



**Faculty of Technology Management and Technopreneurship**

**FACTORS INFLUENCING IMPLEMENTATION OF ADVANCED  
MANUFACTURING TECHNOLOGY IN MALAYSIAN AND  
INDONESIAN SMALL AND MEDIUM ENTERPRISES**

اونيورسيتي تيكنيكل مليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**Jani Rahardjo**

**Doctor of Philosophy**

**2015**

**FACTORS INFLUENCING IMPLEMENTATION OF ADVANCED  
MANUFACTURING TECHNOLOGY IN MALAYSIAN AND INDONESIAN  
SMALL AND MEDIUM ENTERPRISES**

**JANI RAHARDJO**

**A thesis submitted  
in fulfillment of the requirements for the degree of Doctor of Philosophy**



اونيورسيتي تيكنيكل مليسيا ملاك

**Faculty of Technology Management and Technopreneurship**

**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**2015**

## DECLARATION

I declare that this thesis entitled “Factors Influencing Implementation of Advanced Manufacturing Technology in Malaysian and Indonesian Small Medium Enterprises” is the result of my own research except as cited in the references. This thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



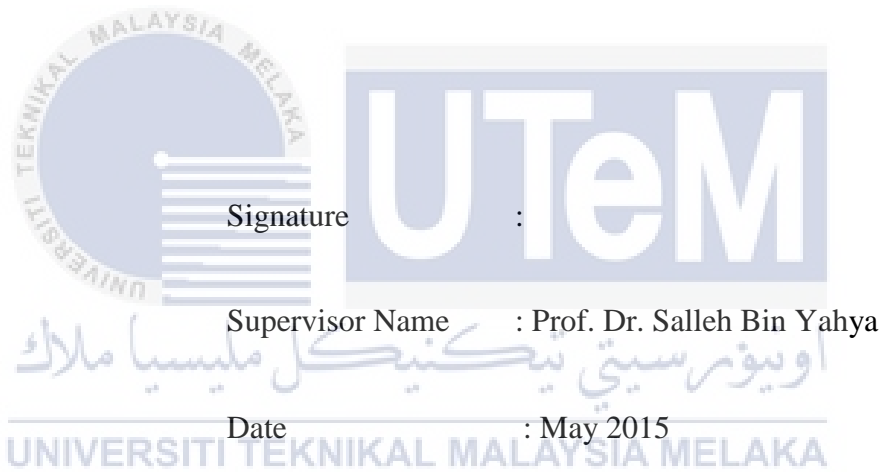
Signature : اونیورسیتی تکنیکل ملیسیا ملاک

Name : Jani Rahardjo  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Date : May 2015

## APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Doctor of Philosophy



## DEDICATION

I would like to dedicate this dissertation to my family and my parents in peace. There is no doubt that without their continual support and counsel I would not have completed this piece of work.



## ABSTRACT

Small and Medium Enterprises (SME) play a vital role in boosting a country's economic development. While a huge number of SME have been founded, the total contribution to the Gross Domestic Product (GDP) is considered to be small compared to the contribution of large companies. In this sense, one way to boost competitiveness is through implementing Advanced Manufacturing Technology (AMT); whereas large companies have no issue in implementing it, it is not the case for SME. This study then examined the prospect of implementing AMT in Malaysian and Indonesian SME. Structural Equation Modeling was arranged for analyzing variables covering Critical Success Factors (CSF), Obstacles, Organizational Characteristics, Strategic Alliances and Monitoring in every stage of the implementation. An approximately 535 samples of data used in this study were SME in food, herbs, and craft industry in Malaysia and Indonesia. Smart Path Least Square (PLS) was used to analyze the model. In conclusion, it was found that the AMT implementation had a significant impact on the performance of Malaysian SME but it did not have any significant impact on the performance of Indonesian SME. This might be due to the fact that AMT implementation in Indonesian SME was generally low. Also, Indonesian SME used hard AMT more than soft AMT. The hard AMT was used as the substitution for labor functions such that AMT has not been optimized the support from soft AMT. Next, the factors that gave significant impacts on the AMT implementation were Strategic Alliances, Monitoring, and Critical Success Factors while the others, namely Obstacles and Organizational Characteristics, gave no significant impact on the AMT implementation. For the Malaysian SME, good leadership was the critical success factor for the AMT implementation, while for Indonesian SME it was organizational culture. Several Strategic alliances significantly affected the success of AMT implementation; they were strategy alliances with vendors, universities and government for Malaysian SME, and strategic alliances with vendors, customers, and government for the Indonesian SME. Monitoring also gave a significant impact on the success of AMT implementation, especially monitoring in humanware for AMT implementation in Malaysian SME and monitoring in technoware for AMT implementation in Indonesian SME. The strategic alliances had a particularly different level and priority in every stage of the AMT implementation. At the early stage of AMT implementation, Malaysian SME needed to make an alliance with university, while the Indonesian SME needed to make an alliance with vendor. At the installation phase, Malaysian and Indonesian SME needed to collaborate with vendors and the government. Furthermore, at the growth stage, Malaysian SME needed to make an alliance with the university, while the Indonesian SME needed to make an alliance with the government. Monitoring of the AMT implementation in every stage was different for both Malaysian and Indonesian SME. For Malaysian SME, monitoring at the pre-installation and installation stage was mainly important on orgaware and humanware, while monitoring at the growth stage was on orgaware. For Indonesian SME, monitoring every stage was relatively at the same level, which was mainly on technoware. This research then gave Malaysian and Indonesian SME new insights into the implementation of AMT. In short, to be successful in

