

**IMPLEMENTATION OF TECHNOLOGICAL CHANGES AMONG  
AUTOMOTIVE VENDORS IN SMIs**

**By**

**WONG YIT JIH**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfilment of the Requirement for the  
Degree of Master of Science**

**March 2004**

## **DEDICATION**

To my family and friends.

With gratitude and love.

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

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**December 2003**

**Chairman: Associate Professor Ir. Md. Yusof Ismail, Ph.D**

**Faculty: Engineering**

The issue on technology changes in local SMIs have not been thoroughly investigated, and yet not well understood. This research is to study the implementation of technology change in one of Malaysian Automotive Industry, Proton, focusing mainly on the performance of its group of vendors. It is meant to provide an overview on how capable this group of vendors are in adapting to changes and consequently enable them to evaluate themselves among themselves.

The research was carried out through survey based on a set of carefully designed questionnaire with references from the Cupe B.C. Consultant Firm Technological Change Questionnaire . The respondents were listed and selected according to the scope set. The research was performed in a sequential manner to obtain information as accurate as possible. Consequently, all data collected was being processed, analysed and evaluated.

Results highlighted vendor performance based on four main criteria: organizational characteristics, workplace practices, employees' involvement and employees training. Findings indicate that vendors are looking for a technology that can increase revenue and productivity. Investment made in machines and equipments are more significant than investment in people. Results also recognized managerial personnel as change champion. However, the overall results suggest that vendors understanding of this issue needs to be increased. It is hoped that this research will benefit the respondents in the form of a guidance, reference or even benchmark for the firms.

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

**PERLAKSANAAN PERUBAHAN TEKNOLOGI DI KALANGAN KUMPULAN  
VENDOR AUTOMOTIF DALAM INDUSTRI KECIL SEDERHANA**

Oleh

**WONG YIT JIH**

**Disember 2003**

**Pengerusi: Profesor Madya Ir. Md. Yusof Ismail, Ph.D**

**Fakulti: Kejuruteraan**

Isu perubahan teknologi dalam industri kecil sederhana tempatan belum pernah mendapat kajian yang teliti, dan pemahaman terhadapnya adalah tidak mencukupi. Penyelidikan ini adalah kajian berkenaan dengan pelaksanaan perubahan teknologi dalam salah satu industri otomotif Malaysia, Proton, fokus kepada pencapaian sekumpulan vendor. Ia bertujuan untuk memberikan gambaran umum tentang keupayaan kumpulan vendor ini dalam menyesuaikan diri kepada perubahan dan membolehkan mereka menilai sendiri dan antara satu sama lain.

Penyelidikan dijalankan melalui kajiselidik berdasarkan set soalan yang direka dengan teliti dengan rujukan daripada soalan kajiselidik perubahan teknologi Firma Perundingan Cupe B.C. Responden-responden disenaraikan dan dipilih berdasarkan kepada skop yang telah ditetapkan. Penyelidikan dijalankan secara berurutan untuk

mendapatkan maklumat setepat semungkin. Seterusnya, semua data yang dikumpulkan itu diproses, dianalisis dan dinilai.

Analisis meninjau pencapaian vendor berdasarkan empat kriteria utama: ciri-ciri organisasi, amalan tempat kerja, penglibatan pekerja dan latihan pekerja. Hasil kajian menunjukkan bahawa vendor mencari jenis teknologi yang dapat meningkatkan keuntungan dan produktiviti. Pelaburan yang telah dibuat dalam mesin dan peralatan adalah lebih ketara daripada pelaburan dalam pekerja. Hasil juga mengenalpasti kakitangan pentadbiran sebagai ketua perubahan. Walaubagaimanapun, hasil keseluruhan menunjukkan bahawa pemahaman vendor dalam isu ini perlu ditingkatkan lagi. Adalah diharapkan supaya penyelidikan ini akan memanfaatkan responden-responden dari segi maklumat yang berfungsi sebagai panduan, atau perbandingan untuk syarikat-syarikat.

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Lastly, I would like to thank the staff at Mechanical Engineering Department of UPM, the Graduate Study of Engineering Faculty, for their kindness, wonderful help and patience to me.

I certify that an Examination Committee met on 29<sup>th</sup> December 2003 to conduct the final examination of Wong Yit Jih on her Master of Science thesis entitled “A Study of the Implementation of Technological Changes Among the Automotive Vendors in the SMIs” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

**Shamsuddin Sulaiman, Ph.D.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Chairman)

**Md Yusof Ismail, Ph.D. P. Eng.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Member)

**Megat Mohammad Hamdan Megat Ahmad, Ph.D.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Member)

**Napsiah Ismail, Ph.D.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Member)

---

**GULAM RUSUL RAHMAT ALI, Ph.D.**

Professor/Deputy Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date:



This thesis submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee are as follows:

**Md Yusof Ismail, Ph.D. P. Eng.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Chairman)

**Megat Mohammad Hamdan Megat Ahmad, Ph.D.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Member)

**Napsiah Ismail, Ph.D.**

Associate Professor  
Faculty of Engineering  
Universiti Putra Malaysia  
(Member)

---

**AINI IDERIS, Ph.D.**

Professor/ Dean of  
School of Graduate Studies  
Universiti Putra Malaysia

Date:

## DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

---

WONG YIT JIH

Date: 03/04/2004

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## LIST OF ABBREVIATIONS

|        |   |   |
|--------|---|---|
| FDI    | - | Foreign Direct Investment                           |
| FMM    | - | Federation of Malaysian Manufacturers               |
| FMS    | - | Flexible Manufacturing System                       |
| FMEA   | - | Failure Mode and Effect Analysis                    |
| GDP    | - | Gross Domestic Product                              |
| HICOM  | - | Heavy Industry Corporation of Malaysia              |
| HRDF   | - | Human Resource Development Fund                     |
| ISO    | - | International Standard Organization                 |
| JIT    | - | Just-In-Time  |
| MASTIC | - | Malaysian Science and Technology Information Centre |
| OBM    | - | Original Brand Manufacturing                        |
| ODM    | - | Original Design Manufacturing                       |
| OEM    | - | Original Equipment Manufacturing                    |
| PSDC   | - | Penang Skill Development Centre                     |
| QFD    | - | Quality Function Deployment                         |
| R&D    | - | Research and Development                            |
| SMEs   | - | Small and Medium Enterprises                        |
| SMIs   | - | Small and Medium Industries                         |
| SPC    | - | Statistical Process Control                         |
| SWOT   | - | Strength, Weakness, Opportunity, Threat             |
| TAM    | - | Technology Audit Model                              |

|       |   |  |
|-------|---|--|
| TQM   | - | Total Quality Management                           |
| UNDP  | - | United Nations Development Program                 |
| UNIDO | - | United Nations Industrial Development Organization |
| VDP   | - | Vendor Development Programme                       |

# CHAPTER 1

## INTRODUCTION

### 1.1 Project Background

Looking back Malaysia's striking economic performance during the last decade, the nation was transformed in a single generation from a primary product exporter into an industrially oriented economy and leading global manufacturers exporter. The growth of GDP, the rise of manufacturing output and the inflows of foreign direct investment had thrust Malaysia to a new stage of development. The economy confronted transition from labour-intensive manufacturing to a structure that is based on higher-value-added, technology-intensive production. There is a great deal of evidence to show that technology and its development is an important factor in the transformation of the economy must be taken into account.

There are collection of papers embracing a variety of disciplinary approaches and levels of analysis, that capture the multiple facets and determinants of technological change, and a remarkable number of them had identified issues of technological change at the heart of their research questions. These discussions and writings, had repeatedly reflect the close interaction of technological change with the market

factors, economic, social, institutional dynamics and technology that has played and will continue to play an major role in the success of firms.

## **1.2 Problem Statement**

As economy shifts towards growth based on low labour costs, industrial technology development becomes more critical to sustain development momentum in local automotive industry. But it is interesting to know whether rapid growth in output and exports is accompanied by the development of capabilities to acquire, adapt and improve important technologies by the component manufacturing sub sector.

Technological development is widely recognized to be the foundation of sustained growth and research has shown technological change lead to broader development problems and outcomes (Felker, 1999). As a result of the failure to distinguish the appropriateness of technology at a given time, in some countries attempts at economic development has floundered, projects have flopped, programs to improve agriculture have failed (Zabidin, 1979). The issue of appropriate technology for a country is significant, especially for Malaysia that has many and varied types of industries and resources.

Technology development occurs mostly in industrial settings, and very few people get to see it. Annual surveys by the Federation of Malaysian Manufacturers (FMM)

indicate that, outside of the foreign investment sector, business awareness and interest in R&D and technology issues is generally poor.

Competition between business rivals within and outside a country has intensified in recent times. The penetration of high technology foreign direct investment, the rise of many multinational corporations in Malaysia's leading manufacturing industries, had strongly imply that local industry ought to develop and deepen their competitive capabilities.

The aim of this study is to explore the research problem and five research issues as an effort to enrich local theoretical research. Findings from this survey research will provide further insight into SMIs technology change and performance, enabling future empirical studies to be carried out to tighten the relationship between the two concepts. Through synthesis of the literature, a problem statement and five research issues were derived in this study:

- Local automotive component industry performance in technology transformation.
- Type of technology change that most likely taking place in automotive SMIs.
- Effects of organizational background to technological performance.
- Preparation of these small companies for change.
- Employees participation as part of the change mechanism.
- Effect of technology change to the organization.

### **1.3 Research Focus and Essentials**

This research is an effort to enrich the information on technology changes issue in Malaysia, which focuses mainly on small and medium level industry, in the case of vendors for one of our local automotive industry, PROTON. It is hoped that this research will offer an opportunity for other researchers to bring together the collective research results in order to fill a crucial gap in the study of Malaysia's technology transformation. The most important aspect of the studies outcome whereby, it will be able to function as a guidance for the companies on appropriate choices and implementation of technology, create awareness among local industry of the technological change issue and last but not least it will be able to provide a clear picture of the current technology development status of the local small and medium industry.

The research will mainly focus on the implementation of technological change by a group of small and medium industries that are the vendors for the automotive sector. In addition, the group of respondents were being examined based on the perspectives of products, production process or organization practices and people. The technological change survey measures the perceived need for change, understanding of the organizational strategy, how change has been communicated, whether people support the change, and how people react to change. Due to some limiting factors such as the time frame given, survey costs and the consequent need to rely almost entirely

on postal communication and the goodwill of all concerned.

#### **1.4 Research Objectives**

The main objectives of this research include:

- (a) To study the production area most affected by technological changes;
- (b) To identify the investment, development and implementation of new technologies by the automotive component manufacturer in Malaysia;
- (c) To identify the effect of technology change to the organization; and
- (d) To recognize how small companies prepare themselves for change.