UNIVERSITI PUTRA MALAYSIA

BARRIERS TO CIM IMPLEMENTATION FOR SMES IN THE KLANG VALLEY

LIM THIAM LAI.

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MASTER OF SCIENCE
UNIVERSITI PUTRA MALAYSIA

2004

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By

LIM THIAM LAI

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

March 2004

DEDICATIONS

To:

My Mother,

My Wife,

My sons.

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

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LIM THIAM LAI

March 2004

Chairman: **Associate Professor Abdel Magid Hamouda, Ph.D.**

Faculty: **Engineering**

Small and Medium Enterprises (SMEs) in Malaysia play a very important role in the country's economic development. In the year 2002, SMEs comprised 90.0% of the total manufacturing establishments in Malaysia and contributing to 33.3% of total employment in the country.

Undoubtedly, in the new millennium, the Malaysia SMEs will face new opportunities as well as challenges, particularly in view of the liberalization of trade and investment under the ASEAN Free Trade Area (AFTA), the ASEAN Investment Area (AIA), the European Union (EU) and the emerging market economies of Eastern Europe and China.

The increasing global competition, technology advances, social changes, changes in government trade and investment policies and changing consumers markets will be some of the difficulties facing the Malaysian

SMEs. Therefore, the SMEs must formulate and implement new strategies that will enable them to cope with these new challenges.

It is essential to conduct research and study on the Malaysian SMEs to provide useful information so to enhance effort to transform the manufacturing industry into a more dynamic sector with high value added, capital intensive, high technology as well as skill and knowledge intensive industries.

The purpose of this study is to investigate how the SMEs perceive automation like computer integrated manufacturing system and how the factors like management mindset; company size and level of computer literate of the workforce can influence on the decision to implement computer integrated manufacturing, CIM.

This study gathered information on the barriers of implementing CIM. The research is an empirical study on the SMEs within Klang Valley. The method of the research is the questionnaire survey method. A total of 290 questionnaires were mail to the selected SMEs companies listed in the SMI Directory 2001 and the FMM Directory 2001. Selection of SMEs was based on stratified sampling method on the basis of 25%. A total of 56 responses were collected and data was analysed using SPSS version-10.0 software.

Analysis techniques used were the test of correlation (Chi-square) and linear regression.

Result of the findings shows that the management understanding and knowledge of CIM and level of computer literate operator has a significant influence to the decision to implement CIM. But, the size of company does not have significant influence on the implementation of CIM. The findings also indicate that to improve the adaptation of CIM, SMEs needs to improve the level of computer integration. Training has been identified as the key issue before the implementation of CIM. Therefore, in order to make implementation successful in SMEs a comprehensive and effective training program is required.

Keywords: CIM, SMEs, Management Mindset, Technical strength

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

HALANGAN KEPADA PELAKSANAAN SISTEM PEMBUATAN BERINTEGRASI KOMPUTER BAGI PEKILANG-PEKILANG KECIL DAN SEDERHANA DI LEMBAH KLANG

Oleh

LIM THIAM LAI

March 2004

Pengerusi: **Profesor Madya Abdel Magid Hamouda, Ph.D.**

Fakulti: **Kejuruteraan**

Pekilang kecil dan sederhana memainkan peranan penting dalam pekembangan ekonomi negara. Pada tahun 2002, pekilang kecil dan sederhana merangkumi 90.0% daripada keseluruhan pertubuhan kilang pembuatan di Malaysia dan menyumbangkan 33.3% pekerjaan negara.

Tidak boleh dinafikan, pada abad baru ini, pekilang kecil dan sederhana akan menghadapi peluang dan juga cabaran baru, terutamanya, dari segi pengliberasasi dagangan dan pelaburan dibawah Rantau Perdagangan Bebas ASEAN (AFTA), Rantau Pelaburan ASEAN (AIA), Perpakatan Eropah (EU) dan pasaran ekonomi baru seperti Eropah timur dan China.

Peningkatan persaingan antarabangsa, peningkatan teknologi, pertukaran social, pertukaran polisi dagangan dan pelaburan kerajaan serta pertukaran pasaran pengguna akan merupakan masalah yang dihadapi oleh pekilang kecil dan

sederhana di Malaysia. Maka, pekilang kecil dan sederhana mesti membentuk dan melaksanakan strategi baru yang akan menolong mereka menghadapi cabaran baru ini.

