

The Hong Kong University of Science and Technology

Dept of Information Systems, Business Statistics
and Operations Management

Seminar Announcement

Trade-in Remanufacturing, Strategic Customer Behavior, and Government Subsidies

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Washington University in St. Louis

Date : 13 January 2016 (Wednesday)
Time : 11:00 - 12:15 pm
Venue : Room 1001, LSK Business Building



Abstract: Remanufacturing has been increasingly used in industry. To facilitate the collection of cores for remanufacturing, many firms offer rebates that allow repeat customers to trade in used products for upgraded ones at a discounted price. This paper studies the impact of strategic customer behavior on the economic and environmental values of such trade-in remanufacturing practice. There are several major findings. First, under trade-in remanufacturing, a firm may earn a higher profit with strategic customers than with myopic customers, which differs from the common belief that firms dislike forward-looking customer behavior due to its detrimental effect on profit. This is because strategic customers can anticipate the future price discount brought by the trade-in option, so when the revenue-generating effect of remanufacturing is strong enough, they might be willing to pay a higher first-period price than the myopic customers. Second, we show that strategic customer behavior may create a tension between profitability and sustainability: On one hand, by exploiting the forward-looking customer behavior, trade-in remanufacturing is more valuable to the firm with strategic customers than with myopic customers; on the other hand, with strategic customers, trade-in remanufacturing may have a negative impact on the environment and also on social welfare, since it may give rise to a significantly higher production quantity without improving customer surplus. Therefore, our research demonstrates that it is important to understand the interaction between trade-in remanufacturing and strategic customer behavior. Finally, to resolve the above tension, we study how a social planner (e.g., the government) should design a public policy to maximize social welfare. It has been shown that subsidizing remanufactured products alone may lead to undesired outcomes; however, the social optimum can be achieved by using a simple linear subsidy and tax scheme for all product versions.

Bio: Renyu (Philip) Zhang is a fifth-year PhD candidate in Operations Management from Olin Business School, Washington University in St. Louis. His research interests focus on addressing fundamental operations issues under the emerging trends in technology, marketplace, and society. Philip's PhD thesis, "Dynamic Pricing and Inventory Management: Theory and Applications" (supervised by Prof. Nan Yang and Prof. Fuqiang Zhang), seeks to understand how a firm should dynamically optimize and coordinate the price and inventory decisions under an uncertain (and possibly competitive) market environment. He has developed the models and methods to analyze the pricing and inventory policy under some emerging market trends such as social networks, sustainability concerns, and commodity price fluctuations. His research works have been published in top-tier operations management journals such as *Operations Research* and *Manufacturing and Service Operations Management*. In the future, Philip wishes to devote his intellectual efforts to two streams of research: (a) operations management under social interactions (e.g., social networks) and (b) sustainable operations.