Assortment and Price Optimization for New and Remanufactured Products

In today's highly competitive and rapidly evolving business landscape, companies must constantly adapt and optimize their product offerings and pricing strategies to stay ahead of the competition. This proposal outlines a comprehensive plan for assortment and price optimization, specifically tailored for both new and remanufactured products.

Assortment optimization refers to the process of selecting the best combination of products or services to offer to customers. The objective is to determine which products should be included in a company's product portfolio with which price to maximize the market share, revenue, or profit, under customer choice behavior models (MNL, M(MNL), etc.) while considering various constraints such as the length of the product line. (Sen et al., 2018)

Remanufacturing offers an opportunity for more sustainable production. It involves taking used products, bringing them back to as-new condition, and selling them again. The benefit of remanufacturing is that it can decrease the production cost for the company under an acceptable return rate. However, cannibalization which means that the purchase of a remanufactured version of a product displaces the sale of a new product, is a challenge that makes it difficult to determine if offering both new and remanufactured products is profitable or not (see, Atasu et al., 2010). Different customer segments react to remanufactured products differently as some find the sustainability aspect attractive and some prefer to buy a new product as opposed to a partly remanufactured one. From the perspective of the manufacturer, remanufacturing can decrease the production and material cost, however, the remanufactured items can potentially cannibalize the sales of new products.

The objective of this work in the first step is to review the literature for assortment and price optimization for new and remanufactured products (see, e.g., Ovchinnikov, 2011) and provide a meaningful classification regarding underlying assumptions, problem formulations, and solution methods. What are the decision variables? Which types of costs and constraints are considered? How are customers' different attraction toward new and remanufactured products captured? How is the cannibalization effect modeled and considered in the literature? In the second step, the goal of this project is to extend AO for remanufacturing considerations based on the existing models in the literature and provide some insights.

Recommended Basic Literature:

Atasu, A., Guide Jr, V. D. R., & Van Wassenhove, L. N. (2010). So what if remanufacturing cannibalizes my new product sales? California Management Review, 52(2), 56-76.

Ovchinnikov, A. (2011). Revenue then cost management for remanufactured products. Production and Operations Management, 20(6), 824-840.

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