Adalah difikirkan menjadi suatu keperluan untuk melaksanakan penyelidikan dan kajian mengenai pekilang kecil dan sederhana di Malaysia, supaya dapat memberi maklumat berguna untuk memperkukuhkan usaha untuk menukar industri pembuatan kepada satu sektor yang bernilai tambahan yang tinggi, modal yang intensif, berteknologi tinggi dan juga industri yang berdasarkan ilmu dan kemahiran yang intensif.

Tujuan penyelidikan ini adalah untuk mengkaji apakah pandangan pekilang kecil dan sederhana terhadap automasi seperti sistem pembuatan berintegrasi komputer dan bagaimana faktor-faktor seperti pemikiran pihak pengurusan; saiz syarikat dan tahap kefahaman mengenai komputer antara pekerja-pekerjanya dapat mempengaruhi keputusan untuk melaksanakan sistem pembuatan berintegrasi komputer, CIM.

Kajian ini mengumpul maklumat-maklumat mengenai halangan-halangan bagi pelaksanaan CIM. Penyelidikan ini merupakan suatu kajian empirikal bagi pekilang-pekilang kecil dan sederhana di Lembah Klang. Kaedah penyelidikan adalah secara soal selidik. Sejumlah 290 borang kajian telah dikirim kepada pekilang-pekilang kecil dan sederhana yang tersenarai dalam SMI Directory 2001 dan FMM Directory 2001. Pemilihan nama-nama pekilang ini adalah

berdasarkan kaedah pesampelan stratified dengan peratus pemilihan sebanyak 25%. Sejumlah 56 jawapan telah diterima dan dianalisa dengan perisian SPSS Ver. 10. Teknik analisa adalah ujian korelasi, iaitu chi-square dan regrasi linear.

Keputusan kajian ini menunjukkan bahawa pengetahuan dan kefahaman pihak pengurusan mengenai CIM dan tahap kefahaman pekerja mengenai komputer mempunyai pengaruh yang nyata terhadap keputusan untuk melaksanakan CIM. Tetapi, saiz syarikat tidak menunjukkan kaitan yang nyata terhadap pelaksanaan CIM. Keputusan kajian juga menunjukkan bahawa untuk meningkatkan pelaksanaan CIM, pekilang-pekilang perlu meningkatkan integrasi komputer di dalam kilang mereka. Latihan merupakan faktor utama sebelum pelaksanaan CIM. Maka, untuk memastikan kejayaan pelaksanaan CIM, suatu program latihan yang menyeluruh dan berkesan adalah suatu keperluan.

Perkataan Utama: CIM, pekilang-pekilang kecil dan sederhana, pemikiran pihak pengurusan, kefahaman komputer

ACKNOWLEDGEMENTS

I wish to thank God for giving me health and strength to complete this research, which I hope will contribute to the welfare of mankind.

I wish to record and express all my sincere thanks to my supervisor, Associate Professor Dr. Abdel Magid Hamouda. This thesis would not be completed without the support, encouragement and comments from him. I would also like to extend my thanks and appreciation to the member of my supervisory committee, Associate Professor Dr. Megat Mohamad Hamdan Megat Ahmad and Associate Professor Dr. Napsiah Ismail.

I also wish to thank all librarians in SMIDEC, MITI MIDA and UPM library for giving me lots of helps in finding necessary information.

Finally, I would like to thank my mother, wife, brothers and sisters who have given me lots of support and motivation towards my study.

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LIST OF ABBREVIATIONS

AHS:	Automated handling system
AMT:	Advanced manufacturing technology
ASRS:	Automated storage and retriever system
CAD:	Computer-aided design
CAM:	Computer-aided manufacturing
CAP:	Computer-aided planning
CAPM:	Computer-aided production management
CAPP:	Computer-aided process planning
CAQ:	Computer-aided Quality Assurance
CAT:	Computer-aided technology
CIM:	Computer integrated manufacturing
CNC:	Computer numerical control
ERP:	Enterprise resources planning
FMS:	Flexible manufacturing system

