impact:** This is a novel study, which simulates the operational level of the entire import and export logistics processes. The import logistics process includes activities such as unloading vessels by quay cranes, moving containers by tractors to yard cranes to go for storage where customs procedures take place then exiting the terminal by customer's truck. The export logistics process includes the activities associated with customers' trucks, lifters, storage yards, tractors and quay cranes. The model takes into account the uncertainties in each activity. To the best of our knowledge, no such model exists in the literature. **Practical Impact:** The model has been verified and validated. It can reproduce the historical data for the case company. This is considered as the base simulation model on which different scenarios can be designed according to the objectives of the case company (e.g. various uncertainties in the logistics processes, different combinations of resources), and test their impact on the overall performance of the entire process. **Keywords:** container terminals, logistics processes, modelling, simulation, scenario analysis