



**UNIVERSITI PUTRA MALAYSIA**

**IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT IN  
THE MALAYSIAN AUTOMOTIVE VENDORS**

**SALMIAH KASOLANG**

**FK 2001 28**



**IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT IN  
THE MALAYSIAN AUTOMOTIVE VENDORS**

**By**

**SALMIAH KASOLANG**

**Thesis Submitted in Fulfilment of the Requirement for the  
Degree of Master of Science in the Faculty of Engineering  
Universiti Putra Malaysia**

**February 2001**



## **DEDICATION**

To my husband – Ahmad Zamree Shaari  
To my parents – Kasolang @ Daeng Matutu and Vallam @ Daeng Matinno  
To my sons – Nasha, Irfan, Faizul, and Rabbani

With gratitude and love.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in  
fulfilment of the requirement for the degree of Master of Science

**IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT IN  
THE MALAYSIAN AUTOMOTIVE VENDORS**

By

**SALMIAH KASOLANG**

**February 2001**

**Chairman: Dr. Megat Mohammad Hamdan Megat Ahmad**

**Faculty: Engineering**

This study is on the implementation of TQM in the Malaysian Automotive Industry focusing at vendor quality management practices. It is meant to gauge how vendors are doing collectively in their quality pursuit, specifically in TQM implementation.

The research methodology involved a survey using a set of established questionnaire addressed to quality personnel and other equivalent officers. The questionnaire gauged the various aspects of quality practices. The design of the questionnaire was based mainly on the seven criteria of the Malcolm Baldrige National Quality Award. The layout of the study consists of four phases captured in PDCA Cycle: Plan, Do, Check, and Act.

The results highlight vendor performance in seven quality criteria and nine groups of quality implementation initiatives. Some of the key findings indicate that a majority of vendors isolated ISO 9000 certification from TQM implementation. Ninety three

per cent of vendors are certified with ISO 9000. Conversely, only about thirty one per cent of vendors claimed to have TQM introduced in their organization.

Based on the overall results, it could be concluded that a majority of the vendors have introduced TQM in one form or the other. However, not many of them realize it because they lack the TQM understanding. Therefore, an improvement framework is suggested to improve the TQM understanding as well as other weaknesses identified in the study. The framework will also help to strengthen some of the current quality practices among vendors. The suggested improvement framework of the TQM implementation has three major segments: (1) assessment prior to an improvement exercise, (2) major elements in TQM improvement framework, and (3) assessment after an improvement exercise. SWOT analysis and PDCA cycle are two of the main elements in the suggested improvement framework.

Abstract tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains.

**PERLAKSANAAN PENGURUSAN KUALITI MENYELURUH DI  
KALANGAN VENDOR OTOMOTIF MALAYSIA**

**Oleh**

**SALMIAH KASOLANG**

**Februari 2001**

**Pengerusi: Dr. Megat Mohammad Hamdan Megat Ahmad**

**Fakulti: Kejuruteraan**

Pengkajian ini adalah berkaitan dengan pelaksanaan TQM di dalam industri automotif di Malaysia dengan menfokuskan kepada amalan kualiti di kalangan vendor. Ia bertujuan untuk mengukur pencapaian vendor secara kolektif dalam usaha meningkatkan kualiti terutamanya di dalam pelaksanaan TQM.

Kaedah penyelidikan melibatkan satu kajiselidik menggunakan set soalan yang ditujukan kepada pegawai kualiti dan yang setaraf dengannya. Set soalan yang digunakan mencakupi berbagai aspek pelaksanaan kualiti. Rekabentuknya berdasarkan sebahagian besarnya kepada tujuh kriteria yang terdapat di dalam Malcolm Baldrige National Quality Award. Secara keseluruhannya, kerja-kerja penyelidikan adalah berdasarkan kepada empat peringkat yang boleh diwakili oleh konsep kitaran PDCA: Plan, Do, Check, and Act.

