Two–level Supply Chain with Extended Warranty in Competitive Market Environment

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Abstract

Market grows more competitive with modern manufacturing characterized by global-fierce competition and more demanding customer. The insistence even greater caused by nearly identical products due to common components and technology being used. As a result, it is very difficult for consumers to choose particular product solely based on the product related characteristics. In this situation, warranty – one of after-sales service – conveys information to reduce the uncertainty or risk perceived by the consumer. The warranty becomes one is that known at the time of purchase. Thus, warranty plays an important role in product choice. Better warranty statements imply that the risk is low and hence induce the consumer to buy the product. As a result, warranty is used as an advertising tool and significant element of marketing strategy for competing with others. Offering wide variety of warranty statement to costumers ensures an increase of sales leading to more profit. On the other hand, customers could obtain the benefits of choosing the one which most appropriate with their needs.

In this paper, we propose several scenarios of warranty in a two-level supply chain consist of a manufacturer and retailers, incorporating sales of two substitute identical product which deliver through two competing retailers to a group of customer. Manufacturer bundling their base warranty into the products, while retailer offer additional insurance against product failure in the form of an extended warranty. Since, the price of each option affects the sales volume, thus, each side prefers to maximize their own satisfaction. For each option, the sale price and warranty period for manufacturer, and the optimal retail price for retailer will be determined by maximizing their profit. Therefore, the interaction between manufacturer and two retailers is modeled using a game theory approach, which *Nash* equilibrium and *Stackelberg* game are employed. The examination focus on whether the extended warranty serves an enticement for manufacturer related to base warranty offered. Furthermore, assess whether the competition existed has an impact on warranty decision and compare which warranty is more efficient in cost.

Keywords
Warranty; extended warranty; Nash equilibrium; supply chain; competition

Biography

Bagus Noval is currently a Graduate (Master) student in the Department of Industrial Engineering at Institut Teknologi Sepuluh Nopember (ITS), Indonesia. He received his Bachelor degree in Department of Statistics from the same university. His research interest includes supply chain and operation research.

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