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Human aspects of quality management in developing countries: a case study and model development for Thai manufacturing SMEs

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**HUMAN ASPECTS OF QUALITY MANAGEMENT IN
DEVELOPING COUNTRIES: A CASE STUDY AND MODEL
DEVELOPMENT FOR THAI MANUFACTURING SMEs**

A thesis submitted in fulfilment of the
requirements for the award of the degree

Doctor of Philosophy (PhD)

from

UNIVERSITY OF WOLLONGONG

by

Panu Buranajarukorn (B. Eng, M. Eng)

School of Mechanical, Materials and Mechatronic Engineering

2006

CERTIFICATION

I, Panu Buranajarukorn, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Mechanical, Materials and Mechatronic Engineering, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Panu Buranajarukorn

1 November 2006

ABSTRACT

Thai manufacturing SMEs have played a major role in increasing the Thai GDP and improving international competitiveness. However, there have been many problems inside organisations that have created obstacles to improving performance in both domestic and international markets. Thailand has entered into FTAs with several international trading groups, and has thus been confronted by fierce overseas competitors. However, Thai manufacturing SMEs have lacked investment in modern technology and management techniques. There appears to be a need for Quality Management (QM) that benefits from well-managed Human Factors (HFs).

Over the past decade, Total Quality Management (TQM) has been used by many larger Thai enterprises, but there has been a slow up-take in Thai manufacturing SMEs. This PhD work has studied 71 Thai manufacturing SMEs in relation to Human Factors - dependent Quality Management Systems (QMSs). These were in three distinct industry groups; Food and Beverage, Automotive and Auto parts, and Textiles and Garments. In a substantial literature review, 300 references have been consulted. This review showed that management issues were critical in Thai manufacturing SME's. Quality Management in particular is largely problematical and a better understanding of the role of human factors is urgently required. Human Factors considered are derived from the seven criteria of the Thailand Quality Award (TQA) and were used as the basis of a questionnaire survey. These were:- Strategic Human Resource Planning, Human Resource Development, Employee Empowerment, Performance Management, Communication and Information Management, Leadership, and Continuous Improvement .

In analysing the results of the investigation, ten hypotheses were explored. The most important conclusions were:-

- The importance of human factors problems in Thai manufacturing SMEs is significant ($\alpha = 0.05$).
- Thai manufacturing SMEs that had implemented TQM had established Organisational Aspects, Performance Management, Leadership and QM training that are different to those that had not implemented TQM. ($\alpha = 0.05$).
- The level of TQM adoption is not significantly related to the need to upgrade organisational performance, morale, work satisfaction, and work

participation. There are significant relationships between morale and work satisfaction ($\alpha = 0.05$) and work participation and work satisfaction ($\alpha = 0.05$).

- The extent of human factors problems in Food and Beverage industries is significantly different from other industries ($\alpha = 0.10$).
- Technology-intensive Thai manufacturing SMEs have more highly developed quality management than those that are Labour-intensive ($\alpha = 0.01$) and also established better performance management systems ($\alpha = 0.05$).
- The outcomes of this research relating to the current status of TQM implementation are useful for Thai manufacturing SMEs considering their problems because their interest in the results of this study was up to 72% ($\alpha = 0.05$).
- Government assistance programmes were considered by many Thai manufacturing SMEs to be unproductive. Less than 70% of Thai manufacturing SMEs had requested help from government to solve their human factors problems ($\alpha = 0.05$). In addition, there were perceived gaps between their needs and their conscious need for government assistance ($\alpha = 0.05$). Therefore, a new approach is required to fill this gap by establishing a productive quality management system.

A SWOT analysis was used to identify Strengths and Weaknesses and examine Opportunities and Threats to Thai manufacturing SMEs.

It concluded that Thai manufacturing SMEs should consider Human Factors as a major issue in establishing an effective Quality Management System. Three models were developed in this study. The first addresses the main five problems; Quality Practices, Human Resources, Management Functions and Operational Tasks, Basic Infrastructure and Organisational Aspects, and Related Problems which influenced the successful implementation of QM. In response to these, the two other models, Government Assistance Strategies and the Development of a Quality Management System specifically addressing the Human Resource in Thai manufacturing SMEs, have been established. It is concluded that government assistance strategies are necessary to assist Thai manufacturing SMEs in five areas; (1) Communication, Information and Education, (2) Provision of Effective SME Development programmes, (3) Improvement of Work Systems, (4) Establishment of Basic Infrastructure, and (5) Development of Quality Management Systems. Finally, it is emphasised that QMS Development needs to be integrated with HR Development.

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LIST OF ABBREVIATIONS

AMT	Advanced Manufacturing Technology
APEC	Asia-Pacific Economic Cooperation
APO	Asian Productivity Organization, Tokyo
AQA	Australian Quality Award
ATSME	Association of Thai Small and Medium Enterprise
BOI	Thailand's Board of Investment
CEO	Chief Executive Officer
CI	Continuous Improvement
DIP	Department of Industrial Promotion
DIW	Department of Industrial Works
DEP	Department of Export Promotion
DOE	Design of Experiment
EQA	European Quality Award
FMEA	Failure Modes and Effects Analysis
FMS	Flexible Manufacturing System
FTA(s)	Free Trade Agreement(s)
FTI	The Federation of Thai Industries
FTPI	(Foundation) Thailand Productivity Institute
GATT	General Agreement on Tariff
GDP	Gross Domestic Product
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis Critical Control Point
HDI	Human Development Index
HF(s)	Human Factor(s)
HR(s)	Human Resource(s)
HRD	Human Resource Development
HRM	Human Resource Management
IMD	International Institute for Management Development

List of Abbreviations

ISMED	Institution for SME Development
ISO	International Organization for Standardization
IT	Information Technology
JICA	Japan International Cooperation Agency
JIT	Just-In-Time
KYT	Kiken Yochi Tore-ningu (Technique), Zero Accident Activities
MBNQA	Malcolm Baldrige National Quality Award
NFI	National Food Institute of Thailand
NSO	Thailand National Statistical Office
NSTDA	National Science and Technology Development Agency
OECD	Organisation for Economic Co-operation and Development
OTOP	One Tambol (District) One Product
PDCA	Plan-Do-Check-Act
QA	Quality Assurance
QCs	Quality Circles
QM	Quality Management
QMS(s)	Quality Management System(s)
QMS (HFs)	Quality Management System focusing on Human Factors
QS 9000	Quality System Standard (for automotive suppliers)
QSME	Quality System for Small and Medium Enterprises
R&D	Research and Development
SA	Social Accountability
SET	The Stock Exchange of Thailand
SME(s)	Small and Medium Enterprise(s)
SPC	Statistical Process Control
SQC	Statistical Quality Control
TCB	Thai Carbon Black Co., Ltd.
TDRI	Thailand Development Research Institute
TFQS	Thailand Foundation Quality Standard
TISI	Thai Industrial Standards Institute
TPA	Technology Promotion Association (Thailand-Japan)

List of Abbreviations

TPM	Total Productive Maintenance
TQA	Thailand Quality Award
TQM	Total Quality Management
UNIDO	United Nations Industrial Development Organization
U.K.	The United Kingdom
U.S.	The United States of America
WCM	World Class Manufacturing
WTO	World Trade Organisation