Keputusan-keputusan kajian memperjelaskan pencapaian vendor dalam tujuh kriteria dan sembilan inisiatif pelaksanaan kualiti. Sebahagian dari penemuan utama

menunjukkan majoriti vendor mengasingkan pengiktirafan ISO 9000 dari pelaksanaan TQM. Sembilan puluh tiga peratus daripada vendor-vendor telah mendapat pengiktirafan ISO 9000. Sebaliknya, hanya lebih kurang tiga puluh peratus vendor yang melaporkan telah memperkenalkan TQM didalam organisasi mereka.

Hasil pengkajian keseluruhannya menunjukkan bahawa majoriti dari vendor sebenarnya telah mula melaksanakan TQM dalam bentuk-bentuknya yang tersendiri. Masih ramai di kalangan vendor yang tidak menyedari hal ini kerana kurang memahami konsep TQM. Justru, rangkakerja peningkatan telah disarankan untuk meningkatkan pemahaman konsep TQM dan juga beberapa kelemahan yang telah dikenal-pasti. Rangkakerja ini juga dapat mengukuhkan beberapa amalan kualiti yang sedia ada di kalangan vendor. Rangkakerja yang disarankan untuk meningkatkan pelaksanaan TQM mempunyai tiga elemen utama: (1) penilaian sebelum proses pembaikan, (2) elemen-elemen utama dalam rangkakerja peningkatan TQM , dan (3) penilaian selepas process pembaikan. Analisis SWOT dan kitaran PDCA adalah antara dua elemen utama dalam saranan rangkakerja pembaikan.

## ACKNOWLEDGEMENTS

I would like to express my deepest gratitude and appreciation to my supervisor, Dr. Megat Mohammad Hamdan Megat Ahmad and other members of the supervisory committee: Prof. Madya Ir. Dr. Md. Yusof Ismail, En. Mohd Rasid Osman, and Pn. Rosnah Mohd Yusuff. Your guidance and assistance have made the completion of this thesis possible. I really appreciate all the efforts you have given to me.

My special thanks also go to Darianto, for the assistance and moral supports. The discussions we had were very useful especially on the use of SPSS. Not forgetting to all my friends who have supported me directly and indirectly. Thank you so much.

I must also thank the Mechanical Engineering Faculty of UiTM, the Mechanical and Manufacturing Department of UPM, the Graduate Study of the Engineering Faculty, and the Graduate School especially the staff at the counter for their wonderful help and patience.

To my husband, parents, sons, and housekeeper, perhaps no words could describe my gratitude for your sacrifice and patience with all the difficulties I have caused you. This work will not be the last, insya Allah. To my family, I hope you will always be there for me in my future endeavors.

May Allah repay all of you with happy lives and successful endeavors.

Salmiah Kasolang





## TABLE OF CONTENTS

	<b>Page</b>
DEDICATION .....	2
ABSTRACT .....	3
ABSTRAK .....	5
ACKNOWLEDGEMENTS .....	7
APPROVAL SHEETS .....	8
DECLARATION FORM .....	10
LIST OF TABLES .....	14
LIST OF FIGURES .....	16
GLOSSARY OF TERMS .....	17
<b>CHAPTER</b>	
<b>1. INTRODUCTION .....</b>	<b>20</b>
1.1 Quality in General .....	20
1.2 Research Need .....	21
1.3 Research Objective .....	21
1.4 Significance of the Study.....	22
<b>2. LITERATURE REVIEW .....</b>	<b>23</b>
2.1 General .....	23
2.2 The Quality Concept .....	24
2.2.1 Historical Background .....	24
2.2.2 Quality Interpretation .....	25
2.2.3 Quality and Inspections: Final Product Characteristics	26
2.2.4 Quality and Prevention: Statistical Techniques .....	27
2.2.5 Quality and Customer Satisfaction and Customer-Supplier Relation.....	28
2.3 Quality in Malaysian Context .....	30
2.3.1 Quality Effort and Support .....	30
2.3.2 Quality in Malaysian Manufacturing Industry .....	31
2.4 Total Quality Management .....	32
2.4.1 Definitions of TQM .....	32
2.4.2 Elements of TQM .....	34
2.4.3 Quality Improvement Initiatives .....	34
2.4.4 TQM Implementation .....	36
2.4.5 Models of TQM .....	37
2.5 TQM in Actual Practices: Similar studies .....	39
2.6 ISO 9000 .....	45
2.7 European Quality Award (EQA) .....	46
2.8 Malcolm Baldrige National Quality Award (MBNQA) ....	47
2.9 Description of the MBNQA Criteria.....	50
2.9.1 Leadership .....	50
2.9.2 Strategic Planning .....	53