implementing AMT as an attempt to boost SME's performance, SME should take into account the strategic alliances and monitoring factors.



## ABSTRAK

Industri Kecil dan Sederhana (IKS) memainkan peranan penting dalam menjaga pembangunan ekonomi sesebuah negara. Walaupun sebahagian besar IKS telah ditubuhkan, namun begitu jumlah sumbangannya kepada Keluaran Dalam Negara Kasar (KDNK) masih dianggap kecil jika dibandingkan dengan syarikat- syarikat besar. Oleh yang demikian, salah satu cara untuk meningkatkan daya saing IKS adalah melalui dengan melaksanakan Teknologi Pembuatan Termaju (AMT). Kajian ini seterusnya menilai prospek dalam melaksanakan AMT bagi IKS di Malaysia dan Indonesia. Kaedahnya ialah menggunakan Permodalan Persamaan Struktural (SEM) untuk menganalisa pembolehubah-pembolehubah yang merangkumi Faktor Kejayaan Kritikal (CSF), hambatan, ciri- ciri organisasi, pakatan strategik dan pemantauan di setiap peringkat pelaksanaan dengan menggunakan analisisa model jalur majmuk terkurang (PLS). Kira-kira 535 sampel data digunakan dalam kajian ini melibatkan IKS dalam sektor makanan, herba dan kraftangan di Malaysia dan Indonesia. Kesimpulannya ialah didapati melalui pelaksanaan AMT ini, ia telah memberi kesan yang ketara terhadap prestasi IKS di Malaysia, tetapi tidak di IKS Indonesia. Secara faktanya, ini mungkin disebabkan oleh pelaksanaan AMT di IKS Indonesia adalah rendah berbanding di Malaysia. Selain itu, IKS Indonesia juga lebih kepada pendekatan AMT keras daripada lembut. Secara terperinci adalah pelaksanaan AMT tidak dioptimumkan daripada sokongan AMT lembut tetapi hanyalah kepada AMT keras contohnya, penggantian fungsi buruh. Seterusnya, didapati juga bahawa faktor-faktor yang memberi kesan yang ketara ke atas pelaksanaan AMT ini adalah seperti kerjasama yang strategik, pemantauan dan faktor kejayaan kritikal manakala hambatan dan ciri- ciri organisasi tidak memberi sebarang kesan - ke atas pelaksanaan ini. Kepimpinan yang baik adalah faktor kejayaan kritikal bagi pelaksanaan AMT di IKS Malaysia manakala budaya organisasi adalah penyumbang bagi IKS Indonesia. Selain itu, beberapa bentuk kerjasama strategik telah memberi kesan yang ketara kepada kejayaan pelaksanaan AMT. Contohnya di Malaysia adalah melalui kerjasama strategik dengan pembekal, universiti dan kerajaan manakala di Indonesia ianya adalah melalui kerjasama strategik dengan pembekal, pelanggan dan kerajaan. Faktor pemantauan juga memberi kesan yang ketara kepada kejayaan pelaksanaan AMT, terutamanya ke atas '*humanware*' di UKM Malaysia dan '*technoware*' di UKM Indonesia. Secara dasarnya, didapati bahawa kerjasama strategik memiliki tahap yang sangat berbeza dan keutamaan di setiap peringkat pelaksanaan AMT. Di awal pelaksanaan AMT, IKS di Malaysia memerlukan kerjasama dengan universiti, sedangkan IKS di Indonesia memerlukan kerjasama dengan pembekal. Pada fasa pemasangan, IKS di Malaysia dan Indonesia memerlukan kerjasama dengan pembekal dan kerajaan manakala di peringkat pertumbuhan, IKS di Malaysia memerlukan kerjasama dengan universiti, sedangkan di Indonesia bekerjasama dengan kerajaan. Lanjutan itu, didapati bahawa pemantauan pelaksanaan AMT di setiap peringkat adalah berbeza untuk kedua- dua IKS, samada di Malaysia mahupun di Indonesia. Bagi IKS di Malaysia, pemantauan di peringkat pra-pemasangan dan pemasangan terutamanya pada '*orgaware*' dan '*humanware*', manakala di Indonesia melibatkan pertumbuhan '*orgaware*' sahaja. Bagi

