Title: Enhancing Express Logistics Efficiency by Big Data and Public Transport in Urban City

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Abstract

Nowadays in Mainland Chain, driven by the booming of e-commerce activities, many express logistics companies are now rapidly expanding their fleet scale to increase its operation efficiency and order fulfillment reliability in order to satisfy the rigorous growing demands, particularly in express logistics operations within urban cities. However, the expanded fleet scale, implying the exploding number of vehicles, causes many negative impacts on the society, such as more pressure on the road usage, and severe traffic congestion. Consequently, it jeopardizes the express logistics operations efficiency, and causes delay delivery and poor on-time fulfillment reliability. Therefore, a new breakthrough has to be sought. Nowadays, some researches are now studying the feasibility of delivering small parcels by using public transport (e.g. railways, buses) to enhance efficiency and traveling time stability. However, currently there is still lacking of methodology and operations mechanism to apply public transport for Express Logistics in urban area. Moreover, in the era of Big Data, more and more advanced technologies (e.g. Smartphone applications) can greatly enhance traffic condition predictability. However, there is a lack of research work studying on the prediction of transportation lead time required by using public transport. Therefore, studies on applying public transport and prediction with Big Data to enhance the express logistics flexibility and reliability are needed. Accordingly, the main objective of this paper is to study the research questions of how public transport and prediction with Big Data can be used to enhance Express Logistics. To tackle this highly complicated integrated model, we propose: 1) to develop a new integrated optimization methodology (with Column Generation, Genetic Algorithm, and Heuristic rules) to deal with parcel allocation and the routing problems of the vehicles with the support of public transport, and 2) to apply Big Data approach to predict the traveling time according to the real-time traffic condition. Our objective is to increase the orders fulfillment reliability. More importantly, we aim to reduce the number of vehicles used. Therefore, this can help ease the traffic congestion and reduce air pollution rising by carbon emissions.