	2.9.3	Customer focus and Satisfaction .....	55
	2.9.4	Information and Analysis .....	56
	2.9.5	Human Resource Development and Management .....	58
	2.9.6	Process Management .....	60
	2.9.7	Business Results .....	63
3.		METHODOLOGY .....	66
	3.1	Research Design .....	66
	3.2	Design of Survey Questionnaire .....	67
	3.1.1	Reasons for Using an Established Questionnaire .....	67
	3.1.2	Description of Questionnaire .....	68
	3.3	Pre-test of Questionnaire .....	68
	3.4	Survey Population .....	69
	3.5	Point of Contact .....	69
	3.6	Time Constraint .....	70
	3.7	Distribution and Collection of Questionnaire .....	71
	3.8	Research Work Layout .....	71
4.		RESULTS AND DISCUSSION.....	74
	4.1	General .....	74
	4.2	Response rate .....	75
	4.3	Organizational Characteristics .....	75
	4.3.1	Sector Analysis .....	75
	4.3.2	Ownership .....	76
	4.3.3	Year Founded .....	77
	4.3.4	Size of Company .....	77
	4.3.5	Approximate Turnover .....	78
	4.3.6	Product Exports .....	79
	4.3.7	Subsidiary/Part of Larger Organization .....	80
	4.4	Results on Seven Quality Criteria .....	81
	4.4.1	Leadership .....	81
	4.4.2	Strategic Planning .....	86
	4.4.3	Customer and market focus .....	89
	4.4.4	Information and Analysis .....	91
	4.4.5	Human Resource Development and Management ....	94
	4.4.6	Process Management .....	99
	4.4.7	Business Results .....	104
	4.5	Results on Nine Quality Initiatives .....	111
	4.5.1	ISO 9000 certification and Strategic Planning .....	111
	4.5.2	TQM Introduction .....	112
	4.5.3	Management Commitment .....	113
	4.5.4	Quality Education and Training .....	116
	4.5.5	Total Employee Involvement .....	118
	4.5.6	Feedback Management System .....	120
	4.5.7	Quantitative and Qualitative Techniques .....	123
	4.5.8	Lean Production .....	125
	4.5.9	Technological Factors .....	127



5.	IMPROVEMENT FRAMEWORK FOR VENDORS .....	129
5.1	General .....	129
5.2	Weaknesses of Vendors.....	130
5.2.1	External Help from Government Bodies .....	130
5.2.2	TQM Understanding .....	131
5.2.3	Membership to Quality Association .....	131
5.2.4	Bench Marking .....	131
5.2.5	Use of Qualitative Techniques .....	132
5.2.6	Lean Production .....	132
5.2.7	Use of Technology .....	133
5.3	Assessment Prior to An Improvement Exercise .....	133
5.4	An Improvement Framework for TQM Implementation ...	134
5.4.1	Define the company's vision and mission on quality	134
5.4.2	Choose a Suitable Management Philosophy .....	135
5.4.3	Develop a Good Understanding of TQM .....	136
5.4.4	Raise Commitment to TQM .....	137
5.4.5	Develop and Disseminate Policy on quality .....	137
5.4.6	Introduce Well Planned Training Program for TQM ..	138
5.4.7	Do SWOT Analysis .....	138
5.4.8	Apply PDCA Cycles .....	140
5.4.9	Concern for Customer Satisfaction .....	140
5.4.10	Maintain The Quality Spirit .....	141
5.4.11	Adopt Continuous Improvement .....	142
5.5	Assessment after an Improvement Exercise .....	143
6.	CONCLUSIONS AND RECOMMENDATIONS .....	144
6.1	General .....	144
6.2	Conclusion on Vendor Quality Performance .....	145
6.2.1	Vendor Performance in Seven Criteria .....	145
6.2.2	Vendor Performance in Nine Quality Improvement Initiatives .....	149
6.3	Summary of Conclusions .....	154
6.4	Recommendations .....	155
	REFERENCES .....	156
	APPENDICES .....	161
A	Survey Questionnaire and Results .....	162
B	External Adaptability and Internal Consistency .....	201
C	Measures of customer satisfaction .....	203
D	Benchmarking .....	204
E	Factors Important to People Satisfaction .....	205
F	Factors Important to People Satisfaction	
	BIODATA OF THE AUTHOR .....	206



