

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

Two Essays on Equilibrium Analysis of Customers' Queueing Behavior

by

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(Conducted in English)

Abstract:

In the past decades, the development of information technology has reshaped how customers obtain product related information and has revolutionized the ways organizations relate to the marketplace. Meanwhile, progress in behavioral research has deepened our understanding of customer behavior. It shows that customers are not passive receiving end but active decisions makers. Those changes in technology and knowledge have created a new world of opportunities and challenges for all aspects of the enterprise. In this thesis, we research into their impacts on the operations of service facilities.

In the first topic, we consider the new challenges associated with the development of information technology. Social media and word-of-mouth forums are shown to have great influence on customers' purchase decisions and have made the buyer-generated content non-negligible. We consider a typical situation where a service provider serves two types of customers, sophisticated and naive. Sophisticated customers are well-informed about service-related information and make their joining-or-balking decisions strategically, whereas naive customers do not have such information and must rely on buyer-generated rating information to make such decisions. We demonstrate that a service provider can increase its profitability by simply 'dancing' its price, that is, replacing the static pricing strategy with a cyclic pricing strategy. To illustrate the mechanism behind this, we model a service system as an $M/M/1$ queue with unobservable queue length. We show that the optimal cyclic pricing strategy is high-low cyclic; in each cycle, sophisticated customers join during the high-price phase and obtain a net utility of zero while naive customers join during the low-price phase and obtain a negative utility. Nevertheless, the adoption of the cyclic pricing strategy requires the potential market size to be larger than a threshold value. We also show that the cyclic pricing strategy actually harms social welfare.

In the second topic, we incorporate new understandings of customer behavior with their equilibrium queueing decisions in health care service context. We investigate how the customers, as active decision makers, affects the operations of a diagnostic system. Customers, i.e., patients, perceive the same set of symptoms differently. They may actively seek multiple opinions when they face big cognitive dissonances from the doctors, i.e., they engage in doctor shopping behavior. Most medical practitioners believes that doctor shopping is responsible for the inefficiency of the public health care sector and should be avoided. Our study tells a different story--doctor shopping is not always associated with health care system inefficiency nor shall always be avoided. When the accuracy of the diagnoses is high, medical practitioners want to prohibit doctor shopping behavior since it helps little, or even adversely, in bringing higher reward, but exaggerates congestion and causes waste. The patients, however, always obtain higher mental gains from doctor shopping. When the accuracy of the diagnoses is not high, medical practitioners may encourage doctor shopping behavior of the patients, but doctor shopping is not always favored by the patients. A welfare-maximizing policy maker, who takes both the medical practitioners' and the patients' appeals into consideration, shall tolerate a certain of doctor shopping rate under most circumstances.

Bio:

Huang Fengfeng is a doctoral candidate under supervision of Prof. Pengfei Guo and Dr. Yulan Wang. Her research focuses on service operations management. She holds a master's degree in Management Science and Engineering from Xi'an Jiaotong University and a bachelor's degree in Aeronautics Design and Synthetic Control from Northwestern Polytechnic University (Xi'an, China).

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All are welcome!