

The Hong Kong Polytechnic University
Department of Logistics and Maritime Studies
Research Seminar

**Unlock the Crowdsourcing Potential to Improve the
Service Level of the Urban Bicycle Sharing System**

by

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Date: 11 January 2019 (Friday)
Time: 2:00pm - 3:00pm
Venue: R401, Shirley Chan Building
The Hong Kong Polytechnic University

(Conducted in English)

Abstract:

We study how service quality and operational efficiency in bike sharing system can be enhanced by adding crowdsourcing via reward incentives to the outsourced bike rebalancing across service regions. In particular, we first provide an analytical model to derive optimal policy for determining reward incentive within a two-region system. We next extend our study to consider more detailed operations by constructing a time-space network with multiple regions and across multiple time periods. We formulate a two-stage stochastic programming model to incorporate the customer demand uncertainty, where the first stage provides strategic bike allocation decisions (i.e., “here-and-now”) and the second stage provides operational bike relocation decisions with respect to different scenarios (i.e., “wait-and-see”). Finally, extensive experiments based on real data are conducted to show that the current practices to relocate bicycles using third-party logistics firms (3PL) can be significantly improved through utilizing crowdsourcing potential in the bike sharing system. Meanwhile, we show that crowdsourcing rebalancing can either dominate or partially substitute 3PL depending on the reward cost. In addition, we suggest the crowdsourcing rebalancing be considered together with 3PL rebalancing in the planning stage for more efficient bike allocation. More importantly, our approach can help improve both the service quality and the total revenue significantly.

Bio:

ZOU Ding is currently a PhD student under the supervision of Dr. GUO Xiaomeng, Dr. PAN Kai and Dr. WANG Yulan, his research interests are data-driven optimization and smart city operations.

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All are welcome!