



**Strategic technology management and the performance of firms in the electrical
and electronics manufacturing industry of Malaysia (1986-1995) – An exploratory
study**

by

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**This thesis is presented for the degree of
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CERTIFICATE

I certify that the substance of this thesis has not already been submitted for any other degree and is not currently being submitted for any other degree. I also certify, to the best of my knowledge, any help received in preparing this thesis and all sources have been acknowledged in this thesis. I further certify that, except where has been acknowledged, the work and ideas presented in this thesis are the researcher's own.

Signed: (Arif Sikander)

Dated:

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ABSTRACT

Malaysia has experienced robust economic growth since 1986. The manufacturing sector has been the main driving force behind this sustained and impressive performance. One success story is that of the electronics and electrical industry in Malaysia between 1986 and 1995, and this thesis is an exploration of the firms involved in the gains that were achieved in the sector during that period. This period is also significant because an Industry Master Plan had been introduced by the Malaysian Government to promote growth and structural change in the manufacturing sector. Using the proposed model, this research explored the relationship between Technology Strategy (TS) and Technology Management (TM) and firm performance, the influence of the type and size of firm and the other background variables on the acquisition of successful factors.

Strategic technology management (STM) approach, which places technology in a strategic context, emerged in the late eighties in response to failure of more traditional techniques for exploiting technology. STM in this study included aspects of both technology strategy (content) and technology management (process). Many studies in strategic management research have investigated the relationship between technology strategy, technology management and firm performance, but largely from a western viewpoint. This study addresses this gap in the literature and focuses on a newly developing country outside the western block namely, Malaysia.

A survey instrument, developed from Strategic Technology Management (STM) literature, was dispatched to the Chief Executive Officers and senior management in 101 high-tech E&E firms. Statistical tools were used to perform Factor and Regression analysis on the variables representing various dimensions. The results were analysed in such a way as to

identify TS and TM factors associated with success within this industry at that time. The results demonstrated that the factors of *key positioning* and *strategic R&D* were linked to performance, while the factors of *technology leadership*, *up-to-date plants and facilities*, *technology consciousness*, *formal planning* and *external technology acquisition* were not. The firms that were more likely to acquire the former factors were those that formed part of a multinational corporation and those involved in joint ventures. Foreign and locally-owned companies were less likely to acquire the factors associated with success within this industry at that time. This has profound implications both for practice within firms and for attempts to facilitate economic success by those in government.

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LIST OF ACRONYMS

AFTA	ASEAN Free Trade Association
ANOVA	Analysis of Variance
ASEAN	Association of Southeast Asian Countries
CEO	Chief Executive Officer
CEPT	Common Effective Preferential Tariff
CI	Condition Index
CM	Contract Manufacturing
E&E	Electrical and Electronics
EC	European Countries
EOR	Export Oriented
FA	Factor analysis
FDI	Foreign Direct Investment
FMM	Federation of Malaysian Manufacturers
FO	Foreign-owned
FTZ	Free Trade Zone
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
IIP	Index of Industrial Production
IMP	Industrial Master Plan
ISUB	Import Substitution
IT	Information Technology
JV	Joint Venture
KMO	Kaiser-Meyer-Olkin Test
LMW	Licensed Manufacturing Warehouse
LO	Locally-owned
LSI	Large Scale Industries
MANOVA	Multivariate Analysis of Variance
MIDA	Malaysian Industrial Development Authority
MITI	Ministry of International Trade and Industries
MNC	Multinational corporation
MPT	Manufacturing and Process Technology
MSI	Medium Scale Industries

NIC	Newly Industrialised Countries
NIE	Newly Industrialised Economies
NRBI	Non-Resource Based Industries
ODM	Original Design Manufacturer
OEM	Original Equipment Manufacturer
OPP	Outline Perspective Plan
PCA	Principal component analysis
PDI	Product Development Intensity
PP	Proportion Proportion Plot
PSDC	Penang Skills Development Centre
R&D	Research and Development
RBI	Resource Based Industries
RDINV	R&D Investment
RDOM	R&D Organisation and Management
RM	Ringgit Malaysian
ROI	Return on Investment
SME	Small and Medium Enterprises
SPSS	Statistical Program for Social Sciences
SRG	Sales Revenue Growth
SSI	Small Scale Industries
STM	Strategic Technology Management
TACQ	Technology Acquisition
TAW	Technology Awareness
TL	Technology Level
TM	Technology Management
TMF	Technology Management Factor
TP	Technology Policy
TPOS	Technology Posture
TPP	Technology and Product Planning
TS	Technology Strategy
TSF	Technology Strategy Factor
TT	Technology Timing
US	United States

VIF

Variance Inflation Factor

WTEC

World Technology Evaluation Center