

International Journal of Production Research >

Volume 43, 2005 - [Issue 8](#)

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# An ABC-based cost model with inventory and order level costs: a comparison with TOC

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Pages 1685-1710 | Published online: 22 Feb 2007

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## Abstract

Activity-Based Costing (ABC) was developed to address the deficiencies of traditional accounting systems in the modern business environment by helping managers understand product and customer profitability and identify priority areas for process improvements. In this study, activity-based costing (ABC) concepts are integrated with a Mixed Integer Program (MIP) for order management and profitability analysis in the case of a firm facing demand in excess of capacity. The model considers unit-level, batch, and order-related costs within a mixed-integer programming model representing the firm's operating structure. The performance criterion of profit and service levels during the 20-period planning horizon is used for model evaluation in a comparison with the results from a Theory of Constraints (TOC) formulation. The analysis of these competing models will provide guidelines for applications of order management models with simultaneous consideration of production planning and profitability analysis, as

well as help managers understand product and customer profitability, and identify priority areas for process improvements. The results indicate that the ABC-based model is more effective in increasing profitability and reducing inventory levels when compared with the TOC-based formulation, making better use of overhead cost information in the selection of orders.

Keywords:

Demand management

Order promising

Production planning

Activity-based costing

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