

The Hong Kong University of Science and Technology
Dept of Information Systems, Business Statistics
and Operations Management
Frontiers in Operations Management Workshop



When Platform Competes with Third-Party Sellers in Its Own Networked Market: A Revenue Management Perspective

by

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Abstract:

We consider a platform marketplace with both third-party and platform-owned sellers. The platform charges commissions to third-party sellers and buyers for their transactions in the marketplace. Meanwhile, it also directly determines the transaction prices for platform-owned sellers in their sales to buyers. Sellers and buyers are divided into different types with their compatibility captured by a bipartite network. Different types of sellers and buyers are heterogeneous in their cost and utility functions. Given the platform's choices of prices and commissions, third-party sellers/buyers maximize their own payoffs from supplying/demanding products, and market-clearing conditions are satisfied in the networked market. Facing the complexity with non-convex equilibrium constraints in the network, we develop a method of determining the platform's price-commission vector for profit maximization purposes. Based on the characterization of the platform's profit-optimal equilibrium, we investigate three other aspects of the revenue management problem. First, under fairness consideration between the platform and its market participants, we develop an efficient approximation algorithm to obtain a price-commission vector such that an allocation of surplus with a fairness level between the platform and its market participants is guaranteed in the equilibrium trades. Next, we shed light on how the platform should determine the optimal mixture of third-party sellers and platform-owned ones in the networked market. Lastly, we establish how the platform's profit-optimal price-commission decision depends on the network structure and demonstrate the impact of network structure on the platform's optimal profit.

Bio:

Dr Hongfan (Kevin) Chen is an Assistant Professor of the Department of Decision Sciences and Managerial Economics at The Chinese University of Hong Kong (CUHK) Business School. He received his PhD and MBA degrees in Operations Management from the University of Chicago Booth School of Business. Prior to Chicago Booth, he studied Industrial Engineering and Applied Mathematics at Georgia Institute of Technology. Before joining CUHK, he also had some professional experience in companies including Airbnb, Amazon, Cox Enterprises, Interface, Hewlett Packard and ABB. Prof Chen's research primarily focuses on revenue management, platform marketplaces, and optimisation under uncertainty.

All interested are welcome!
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