Ain Shams University
Faculty of Engineering

Moving From Quality Management to Business Excellence through an Integrated Approach

A Thesis

By

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Abstract

In today's highly competitive global economy, many organizations are striving business excellence by implementing Six Sigma and Lean manufacturing beside their ISO 9000 Quality Management System (QMS). However, the academic literature still contains few empirical studies for the impact of integrating Lean and Six Sigma with ISO 9000 QMS and if this will lead to business excellence.

In this study, a theoretical model is proposed and tested for the impact of Lean and Six Sigma integration with ISO 9000 using Partial Least Squares (PLS) path analysis. This empirical assessment collected 33 responses from manufacturing firms applying Lean and Six Sigma together with ISO 9000. Five constructs of business excellence were hypothesised to validate the model. The results of the analysis showed that integrating Lean and Six Sigma with ISO 9000 QMS have a significant positive impact on all constructs of business excellence.

Moreover, the survey highlighted key problems and obstacles in the way of successful integration of the three initiatives. These have been considered in the 4 phases proposed model for integration.

Keywords: Lean, Six Sigma, ISO 9000, Business excellence, PLS path modelling

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List of Acronyms

ANOVA	Analysis Of Variance
AVE	Average Variance Extracted
BB	Black Belt
BCPE	Baldrige Criteria for Performance Excellence
CEO	Chief Executive Officer
COPQ	Cost of Poor Quality
Cp	Process capability
CQI	Continuous Quality Improvement
CTQ	Critical To Quality
DFSS	Design For Six Sigma
DMADV	Define, Measure, Analyze, Design and Verify
DMAIC	Define, Measure, Analyse, Improve and Control
DOE	Design Of Experiments
DPMO	Defects Per Million Opportunities
EFQM	European Foundation for Quality Management
EU	European Union
FMEA	Failure modes and effects analysis
FTY	First Time Yield
GB	Green Belt
ISO	International Standardization Organization
JIT	Just In Time
LISREL	Linear Structural Relations
LSS	Lean Six Sigma
LSS+	Lean Six Sigma plus
LSSL	Lean Six Sigma light
LV	Latent Variable
MBB	Master Black Belt
MBNQA	Malcolm Baldrige National Quality Award
MTTR	Mean Time To Repair
MV	Manifest Variables

NIST	National Institute of Standards and Technology
OEE	Overall Equipment Effectiveness
OHSAS	Occupational Health & Safety Advisory Services
PLS	Partial Least Squares
PPM	Part Per Million
QFD	Quality Function Deployment
QMP	Quality Management Principles
QMS	Quality Management System
SEM	Structural Equation modelling
SIPOC	Suppliers, Inputs, Process, Outputs, Customers
SMDE	Single Minute Die Exchange
SME	Small and Medium Enterprises
STDEV	Standard Deviation
STERR	Standard Error
SUF	Single Unit Flow
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TL	Traditional lean
TPM	Total Productive Maintenance
TPS	Toyota Production System
TQM	Total Quality Management
TSS	Traditional Six Sigma
VOC	Voice Of Customer

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