UKM Indonesia, pemantauan di setiap peringkat lebih kurang sama, melibatkan '*technoware*'. Hasil kajian ini telah memberikan senario baru dalam pelaksanaan IKS di Malaysia dan Indonesia, selain dapat merumuskan bahawa kerjasama strategik dan faktor-faktor pemantauan adalah penentu kejayaan kepada pelaksanaan AMT di IKS.



## ACKNOWLEDGEMENT

While writing this dissertation, I was fortunate enough to have a supervisor whose support and involvement took many forms.

Prof Dr. Salleh Yahya, my supervisor from the beginning of my doctoral program, has been unfailingly supportive. He has provided me with insight and motivation necessary for the completion of this dissertation. He has also made major stylistic and editorial contribution to this dissertation for which I am grateful. I was lucky to have the opportunity to work closely with him.

Dr. Budi has been supportive on my effort to take the doctoral program. His generous involvement has encouraged me to take doctoral program in Malaysia. I thank him for his friendship throughout the years.

Gratitude and thanks to my colleagues Dr. Izmi Rajiani, Dr. Nyoman Sutapa, Dr. Gede. A, Dr. Siana Halim and Togar Panjaitan, M.Sc, Dra. Indriati Bisono, M.Sc, Prof. Anita Lie. Their friendship and support have helped me through this long and seemingly never-ending process.

Finally, I am most deeply indebted to my wife, my sons and my mother and my parents in law for their unlimited patience, love and strong support in those periods when they were most needed

## TABLE OF CONTENT

	<b>PAGE</b>
<b>DECLARATION</b>	
<b>APPROVAL</b>	
<b>DEDICATION</b>	
<b>ABSTRACT</b>	<b>i</b>
<b>ABSTRAK</b>	<b>iii</b>
<b>ACKNOWLEDGEMENT</b>	<b>v</b>
<b>TABLE OF CONTENT</b>	<b>vi</b>
<b>LIST OF ABBREVIATION</b>	<b>x</b>
<b>LIST OF TABLES</b>	<b>xii</b>
<b>LIST OF FIGURE</b>	<b>xviii</b>
<b>CHAPTER</b>	
<b>1. INTRODUCTION</b>	<b>1</b>
1.1 Background	1
1.2 Problem Statement	10
1.3 Research Questions	11
1.4 Research Objective	12
1.5 Contribution of The Research	13
1.6 Key Concept	13
1.6.1 Definition of AMT	13
1.6.2 Influencing Factors	14
1.6.3 Definition of Malaysian And Indonesian SME	14
1.7 Layout of The Thesis	14
<b>2. LITERATURE REVIEW</b>	<b>16</b>
2.1 Advanced Manufacturing Technology (AMT)	16
2.2 AMT Implementation Process	19
2.2.1 Organizational Characteristic	24
2.2.2 Critical Success Factors	26
2.2.3 Obstacles	27
2.2.4 Strategic Alliance	28
2.2.5 Monitoring	31
2.3 Performance	33
2.4 Previous Research in AMT	34
2.5 Resource Based View (RBV)	36
2.6 Small Medium Enterprises (SME)	41
<b>3. THEORETICAL FRAMEWORK AND HYPHOTHESES</b>	<b>52</b>
3.1 Theoretical Framework	52
3.2 Relationship among Variables and Hyphoteses	55
3.2.1 Impact of AMT Implementation to Performance	55
3.2.2 Relationship Between Organizational Characteristics and AMT Implementation	57
3.2.3 Relationship Between Critical Success Factors And AMT Implementation	58
3.2.4 Relationship Between Obstacles And AMT Implementation	59

