Taylor & Francis
Online

Production Planning & Control ›
The Management of Operations
Volume 14, 2003 - Issue 7

435 Views | 41 CrossRef citations to date | 0 Altmetric

Original Articles

An optimal design for process quality improvement: modelling and application

Jen-Ming Chen & Jia-Chi Tsou

Pages 603-612 | Published online: 06 Oct 2011

Cite this article https://doi.org/10.1080/09537280310001626197

Sample our
Economics, Finance,
Business & Industry 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

Existing research works on process quality improvement focus largely on the linkages between quality improvement cost and production economics such as set-up cost and defect rate reduction. This paper deals with the optimal design problem for process improvement by balancing the sunk investment cost and revenue increments due to the process improvement. We develop an optimal model based on Taguchi cost functions. The model is validated through a real case study in automotive industry where the 6-sigma DMAIC methodology has been applied. According to this research, the management can adjust the investment on prevention and appraisal costs on quality improvement that enhances process capability, reduces product defect rate and, as a result, generates remarkable financial return.

Keywords:

process quality improvement | 6-sigma | Taguchi cost function | case study | revenue management

Previous article | View issue table of contents | Next article

Acknowledgements

We would like to thank the editors and two anonymous referees for their valuable and constructive comments, which have led to a significant improvement in this paper.

JEN-MING CHEN is a Professor at the Institute of Industrial Management at the National Central University, Taiwan. He received a BS in Industrial Management Science from the National Cheng Kung University, Taiwan in 1983, an MS in Industrial Engineering from the University of Arizona in 1988, and a PhD in Industrial Engineering from the Pennsylvania State University in 1992. His research interests include inventory and supply chain management, and pricing and yield management. He is an active member of several professional organizations, including Informs, DSI and IIE. Dr Chen is the recipient of the George B. Dantzig Dissertation Award from the Informs and the recipient of the IIE Doctoral Dissertation Award, both in 1994.

JIA-CHI TSOU, 6-sigma Master Black Belt at Ford Motor Company, is currently a doctoral student at the Institute of Industrial Management at the National Central University, Taiwan. He graduated with an MBA in Small and Medium Enterprises (SMEs) from the University of Liverpool, UK. He also gained an MS and a BS in Mechanical Engineering at the National Central University, Taiwan. Mr Tsou has extensive experience in quality assurance, production systems and supplier management in the automotive industry. His research interests include quality management and yield management in the automotive industry.

Related Research Data

Process quality improvement and setup reduction in dynamic lot-sizing
Source: International Journal of Production Research
Production economics and process quality: A Taguchi perspective
Source: International Journal of Production Economics

A Taxonomy and Research Overview of Perishable-Asset Revenue Management: Yield Management, Overbooking, and Pricing

Source: Operations Research

Dynamic Process Improvement

Source: Operations Research

An Application of Yield Management to the Hotel Industry Considering Multiple Day Stays

Source: Operations Research

Lot sizes and setup frequency with learning in setups and process quality

Related research

People also read | Recommended articles | Cited by 41

Information for

Authors

R&D professionals

Editors

Librarians

Societies

Open access

Overview

Open journals

Open Select

Dove Medical Press

F1000Research

Opportunities

Reprints and e-prints

Advertising solutions

Accelerated publication

Corporate access solutions

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