



Make-to-Order Supply Chain Design for Response Time Sensitive Markets

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Abstract

We consider a situation where a manufacturer stocks a generic base product and delays differentiation until actual orders arrive. This demand pooling reduces the demand variance, allows more accurate forecasts and requires less safety stock. In contrast, customer demand for a specific end-product typically has a high level of uncertainty and thus product differentiation occurs only in response to individual orders. We look at the strategic design of such make-to-order supply chains under general customer demand and general service times. The problem is set-up as a network of M/G/1 queues and modeled as a nonlinear mixed-integer program. We combine queuing theory and MIP to model response time and location/capacity/distribution decisions respectively. We propose a linearization based on a simple transformation and piecewise linear approximations and an exact solution method based on cutting plane methods. Numerical results and managerial implications are provided.

Biography

Samir Elhedhli is an associate professor at the Department of Management Sciences, University of Waterloo. He was Assistant Professor from 2001 until 2006. He holds a B.Sc. and a M.Sc. in Industrial Engineering from Bilkent University and a Ph.D. in Management from McGill University. He has expertise in large scale optimization with applications in supply chain and service systems design. His work has appeared in journals such as Management Science, Mathematical Programming, MSOM, IIE Transactions, OR Letters, EJOR, Computers and OR, and INFOR. He holds research grants from NSERC, CITO and CFI.

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