3.2.5	Effect Of Strategic Alliances To The AMT Implementation	59
3.2.6	Effect Of Monitoring To The Success Of AMT Implementation	60
3.2.7	The Differences Of Strategic Alliances In Every Stage Of AMT Implementation	61
3.2.8	The Differences Of Monitoring In Every Stage Of AMT Implementation	61
3.3	Definition Of Operational Variables	62
3.3.1	Definition Of Operational AMT Implementation (X1)	62
3.3.2	Operational Definition Of Performance (X2)	62
3.3.3	Operational Definition Of Organizational Characteristics (X3)	62
3.3.4	Operational Definition Of Critical Success Factors (X4)	63
3.3.5	Operational Definition Of Obstacles (X5)	63
3.3.6	Operational Definition Of Alliances (X6)	63
3.3.7	Operational Definition Of Monitoring (X7)	63
3.4	Measurement Of Variables	63
3.4.1	Measurement Of AMT Implementation	64
3.4.2	Measurement Of Performance	64
3.4.3	Measurement Of Organizational Characteristics	66
3.4.4	Measurement Of Critical Success Factors	66
3.4.5	Measurement Of Obstacles	67
3.4.6	Measurement Of Alliances	67
3.4.7	Measurement Of Monitoring	68
3.5	Chapter Summary	68
<b>4.</b>	<b>RESEARCH METHODOLOGY</b>	<b>70</b>
4.1	Research Design	70
4.1.1	Purpose Of The Study	70
4.1.2	Type Of Research	71
4.1.3	Research Area And Time Horizon	71
4.1.4	Unit Of Analysis	71
4.1.5	Sampling Design	72
4.1.6	Data Collection Methods	75
4.2	Data Analysis Methods	77
4.2.1	Validity And Reliability Test	77
4.2.2	Descriptive Analysis	78
4.2.3	Hypothesis Testing	78
4.2.4	Factor Analysis	80
4.2.5	Structural Equation Modeling (SEM)	82
4.3	Chapter Summary	89
<b>5.</b>	<b>MALAYSIAN SME IN THE FOOD, HERBS AND CRAFT INDUSTRY DATA ANALYSIS</b>	<b>91</b>
5.1	Reliability And Validity Test	91
5.2	Respondents Profile	91
5.3	AMT Implementation	93
5.3.1	AMT Technique	93
5.3.2	Impact Of AMT On Sales Turnover Growth, Profitability And Organization Performance	100

5.3.3	AMT Implementation	107
5.4.	Structural Equation Modeling (SEM) For AMT Implementation	125
5.5	Hypothesis Testing	147
5.5.1	Impact Of AMT Implementation To Performance	147
5.5.2	Relationship Between Organization And AMT Implementation	149
5.5.3	Relationship Between Critical Success Factor And AMT Implementation	150
5.5.4	Relationship Between Obstacles And AMT Implementation	152
5.5.5	Effect Of Strategic Alliances To The AMT Implementation.	154
5.5.6	Effect Of Monitoring To The Success Of AMT Implementation	155
5.5.7	The Differences Of Strategic Alliances In Every Stage Of AMT Implementation.	157
5.5.8	The Different Monitoring In Every Stage Of AMT Implementation	158
5.6	Chapter Summary	159
<b>6.</b>	<b>INDONESIAN SME IN THE FOOD, HERBS AND CRAFT INDUSTRY DATA ANALYSIS</b>	<b>164</b>
6.1	Reliability And Validity Test	164
6.2	Respondent Profile	164
6.3	AMT Application	167
6.3.1	AMT Technique	167
6.3.2	Impact Of AMT On Sales Turnover Growth, Profitability And Organizational Performance	173
6.3.3	AMT Implementation	180
6.4	Structural Equation Modeling (Sem) For AMT Implementation	195
6.5	Hypothesis Testing	218
6.5.1	Impact Of AMT Implementation To The Performance	218
6.5.2	Relationship Between Organization And AMT Implementation	220
6.5.3	Relationship Between Critical Success Factor And AMT Implementation	221
6.5.4	Relationship Between Obstacles And AMT Implementation	222
6.5.5.	Effect Of Strategic Alliances To The AMT Implementation	222
6.5.6	Effect Of Monitoring On The Success Of AMT Implementation	224
6.5.7	Different Strategy Alliances In Every Stage Of AMT Implementation	225
6.5.8	Different Monitoring Level In Every Stage Of AMT Implementation	226
6.6	Chapter Summary	227
<b>7.</b>	<b>COMPARISON AND DISCUSSION</b>	<b>230</b>
7.1	AMT Implementation Model In Malaysian And Indonesian SME	230

