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

Blockchain Adoption for Traceability in Food Supply Chain Networks

by

Dr Fasheng XU
Assistant Professor of Supply Chain Management
Whitman School of Management
Syracuse University

Lingxiu DONG [a], Phil (Puping) JIANG [a]
[a] John M. Olin Business School of Washington University in St. Louis

Date: 6 January 2020 (Monday)
Time: 10:30am - 11:30am
Venue: R501, Shirley Chan Building
The Hong Kong Polytechnic University*

(*The venue is subject to change due to unforeseen circumstances. Please pay attention to our further notice.)

(Conducted in English)

Abstract:

Innovative retailers in food supply chains have been exploring the use of blockchain as a part of ongoing effort of reducing continuing contamination risks and food waste. We investigate how the adoption of blockchain technology can affect incentives of supply chain members and whether and how its anticipated benefits may be realized. We study a three-tier supply chain with multiple lower-tier (tier-2) suppliers and characterize the equilibrium contractual arrangement and corresponding tier-2's risk mitigation effort for both the cases with and without blockchain. We first find that traceability enabled by blockchain may not always be beneficial to all supply chain members and may also decrease lower-tier suppliers' incentive to invest in contamination risk-reduction effort. As a cautionary tale, it is possible that the retailer, usually the main advocate of the blockchain technology in food supply chains, could be worse-off after achieving perfect traceability via blockchain. Moreover, the supply chain network structure and the supply chain member interaction also influence the effect of blockchain-enabled traceability. Blockchain adoption is always beneficial for the retailer and the suppliers in both tiers when the number of tier-2 suppliers is large enough. When there are multiple tier-1 suppliers who share all tier-2 suppliers and compete in a Bertrand manner, blockchain adoption always benefits the retailer and the tier-2 suppliers, while leaving zero profit to tier-1. Finally, when the tier-1 supplier can implement imperfect inspection that provides partial traceability, the retailer may favor the inspection-driven partial traceability than the blockchain-driven full traceability.

Bio:

Fasheng Xu is an Assistant Professor of Supply Chain Management at Whitman School of Management, Syracuse University. Fasheng received a B.S. in Industrial Engineering and Operations Research from Shanghai Jiao Tong University, and a Ph.D. in Operations Management from Olin Business School, Washington University in St. Louis. Fasheng's research interests lie at the interface of operations, finance, and economics. Much of his current research is focused on studying the emerging operations issues under financial frictions, in the contexts of supply chain finance, crowdfunding platform, and blockchain technology; and identifying the implications for individuals and businesses. Moreover, Fasheng is interested in issues broadly arising in social and economic networks, information economics, and the design and operations of online marketplaces and platforms.

Please email to anne-ly.wong@polyu.edu.hk for enquiries.

All are welcome!