



Production Planning & Control >  
The Management of Operations  
Volume 14, 2003 - [Issue 7](#)

431 | 41 | 0  
Views | CrossRef citations to date | 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  
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

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:

## 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

Case study: quality improvement model in a car seat assembly line >

J.-C. Tsou et al.

Production Planning & Control

Published online: 21 Feb 2007

## 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