Managing New Product Technology Decisions under Technical and Demand Uncertainty

Leslie Monplaisir
Department of Industrial Engineering
Wayne State University
Detroit, MI 48202, USA
leslie.monplaisir@wayne.edu

Amir Sanayei
Department of Industrial Engineering
Wayne State University
Detroit, MI 48202, USA
sanayei@wayne.edu

Abstract

New product technology decisions have crucial role on all New Product Development (NPD) downstream activities and product success in the market. Although new technologies promise higher competitive advantage by offering higher performance and flexibility, technical associated with new technologies as well as market uncertainties could make the NPD process more risky and challenging in terms of development cost and time to market. In this research we propose a framework to manage the new product technology decisions in order to incorporate managerial flexibility into NPD projects to decrease technical and market risks, while increasing potential market value. In our framework, at each review stage, management can choose the technology or postpone this decision to the next review stage. Postponing the technology decision, give more the opportunity to acquire more information which helps us to resolve the uncertainty but simultaneously it may cause delay in product launch and significant profit loss. In proposed model, a Bayesian manner is used to update our perception about the technology's reliability based on new received information at each review stage. Monte Carlo simulation is used to deal with the market uncertainty. An illustrative example is presented to choose the battery pack control system in hybrid and electric vehicles.

Keywords
New Product Development, Technology Selection, Technical Uncertainty, Demand Uncertainty

Biography

Leslie Monplaisir, Associate Professor of Industrial and Manufacturing Engineering, is Chair of the Department of Industrial and Systems Engineering at Wayne State University (WSU). He is a Lead Researcher and Director of the Product Development and Systems Engineering Consortium (PDSEC) at WSU. His research interests include: Lean Product Development, Design for lean Systems and Services and Design reuse, Collaborative PD Decision Making, Product Architecture Optimization, Design for Supply Chain, Global Product Platform Optimization and Healthcare Technology System Design He has authored over 100 publications in these areas with funded research from NSF, Ford, Sun Microsystems, Tardec and PTC.

Dr. Monplaisir joined the College of Engineering at Wayne State University in the Department of Industrial and Manufacturing Engineering in 1996 from Florida A & M University where he was a visiting assistant professor. He earned his PhD in Engineering Management from the Missouri University of Science and Technology (MUST), a master's in Computer Integrated Manufacturing from the University of Birmingham in Great Britain, and bachelor's in Mechanical Engineering from the University of the West Indies in Trinidad.

Amir Sanayei is currently a PhD candidate in Department of Industrial and Systems Engineering at Wayne State University. His research interest includes Decision Analysis and Optimization in New Product Development and Supply Chain. He earned his master's in Industrial Engineering from Mazandaran University and bachelor's in System's Engineering from Iran University and Science and Technology (IUST) in Iran.