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On the evaluation of commonality strategy in product line design: The effect of valuation change and distribution channel structure

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Abstract

This paper investigates a manufacturer's optimal decisions in relation to the adoption of the commonality strategy in a decentralized channel as opposed to a centralized channel. Our model, through valuation premium and discount, captures the possible changes in the perceived quality made by customers as a result of the use of common design in the high-quality and low-quality products. We show that commonality always help reduce the extent of quality distortion encountered by the low-valuation segment, regardless of the channel structure. We also show that the adoption of commonality strategy in a decentralized channel is able to reduce channel efficiency loss, which may lead to improvements in the channel profits even when there is no cost saving associated with the use of common components. The valuation premium and discount are influential on several important measure including optimal quality levels, channel profits, and consumer surplus. Furthermore, we point out an important issue on the coordination between the manufacturer and the retailer that must be addressed if the commonality strategy is to be implemented in a decentralized channel.

Key words: component commonality; product line; marketing-manufacturing interface; channel coordination;

1. Introduction

It is commonly recognized that product line proliferation presents a major operational challenge for many firms today despite its importance for attracting different consumer segments. A proliferation of products negatively affects operational performance due to higher forecast errors, higher manufacturing costs, and higher overhead and administrative costs (Lee and Billington, 1994). The use of component commonality or standardization has been widely regarded as a cost-effective way for firms to mitigate the negative effects of product line proliferation. The major benefits of using

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