The Hong Kong University of Science and Technology

Dept of Information Systems, Business Statistics and Operations Management

OM Seminar

Impact of Market Thickness and Heterogeneity on Matches in Online Marketplaces with Active Providers

by

Mr. Rahul ROY, University of North Carolina

Date	:	**19 December 2025 (Friday)**
Time	:	**10:30am – 11:45am**
Venue	:	**Case Room 1005, LSK Business Building**

Abstract:

In online service marketplaces, supply-side thickness—the number of providers—is widely believed to be crucial for facilitating matches, i.e., transactions between providers and customers. Empirical literature generally supports this view, providing evidence for the hypothesis that market thickness increases matches, albeit at varying rates. This support is typically obtained in contexts with a passive seller listing where all sellers are readily listed for customers. Distinctively, our study empirically examines an online marketplace where providers are active, meaning they must extend a proposal to be listed. For our study, we collaborated with a leading U.S. online solar marketplace that connects solar panel installers with potential adopters. We use dynamic models and advanced clustering algorithm to investigate how supply-side thickness affects transactions in such marketplaces. Our analysis of an online marketplace with active providers reveals results that challenge the conventional understanding: We find a significant, inverted U-shaped relationship between market transactions and supply-side thickness. This indicates that transactions initially increase with thickness up to a certain thickness threshold, a□er which they begin to decline. This finding diverges from the general understanding in the literature, suggesting the need for new marketplace design strategies. We show that increased heterogeneity among supply-side participants negatively impacts transactions, and this effect is exacerbated in thicker markets. To our knowledge, this is the first empirical study that explores the effect of supply-side heterogeneity on marketplace transactions with active providers. Our findings highlight the complex effects of increased thickness and heterogeneity, offering valuable managerial insights.

Bio:

Rahul Roy is a final-year PhD candidate and the Harvey Wagner OM Scholar at the Kenan-Flagler Business School, University of North Carolina at Chapel Hill, where he is jointly advised by Professors Jayashankar M. Swaminathan and Nur Sunar. Prior to his doctoral studies, Rahul spent nearly five years in industry working across the energy and AI sectors in India and the United Kingdom.

Rahul's research sits at the intersection of technology, energy, and sustainability, with a focus on improving system design and operations in data-rich, digitally mediated environments. He primarily uses empirical methods—integrating machine learning, econometrics, and causal inference—to study energy innovations such as online solar platforms and EV smart charging, and how these technologies can be optimized for real-world implementation. In particular, his work examines how these systems function in practice, especially in relation to user behavior and engagement, market design, and alignment with broader social and climate goals. A complementary stream of his research investigates fairness and equity in technology-driven systems, with the aim of informing more inclusive and just energy solutions. Ultimately, Rahul seeks to advance understanding of emerging energy technologies and innovative business models that support low-carbon, sustainable energy transitions.

All interested are welcome!
Enquiries: Dept of ISOM