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

Optimal Policies and Heuristics To Match Supply With Demand For Online Retailing
by
Dr Yun-Fong Lim

Associate Professor of Operations Management
Singapore Management University

Date	:	**7 May 2021 (Friday)**
Time	:	**10:30 - 11:45 am**
Zoom ID	:	**927 9987 9236 (passcode 632818)**

Abstract: We consider an online retailer selling multiple products to multiple zones over a single period. The retailer orders the products from a single supplier and stores them at multiple warehouses. At the start of the selling period, the retailer determines the order quantities of the products and their storage quantities at each warehouse subject to its capacity constraint. At the end of the period, after knowing the demands, the retailer determines the retrieval quantities from each warehouse to fulfill the demands. The retailer's objective is to maximize her expected profit. For the single-zone case, we solve the problem optimally. The optimal retrieval policy is a greedy policy. We design a polynomial-time algorithm to determine the optimal storage policy, which preserves a nested property: Among all non-empty warehouses, a smaller-index warehouse contains all the products stored in a larger-index warehouse. The optimal ordering policy is a newsvendor-type policy. The problem becomes intractable analytically if there are multiple zones and we propose an efficient heuristic to solve it. This heuristic involves a non-trivial hybrid approximation of the second-stage expected profit. Numerical experiments using both synthetic data and real data from a major fashion online retailer in Asia suggest that our heuristic outperforms state-of-the-art approaches with significantly less computational time. With flexible fulfillment, our heuristic improves the efficiency by 28% on average compared to a dedicated policy adopted by the retailer.

Bio: Dr Yun-Fong Lim is an Associate Professor of Operations Management and MPA Research Fellow at the Lee Kong Chian School of Business, Singapore Management University (SMU). He is also an Academic Director of the MSc in Management (MiM) Program at SMU. He has been a Chang Jiang Chair Professor, a Lee Kong Chian Fellow, and an NOL Fellow. Dr Lim's research has appeared in *Operations Research*, *Management Science*, *Manufacturing and Service Operations Management*, and *Production and Operations Management*. He has delivered keynote and plenary speeches in several international conferences. In addition, his work has received funding by MOE, A*STAR, and NNSF, and media coverage by The Business Times, CNA938, and Channel 8. Dr Lim's current research interests include e-commerce and marketplace analytics, online platforms, warehousing and fulfillment, sustainable urban logistics, and flexible workforce and resource management. He serves as an Associate Editor for *Naval Research Logistics* and Guest Editor for *Production and Operations Management*.

Dr Lim is a recipient of the SMU Teaching Excellence Innovative Teacher Award. He teaches both undergraduate and postgraduate courses in Operations Management. He has provided consulting service and executive development to corporations such as Alibaba, Maersk, McMaster-Carr Company, Resorts World Sentosa, Schneider Electrics, Temasek Holdings, and Zalora. Dr Lim obtained both his PhD and MSc degrees in Industrial and Systems Engineering from the Georgia Institute of Technology.

All interested are welcome!
Enquiries: Dept of ISOM