

A Real Option Theoretic Framework for Economic Justification of Product Family Design and Product Platform Development

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Abstract

Developing multiple product variants, based on product families which share common platforms, has been well recognized as an effective means of creating product variety while maintaining mass production efficiency. Investing into product families and platforms allows a company the flexibility to accommodate future customization requirements, but at the expense of increased complexity in design and production. The real option theoretic approach proposed in this paper improves upon the traditional discounted cash flow analysis-based valuation methods which tend to underestimate the potential of a design project originating from numerous product family options. The resulting real option models can substantially facilitate decision-making in long-term investments, particularly those subject to uncertainty and irreversibility throughout the design of product families and platforms.