The Hong Kong University of Science and Technology

Dept of Information Systems, Business Statistics
and Operations Management
Dept of Industrial Engineering & Decision Analytics
Joint Seminar Announcement

Multi-Item Online Order
Fulfillment in a Two-Layer Network
by

Dr Linwei Xin

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University of Chicago

Date	:	**11 June 2021 (Friday)**
Time	:	**09:30 - 10:45 am**
Zoom ID	:	**982 9972 1714 (passcode 315647)**

Abstract: The boom of e-commerce in the globe in recent years has expedited the expansion of fulfillment infrastructures by e-retailers. While e-retailers are building more and more mini-warehouses close to end customers to offer faster delivery service than ever, the associated fulfillment costs have skyrocketed. In this paper, we study a real-time fulfillment problem in a two-layer RDC-FDC distribution network that has been implemented in practice by major e-retailers. In such a network, the upper layer contains larger regional distribution centers (RDCs) and the lower layer contains smaller front distribution centers (FDCs). We allow order split: an order can be split and fulfilled from multiple warehouses at an additional cost. The objective is to minimize the routine fulfillment costs. We study real-time algorithms with performance guarantees in both settings with and without demand forecasts. We also complement our theoretical results by conducting a numerical study by using real data from Alibaba.

This is joint work with Xinshang Wang (Alibaba) and Yanyang Zhao (Chicago Booth).

Bio: Dr Linwei Xin is an Assistant Professor of Operations Management at Booth School of Business, University of Chicago. Dr Xin's primary research is on inventory and supply chain management: designing models and algorithms for organizations to effectively "match supply to demand" in various contexts with uncertainty. His research on stochastic inventory theory by using asymptotic analysis has been recognized with several INFORMS paper competition awards, including the Applied Probability Society Best Publication Award (2019), First Place in the George E. Nicholson Student Paper Competition (2015), Second Place in the Junior Faculty Interest Group Paper Competition (2015), and a finalist in the Manufacturing and Service Operations Management Student Paper Competition (2014). His work with JD.com on dispatching algorithms for robots in unmanned warehouses was recognized as a finalist for the INFORMS 2021 Franz Edelman Award, with an estimate of billions of dollars in savings. His research motivated by Walmart online grocery's recommendation-at-checkout-system received the 2017 CSAMSE (Chinese Scholars Association for Management Science and Engineering) Best Paper Award. His research with Argonne National Lab on dynamic line rating received the 2020 IEEE Transactions on Power Systems Best Paper Award. His other honors include winning a National Science Foundation grant as a principal investigator. His research has been published in journals such as *Operations Research* and *Management Science*. His research has also been featured by various media outlets, including Chicago Booth Review and INFORMS Resoundingly Human Podcast. He currently teaches MBA and PhD courses at the University of Chicago.

All interested are welcome!
Enquiries: Dept of ISOM