Beyond the Warranty Price: Aligning Extended Warranty Service with Consumer Preferences in a Competitive Market

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Abstract. Extended Warranty Service (EWS), also known as Service Contract (SC), extends beyond the base warranty, providing broader protection that consumers can purchase separately [2, 4]. While manufacturers typically offer SC as EWS, third-party service providers (TSPs) also enter the market, providing consumers with alternative options [5]. Consequently, consumers can opt for the manufacturer's SC or the TSP's Service Plan (SP). While similar, SC and SP may differ in duration and coverage, with the preference leaning towards SP that matches or exceeds the SC's attributes.

This dynamic landscape presents challenges and opportunities for manufacturers and TSPs, particularly in effectively pricing their products and services to maximize profitability. The manufacturer must jointly determine product and SC prices, considering market conditions and TSP behavior. Considering manufacturer decisions, TSPs must decide on SP breadth and price. They could adopt two possible strategies in the competitive market: focusing on price and maneuvering on service breadth. The former aims to provide a service that is the same as the SC but with a lower price, while the latter focuses on providing a more prolonged or broader service. As such, three service policies could be defined by the TSP: (1) Standard Service Plan (SSP), (2) Advanced Service Plan (ASP), and (3) Both standard and advanced Service Plans (BSP). Therefore, they must answer: How should the manufacturer set the product's price and SC maximize her profit? What is the optimal SP policy? In other words, should TSP offer an SP equivalent to the manufacturer's SC (SSP) or a more comprehensive SP (i.e., either ASP or BSP)? How should the TSP determine its service prices considering the manufacturer's pricing decisions?

Although the benefits of base and extended warranty services have received extensive attention, research on EWS policy-making is limited in the literature. These studies can be categorized based on different parameters, e.g., supply chain structure. From this perspective, the literature can be classified into three groups: 1) a manufacturer selling a product and offering the EWS (e.g., [6, 7]); 2) a provider offers the EWS without considering the manufacturer (e.g., [2, 8]); 3) considering both manufacturer and service provider in analyses (e.g., [3, 9]). An overview of the literature reveals that the competitive market was investigated in fewer studies due to its complexity (e.g., [3, 9]). Despite the investigation of the pricing policy for EWS, to the best of our knowledge, consumer characteristics (i.e., risk attitudes and loyalty) have not been incorporated in developing pricing policies. Furthermore, while considering market competition and service breadth and the combined effect of service policy and price, pricing policy development has not been investigated in the literature.

To capture customers' and market characteristics, this study develops a mathematical analysis to formulate the competition between the TSP and the manufacturer in EWS service provision. It applies the consumer choice model (CCM)

to capture consumers' utility in analyzing their behavior in opting for EWS. More specifically, this study investigates a manufacturer who sells its product to heterogeneous consumers in terms of risk attitude and brand loyalty. Its EWS service, called SC, is sold separately to consumers who want to protect themselves against product failures. In addition to the manufacturer, a TSP aims to provide EWS for consumers in this market. This service (known as SP) could be a substitution for the SC. The TSP aims at adopting the optimal policy among (i) providing an EWS with the same coverage at a lower price, (ii) providing an EWS with broader or more prolonged coverage, and (iii) providing both standard and advanced service for consumers with different risk attitudes. These policies are called Policy SSP, Policy ASP, and Policy BSP, respectively.

To analyze the competition between the manufacturer and TSP, we formulate the problem under investigation as a Stackelburg game between the manufacturer and the TSP due to the asymmetric information about the product attributes. The developed game includes the CCM to assist the manufacturer and TSP with pricing the product and extended warranty services. Additionally, we investigate different circumstances and determine the optimal price of the manufacturer's product and service. The results reveal that consumers' preferences for advanced services, brand loyalty, product failure rate, and consumers' risk aversion significantly influence service demand and profits. Additionally, the results demonstrate that the ASP yields the greatest profitability if the product failure rate is high, consumers are inclined towards advanced services, or they exhibit high-risk aversion. Conversely, the Policy SSP is preferred when these parameters are at their lowest levels.

Keywords: Game Theory; Pricing; Extended Warranty Service; Consumer Choice Model; Service Policy.

References

1. Zhang, X., Hu, J., Sun, S., & Qi, G: Extended Warranty Strategy and Its Environment Impact of Remanufactured Supply Chain. Int. J. of Environmental Research & Public Health, 19(3), 1526 (2022).
2. Wang R., Ke C., & Cui S.: Product Price, Quality, and Service Decisions Under Consumer Choice Models. Manufacturing & Service Operations Management (2021).
3. Hu, J., Sun, S., Zhang, X., & Meng, Q.: Optimal Extended Warranty Strategy: Provided by Manufacturer or E-Commerce Platform?. Sustainability, 14(19), 12157 (2022)..
4. Jiang, B., & Zhang, X.: How Does a Retailer. Management Science, 57(4), 727-740 (2011)..
5. Durugbo, C. M.: After-sales services and aftermarket support: A systematic review, theory and future research directions. Int. J. of Production Research, 58(6), 1857-1892 (2020)..
6. Liu, Z., Diallo, C., Chen, J., & Zhang, M.: Optimal pricing and production strategies for new and remanufactured products under a non-renewing free replacement warranty. International Journal of Production Economics, 226, 107602 (2020).
7. Shang, L., Yu, X., Wang, X., & Qiu, Q.: Study of A Two-stage Random Warranty to Maintain Fairness. Procedia Computer Science, 214, 437-440 (2022).
8. Huang, Y.-S., Fang, C.-C., Lu, C.-M., & (Bill) Tseng, T.-L.: Optimal Warranty Policy for Consumer Electronics with Dependent Competing Failure Processes. Reliability Engineering & System Safety, 222, 108418 (2022).
9. Liu, Z., Chen, J., Diallo, C., & Venkatadri, U.: Optimal extended warranty pricing and retailing strategies in a closed-loop supply chain. Int. J. of Production Research, 1-24 (2022).