

IIE Transactions >

Volume 36, 2004 - [Issue 6](#)

1,894 Views | 140 CrossRef citations to date | 0 Altmetric

Original Articles

Make-to-order, make-to-stock, or delay product differentiation? A common framework for modeling and analysis

DIWAKAR GUPTA & SAIF BENJAAFAR

Pages 529-546 | Received 01 Jun 2002, Accepted 01 Oct 2003, Published online: 17 Aug 2010

🗨️ Cite this article <https://doi.org/10.1080/07408170490438519>

Sample our
Engineering & Technology
Journals

>> [Sign in here](#) to start your access
to the latest two volumes for 14 days

📄 Full Article | 📊 Figures & data | 📖 References | 🗨️ Citations | 📊 Metrics

📄 Reprints & Permissions

Read this article

🔗 Share

Abstract

Delaying product differentiation is a hybrid strategy that strives to reconcile the dual needs of high variety and quick response time. A common product platform is built to stock in the first stage of production (called the Make-To-Stock (MTS) stage) which is then differentiated into different products after demand is known in the second stage (known as the Make-To-Order (MTO) stage). In this article, we develop models to compute the costs and benefits of delaying differentiation in series production systems when the order lead times are load dependent. The models are then used to gain insights through analytical and numerical comparisons. For example, we observe the following patterns in a large number of numerical experiments. The effect of congestion in the MTS and MTO stages is asymmetric with tighter capacity at the MTO stage having a greater detrimental effect on the desirability of delaying differentiation. If

there is flexibility in choosing the point of differentiation, higher loading is observed to favor later differentiation. Also, if the sequence in which work is performed can be affected, then placing workstations that have a tighter capacity in the MTS stage lowers costs.

Acknowledgements

The authors are grateful to two anonymous referees for their help in improving an earlier version of this manuscript. This material is based in part upon work supported by the National Science Foundation under grant no. DMII 9988721. Additional funding was provided by the Graduate School of the University of Minnesota through a grant to DG and by the Honeywell Corporation through a grant to SB.

Related research

People also read

Recommended articles

Cited by
140

[Hybrid make-to-stock and make-to-order systems: a taxonomic review >](#)

Kay Peeters et al.

International Journal of Production Research

Published online: 22 Jun 2020



[Combined make-to-order/make-to-stock supply chains >](#)

Philip Kaminsky et al.

IIE Transactions

Published online: 23 Sep 2009

[A review of production planning and control: the applicability of key concepts to the make-to-order industry >](#)

M. Stevenson * et al.

International Journal of Production Research

Published online: 22 Feb 2007

[View more](#)

Information for

[Authors](#)

[R&D professionals](#)

[Editors](#)

[Librarians](#)

[Societies](#)

Opportunities

[Reprints and e-prints](#)

[Advertising solutions](#)

[Accelerated publication](#)

[Corporate access solutions](#)

Open access

[Overview](#)

[Open journals](#)

[Open Select](#)

[Dove Medical Press](#)

[F1000Research](#)

Help and information

[Help and contact](#)

[Newsroom](#)

[All journals](#)

[Books](#)

Keep up to date

Register to receive personalised research and resources by email



Sign me up



Copyright © 2026 Informa UK Limited [Privacy policy](#)

[Cookies](#) [Terms & conditions](#) [Accessibility](#)

Registered in England & Wales No. 01072954
5 Howick Place | London | SW1P 1WG



Taylor & Francis
by informa