Essays on Operations Management Decision Making for Sharing and Circular Economy

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Dissertation Abstract

In comparison to the traditional consumption model of exclusive ownership of products, sharing economy model is an emerging business model that enables "accessibility without ownership". The recent growth of sharing economy can be attributed to the proliferation of digital sharing economy platforms that facilitate transactions for temporary access to products. Furthermore, instead of the linear take-make-dispose economy, the circular economy model is also gaining attention from practitioners and researchers. The concept of circular economy is based on the principle to maintain the value of the products in the economy for as long as possible and reduce the environmental impact of the products. The sharing economy business models can contribute to the goals and principles of the circular economy and have disruptive power to affect the operations of traditional firms and the behaviour of consumers.

In this dissertation, through the three essays, I study the three applications of sharing economy in the business-to-business (B2B), consumer-to-consumer (C2C) and business-to-consumer (B2C) context. In the first essay (Chapter 2), I explore the B2B aspect of the sharing economy where I study an entrant firm's choice to buy refurbished equipment from a supplier or rent state-of-art equipment with limited capacity shared by a peer incumbent firm when the two firms are operating in two differentiated markets characterised by different market size, price and technology sensitivities of the consumers. Through the second essay (Chapter 3), I study a firm's product line strategy to offer only green products or only brown products or both kinds of products in the presence of a C2C sharing market where the consumers are segmented into environmentally conscious and environmentally non-conscious segments based on their willingness to pay for the environmental attribute of the green product. Finally, in the third essay (Chapter 4), I focus on a C2C sharing platform's strategic decision to launch its own B2C sharing service and a B2C sharing platform's expansion strategy to introduce a C2C sharing service under service quality improvement considerations in the C2C market.

In the first essay (Chapter 2), I focus on the B2B domain of the sharing economy. Buying refurbished equipment is a viable economic alternative to buying higher-priced new advanced technology equipment. However, rather than engaging in exclusive ownership, the access-based business-to-business sharing economic model (B2B SE) enables firms to get access to relatively newer advanced technology equipment at a lower price. It also facilitates firms in ownership of advanced equipment to monetise their spare capacity. In Chapter 2, I examine a capacity-constrained incumbent firm's decision to share equipment in the B2B sharing market. I also study an entrant firm's decision to either rent shared equipment or buy refurbished equipment in the presence of both sharing and refurbished markets. The incumbent and entrant operate in two mutually exclusive markets, Market-1 and Market-2 respectively differentiated by size, consumers having different sensitivities to (i) the price of service offered and (ii) technology used by the firms. Intuitively, the entrant should always opt for renting because it is a financially feasible option and the firm can get access to technologically superior equipment. Furthermore, the incumbent should always share as it enables the firm to monetise spare capacity and offset the cost of ownership. Contrary to intuitions, I find that not engaging in sharing transactions would be profitable for both firms when the price and technology sensitivities of Market-2 consumers are low, the size of both the markets is high, and Market-1 consumer's sensitivity to technology is high but sensitivity to price is low. I also derive insights into the impact of the firm's choices on equipment utilization and consumer surplus.

In the second essay (Chapter 3), I focus on the C2C aspect of the sharing economy. Green products are typically costlier than conventional (brown) products and, hence, less affordable to many consumers. Consumer-to-consumer (C2C) sharing is an emerging economic model that may help a firm to expand its green product market reach. In the C2C model, the products are shared by their owners on a rental basis when they are not being used. This facilitates consumption of the green product by consumers not willing to buy the same at a high price (value-enhancement effect). Of course, "access over ownership" can lead to sales cannibalization as buyers too can rent instead of purchasing (cannibalization effect). I provide strategic insights on a firm's product line decision while it operates in a market comprising environmentally conscious and non-conscious segments in the presence of C2C sharing. I find that the existence of a sharing market encourages the firm to introduce a green product. The firm's product line expansion from just a brown product to offering both brown and green products benefit the consumers most when the willingness to pay (WTP) for the environmental attribute is in the medium range and there is a smaller proportion of conscious consumers. However, when the WTP for the environmental attribute is in the medium range and the proportion of conscious consumers is higher, the consumers will benefit the most when the firm offers only a green product. Contrary to the intuition that a C2C sharing market would create the value-enhancement effect, I find that offering only brown products results in sales cannibalization.

In the third essay (Chapter 4), I study the sharing platforms engaged in both C2C sharing and B2C sharing services. Sharing platforms (SPs) enable renters to get temporary access to products in return for a fee. Consumer-to-consumer SPs (C2C-SPs), like Tulerie, facilitate lenders to share their idle products (lender-owned products or LP) with the renters. Business-to-consumer SPs (B2C-SPs), like, Endless Wardrobe provide their own products (platform-owned products or PP) for rental. While some C2C-SPs provide only LPs, other C2C-SPs, like Hurr Collective have expanded into B2C sharing service by offering PP and operating as a hybrid SP (HYB-SP). However, hardly one can find a B2C-SP that has expanded into a C2C sharing service by allowing collaboration among consumers. Furthermore, renters may also face performance risks from LP and PP, where the relative acceptance of LP can be higher or lower than PP along with psychological risks from "stranger sharing" in C2C transactions. To alleviate the renter's psychological risk, C2C-SPs invest in improving service quality in the C2C market. So, I examine how these factors influence the SP's expansion strategies. The analysis shows that a higher acceptance of PP than LP would induce the C2C-SP to always extend into offering PP which would be associated with a reduction in the C2C service quality. However, if this acceptance is higher towards LP than PP, then the C2C-SP would transition to HYB-SP when it incurs a higher expenditure for C2C service quality improvement. This higher expenditure for service quality improvement and the inability to charge a high commission fee to the lender is what might be restricting the B2C-SP from transitioning to HYB-SP. The qualitative conclusions from the initial findings when acceptance of PP is more than LP do not change by considering: (i) a fixed-fee design instead of the commission fee of the SP and (ii) transaction cost incurred by lenders in the C2C market. Managerial implications and future research are discussed.