GT:	Group technology
IRM:	Integrated resource management
ISA:	Integrated system architecture
IT:	Information technology
MNC:	Multi national company
MRP:	Material requirement planning
MRP II:	Manufacturing resources planning
OMT:	Object oriented technology
OS:	Operating system
PPS:	Production planning systems
QC:	Quality circle
ROI:	Return of investment
SADT:	Structural analysis and design technique
SCM:	Supply chain management

SME:	Small and medium enterprises
WIP:	Work in progress
VM:	Virtual manufacturing

LIST OF GOVERNMENT AGENCIES

1.	FMM	Federation of Malaysian Manufacturers
2.	MATRADE	Malaysia External Trade Development Corporation
3.	MIDA	Malaysian Industrial Development Authority
4.	MIDF	Malaysia Industrial Development Finance Berhad
5.	MITI	Ministry of International Trade and Industry
6.	MTDC	Malaysian Technology Development Corporation
7.	NPC	National Productivity Corporation
8.	SMIDEC	Small and Medium Industries Development Corporation

CHAPTER 1

INTRODUCTION

1.1 Introduction

Malaysia has transformed herself from an agriculture based economy to an economy that is based on industrialization. For more than two decades, the Malaysian economy has experienced tremendous growth due to industrialization. Today, Malaysian manufacturing industries are facing increasing competition from other emerging industrialized countries, like Thailand, China and Eastern Europe (Hashim, M.K. and Wafa, S.A., 2002). Furthermore, introduction of trade liberalization like ASEAN Free Trade Area (AFTA), ASEAN Investment Area (AIA) would mean that Malaysian industries have to be better prepared to face greater challenges ahead. In the global market, the characteristics of order-qualifiers for manufacturing industries is the capability of producing high quality products with shorter delivery lead time and the ability to produce according to the diverse requirements of the customers (Nagalingam, S.V. and Lin, G.C.I., 1999). Hence, in order to overcome the above issues, it is necessary for Malaysian industries to adopt advanced manufacturing technology (AMT) and computer integrated manufacturing (CIM).

The concept of CIM was coined by Dr. Joseph Harrington in 1973 in the book called "Computer Integrated Manufacturing" (Harrington, J., 1973). CIM only became commonly known from early 1980. The proposal of CIM in the early 1970s might have appeared to be over futuristic. Today, with the tremendous developments in computer, electronics and mechanical technologies, CIM became a reality that can be achieved without much difficulty.

Small and Medium Enterprise (SMEs) as compared to large firms, produce much smaller quantity of products in batches. In order to compete with the larger firms, they must always look for niche market by customized their products according to the changing needs of their customers. Therefore, by adopting CIM, it will certainly help to enhance flexibility to meet the above goal. In the wave of globalization, CIM was named as the factor that, not only determine the development but also the survival of many companies (Luong, L.H.S., 1998). The benefits of CIM are well documented. Some of these benefits include, shorter lead time, gain in productivity, reduce in work-in-progress, lower cost and improve competitiveness (Quantz, P.A., et al., 1984; Babbar, S. and Rai, A., 1990 and Bedworth, D.D., et al., 1991). Clive Vassell urge the SMEs to adopt CIM (Vassell, C., 1999).

1.2 SMEs in Malaysia

Small and Medium Industries is defined as the company that is incorporated under the Companies Act 1965, having less than 150 full time employees and with an annual sales turnover that is less than RM25 million. A small-scale enterprise referred to a company with an annual sales turnover of less than RM 10 million and not more than 50 full-time employees and a medium-scale enterprise was referred to a company with an annual sales turnover between RM10 million to RM25 million and has between 51 to 150 full-time employees (SMIDEC, 2001).

In many developed countries, the small and medium industries contributed substantially to the economic development of the countries as well as providing job opportunities to the job market. SMEs in Japan comprised 99.7 per cent, Taiwan 98.1 per cent and Germany 99.0 per cent of total manufacturing establishments. In Malaysia, based on the media statement by Y.B. Dato' Seri Rafidah Aziz, Minister of International Trade and Industry of Malaysia on 22 August 2002, SMEs comprised 90.0 per cent of the total manufacturing establishments in Malaysia and contributing to 33.3 percent of total employment of the country.

Malaysia has set its vision of becoming a fully industrialized nation by the year 2020. This has initiated the government to emphasize on the effort to