## **LIST OF TABLES**

<b>Table</b>	<b>Page</b>
2.1: Quality Improvement Initiatives	37
2.2: Basic Strategy Elements	38
2.3: European Quality Award Criteria	49
2.4: The Baldrige 1997 Criteria	51
4.1: Percentage of Exports by Vendors	82
4.2: Vendor Performance on Leadership	84
4.3: Cross-tabulation of different quality communication methods	87
4.4: Performance of Different Types of Employee Rewards	90
4.5: Vendor Performance on Strategic Planning	91
4.6: Vendor Performance on Customer and Market Focus	94
4.7: Quality Inspection Trend	95
4.8: Vendor Performance on Information and Analysis	96
4.9: Vendor Performance on Human Resource Development and Management	99
4.10: Vendor Performance on Quality Training	100
4.11: Vendor Performance on Process Management	106
4.12: Involvement of Nine Functions in Process Improvement	108
4.13: Involvement of Nine Functions in Product Development	108
4.14: Cross Tabulation of Different Functions	111
4.15: Pearson Correlation on Different Sources of Supplier Evaluation	113
4.16: Cost of Maintaining Quality Level	115
4.17: Pearson Correlation on Various Sources of Failure Costs	116
4.18: Vendor Performance on Rejects of Incoming Goods	118



4.19: Vendor Performance on Returns of Outgoing Goods	119
5.1: Vendor Main Weaknesses	139
5.2: Activities of the Proposed Improvement Framework	143
5.3: Major Items in External Adaptability and Internal Consistency Performance on Seven Criteria	152
6.1: Summary of Vendor Performance on Seven Criteria	155
6.2: Summary of Vendor Performance on Nine Quality Improvement Initiative	159



## LIST OF FIGURES

	<b>Page</b>
<b>Figure</b>	
3.1: Research Work Layout	74
4.1: Vendor Distribution on Company Types	77
4.2: Vendor Distribution on Company Ownership	78
4.3: Percentage of Vendors and Range of Employees	79
4.4: Vendor Distribution on Training Frequency	100
4.5: Quality Topics for Manufacturing Staff	103
4.6: Quality Topics for Non-manufacturing Staff	104
4.7: Inspection Levels of Different Goods	106
4.8: Sources of Supplier Evaluations	112
4.9: Employee Suggestions per year	114
4.10: Sources of Failure Loss in Percentage of Production Costs	117

## **GLOSSARY OF TERMS**

### **BENCHMARKING:**

Benchmarking is an improvement process in which a company measures its performance against that of best-in-class companies, determines how those companies achieved their performance levels, and uses the information to improve its own performance.

### **EMPOWERMENT:**

Empowerment could mean a condition whereby employees have the authority to make decisions and take action in their work areas without prior approval.

### **CAUSE-AND-EFFECT DIAGRAM:**

A tool for analysing process dispersion. It is also referred to as the Ishikawa diagram, and the fishbone diagram. The diagram illustrates the main causes and sub-causes leading to an effect (symptom). The cause-and-effect diagram is one of the seven tools of quality.

### **COMMON CAUSES:**

Common causes of variation are those inherent in a process over time. They affect every outcome of the process and everyone working in the process.

