

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

Values of Traceability in Supply Chains

by

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Time: 10:30am - 11:30am
Venue: M802, Li Ka Shing Tower
The Hong Kong Polytechnic University
(Conducted in English)

Abstract:

Recent development in the Blockchain technology has enabled end-to-end traceability of supply chains. When a product failure occurs, such traceability information can be used to identify the suppliers at fault. This could revolutionize supply chain operations for industries where traceability is difficult to achieve under traditional technologies (e.g., agri-food and pharmaceutical). In this paper, we study how the supply chain traceability enabled by new technologies such as Blockchain can affect suppliers' quality decisions, supply chain contracts, and each stakeholder's profit level. To gain insights into the values of traceability under different supply chain structures, we consider two types of supply chains: 1) parallel supply chains, where all suppliers belong to the same tier of the supply chain and the buyer procures the same material from each supplier, and 2) serial supply chains, where each supplier belongs to a different tier of the supply chain and manages a particular stage of the production process. We find that in a parallel supply chain, the critical value of tracing the suppliers lies in that it helps to guarantee the cash flow for the buyer to be unconstrained in more cases, and hence can improve suppliers' quality levels, the end product quality, and the buyer's and suppliers' expected profits when the loss incurred by the buyer in defection is sufficiently large. On the other hand, in a serial supply chain, the critical value of tracing the production process lies in that it helps to better incentivize suppliers in different tiers, both directly and indirectly, and hence always improves suppliers' quality-improving efforts, the end product quality, and the buyer's and suppliers' expected profits. Moreover, from both the buyer and suppliers' perspectives, traceability is more likely to create value in serial supply chains than in parallel supply chains. We also study scenario where the contracts include penalization and scenario where the identification of defective suppliers is inaccurate.

Bio:

Ming Hu is a Professor of Operations Management at Rotman School of Management, University of Toronto and one of the 2018 Poets & Quants Best 40 Under 40 MBA Professors. He is the recipient of Wickham Skinner Early-Career Research Accomplishments Award by POM Society (2016) and Best Operations Management Paper in Management Science Award by INFORMS (2017). He currently serves as the editor-in-chief of *Naval Research Logistics*, co-editor of a special issue of *Manufacturing & Service Operations Management*, department co-editor of *Service Science*, and associate editor of *Operations Research* and *Manufacturing & Service Operations Management*, and senior editor of *Production and Operations Management*. He currently also serves as Vice Chair/Chair-Elect for the RM&P Section of INFORMS and Secretary/Treasurer for the MSOM Society of INFORMS. He received a master's degree in Applied Mathematics from Brown University in 2003, and a Ph.D. in Operations Research from Columbia University in 2009.

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All are welcome!