### **COMPANY CULTURE:**

Company culture means a system of values, beliefs, and behaviours inherent in a company. To optimise business performance, top management must define and create the necessary culture.

### **COST of QUALITY (COQ):**

A term introduced by Philip Crosby to mean the cost of poor quality. In different perspective, it refers to the cost of activities, resources, and other forms of initiative to introduce, maintain, and sustain quality. Feigenbaum divided main costs relevant to quality into four main categories: prevention costs, appraisal costs, internal failure costs, and external failure costs.

### **INTEGRATED PRODUCT AND PROCESS DEVELOPMENT:**

IPPD is a management process that integrates all activities from product concept through production/field support, using a multi-functional team, to simultaneously optimize the product and its manufacturing and sustaining processes to meet cost and performance objectives. IPPD is an expansion of concurrent engineering utilizing a systematic approach to the integrated, concurrent development of a product and its associated manufacturing and sustaining processes to satisfy customer needs.

### **JUST-IN-TIME MANUFACTURING (JIT):**

An optimal material requirement planning system for a manufacturing process in which there is little or no manufacturing material inventory on hand at the manufacturing site and little or no incoming inspection.

### **MALCOLM BALDRIGE NATIONAL QUALITY AWARD (MBNQA):**

An award established by the American Congress in 1987 to raise awareness of quality management and to recognise U.S. companies that have implemented successful quality management systems.

### **ORGANIZATION:**

An organisation can be defined as a set of activities whereby humans, materials, and technology interact to achieve the organisational purpose for the existence.

### **QUALITY FUNCTION DEPLOYMENT (QFD):**

A structured method in which customer requirements are translated into appropriate technical requirements for each stage of product development and production. The QFD process is often referred to as listening to the voice of the customer.

### **QUALITY CONTROL:**

The operational techniques and activities used to fulfil requirements for quality of a product, service, or process.

### **REENGINEERING:**

There is a variety of definitions of reengineering, but they share some key characteristics: specify the customer's objectives; describe and analyse the existing processes, identifying those that add value; Reengineer (redesign) the processes to most effectively meet customers' objectives.

### **SEVEN TOOLS OF QUALITY:**

Kaoru Ishikawa develops these quality tools used for data presentation to produce a systematic and/or meaningful information. The seven tools are Pareto Diagram, Cause-and-effect diagram, Flowchart, Check sheet, Histogram, Scatter diagram, Graphs and Control charts.

### **SPECIAL CAUSES:**

Special causes of variation are those arising from special circumstances. They are not an inherent part of a process. Special causes are also referred to as assignable causes.

### **STATISTICAL PROCESS CONTROL (SPC):**

The application of statistical techniques to control a process. Often the term "statistical quality control" is used interchangeably with "statistical process control."

### **TOTAL QUALITY MANAGEMENT (TQM):**

A term initially coined by the Naval Air Systems Command to describe its Japanese-style management approach to quality improvement. It is a management philosophy to ensure competitiveness. Its goal, is customer satisfaction through continuous improvement. It requires strong commitment of top management with co-operation from all employees in every facet of business functions.



#### **TOP-MANAGEMENT COMMITMENT:**

Top management commitment refers to the participation of the highest-level officials in their organisation's quality improvement efforts. Their participation includes establishing and serving on a quality committee, establishing quality policies and goals, deploying those goals to lower levels of the organisation, providing the resources and training that the lower levels need to achieve the goals, participating in quality improvement teams, reviewing progress organisation-wide; recognising those who have performed well, and revising the current reward system to reflect the importance of achieving the quality goals.

#### **VALUE-ADDING PROCESS:**

Those activities that transform an input into a customer-usable output. The customer can be internal or external to the organisation.

#### **VARIATION:**

A change in data, a characteristic, or a function that is caused by one of four factors: special causes, common causes, tampering, or structural variation.

# CHAPTER 1

## INTRODUCTION

### 1.1 Quality in General

Despite the negative labels given to TQM due to disappointments with the results voiced by some people, it is a fact that world class organizations have implemented quality in one form or the other (Juliard, 1995). Any organization needs a system of quality initiatives to produce a quality management system. It does not matter what labels given to these quality initiatives. The fact remains the same that a quality system is necessary at least to have smooth running operations.

When market is open, competition is unavoidable. The challenge now has gone far beyond just a smooth business. The more important consideration in modern world is to become competitive in the open market and to stand tall among other business rivalries. Now that marketing strategy has changed tremendously with the introduction of new technology like computers and Internet, the competition becomes even fiercer. To be just good is not good enough. An organization has to have the competitive edge and excel in their business performance, which are the measurable results of success. Simply put, excellence is achieved through a quality management system anchored by a system of quality.

Total Quality Management (TQM) offers a journey to a total quality management system. It has gained tremendous attention worldwide since it was first introduced.

Talks, conference, seminars, researches and so on are dedicated to understanding TQM in many of its dimensions like definitions, fundamental elements, implementation methods, possible obstacles, and so forth.

## 1.2 Research Need

Considering the dynamic and complexity of business environment, there is always a need for a continuing effort in research. A continuous effort will contribute towards a more comprehensive information leading to a better understanding of the real situation. This requires a collective work due to the wide range of business horizons. Quality is one element in business horizon that has a large influence in the management and competitiveness of modern business. In Malaysian context, studies particularly on quality management practices among automotive vendors are scarce. There are not many literatures available for reference. Yet, the well being of the automotive industry is important to the Malaysian economy. Even though the large automotive companies have more influence on the automotive industry, the potential influence of the automotive vendors should not be underrated. As suppliers of the automotive parts, vendors have a direct influence on the performance of the large automotive companies as the main producers of automotive products like cars, lorries, and tractors. If the quality of the automotive parts is poor due to improper management by vendors, the final automotive products of the main automotive producers are more likely to be shoddy. This indicates that quality is important to automotive vendors and more respective studies are needed. This thesis is dedicated to describe a corresponding study into this matter. Details of the study are given in the subsequent sections.

### **1.3 Research Objective**

This research is an effort to be part of the collective work to enrich the information on quality issues in Malaysia. The objective of the research is to study into the implementation of TQM in a group of Malaysian automotive vendors as suppliers to a common car producer. At the same time, the study will reveal the current quality management practices of automotive vendors. In general, three components of performance measurement areas are targeted: human, technical, and business (Zairi, 1991).

### **1.4 Significance of the Study**

Results from this study will contribute to quality data specifically on the implementation of TQM in Malaysian automotive vendors. This quality data could be of benefits to others: consultants/experts, academicians, administrators, managers, vendors, students, etc. To consultants/experts, more data means more money; when there are many problems identified, there will be more opportunities for business. To academicians, the more data the more input for the development of syllabus at the university level. This study would provide a means to include the industrial customers in the process of designing and improving the TQM syllabus. Therefore, the TQM syllabus could be tailored and up-dated based on the current market needs. Certainly, this is an approach of TQM principle itself that is to better understand and satisfy the customers by means of continuous improvement. To administrators/managers and vendors, more data would give more information on

how to handle things at hands. To students, more data means more materials to learn from. In general, there is a need to continuously gather data because many important decisions in business require facts and numbers.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 General**

With the ever-growing attention given to quality as a business strategy since its early introduction, there exist today a wide scope of quality coverage and a voluminous information related to it. Presented in this chapter is a selective scope of this vast information. It is fundamental to quality understanding that leads to the fulfillment of the research objective. The literature review is also arranged in a structured way whereby there is a continuous flow between two consecutive subtopics. This arrangement is to build a smooth transition of information from one topic to another. The literature review begins with brief historical background of quality and ends with seven criteria for the assessment of vendor performance in TQM implementation. The other topics included are The Quality Concept, Quality in Malaysian context, Total Quality Management, TQM in Actual Practices, ISO 9000, European Quality Award, The Malcolm Baldrige National Quality Award, and Description of the MBNQA Criteria.