7.1.1	Effect Analysis Of AMT Implementation To Performance	232
7.1.2	Effect Analysis Of Organizational Characteristics To AMT Implementation	238
7.1.3	Effect Analysis Of Critical Success Factors (CSF) To AMT Implementation	240
7.1.4	Effect Analysis Of Obstacles In AMT Implementation	241
7.1.5	Effect Analysis Of Strategic Alliances To AMT Implementation	242
7.1.6	Effect Analysis Of Monitoring To AMT Implementation	244
7.1.7	Differences Analysis Of Strategic Alliances In Every Stage Of AMT Implementation	245
7.1.8	Differences Analysis Of Monitoring In Every Stage Of AMT Implementation	246
7.2	Discussion	247
7.3	Chapter Summary	250
<b>8.</b>	<b>SUMMARY AND CONCLUSION</b>	<b>251</b>
8.1	Summary	251
8.2	Conclusion	252
8.3	Implication For Small Medium Enterprises	254
8.4	Contribution To The Body Of Knowledge	256
8.5	Limitation And Direction For Future Research	256
<b>REFERENCES</b>		<b>258</b>
<b>APPENDICES</b>		<b>273</b>



اونيورسيتي تيكنيكل مليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## LIST OF ABBREVIATION

ABC	: Activity Based Costing
AMT	: Advanced Manufacturing Technology
ANOVA	: Analysis of Variance
AVE	: Average Variance Extracted
BC	: Bar Coding
BSR	: Buyer-Supplier Relationship
CAD	: Computer Aided Design
CAE	: Computer Aided Engineering
CAM	: Computer Aided Manufacturing
CAPP	: Computer Aided Process Planning
CB-SEM	: Covariant Based Structural Equation Modelling
CFA	: Confirmatory Factor Analysis
CIM	: Computer Integrated Manufacturing
CNC	: Computer Numerical Control
CRM	: Customer Relation Management
CSF	: Critical Success Factors
EDI	: Electronic Data Interchange
ERP	: Enterprise Resource Planning
FMS	: Flexible Manufacturing System
GDP	: Gross Domestic Product
HACCP	: Hazards Analysis Critical Control Point
HVAC	: Heating Ventilation and Air Conditioning
IMP	: Industrial Master Plan
ISO	: International Organization for Standardization

JIT	: Just In Time
LAN	: Local Area Network
LE	: Large Enterprise
ME	: Medium Enterprise
MIES	: Micro Enterprises
MIS	: Management Information System
MITI	: Ministry of International Trade and Industry
MP	: Malaysia Plan
MRP	: Material Requirement Planning
NC	: Numerical Control
NEM	: New Economic Model
NIES	: New Industrial Countries
OSHAS	: Occupational Safety and Health Administration System
PCA	: Principal Component Analysis
PLS-SEM	: Partial Least Square Structural Equation Modelling
OEE	: Overall Efficiency Equipment
QC	: Quality Control
QFD	: Quality Function Deployment
RFID	: Radio Frequency Identification
R&D	: Research and Development
SCM	: Supply Chain Management
SE	: Small Enterprise
SEM	: Structural Equation Modeling
SME	: Small Medium Enterprises
SMIDEC	: Small and Medium Industries Development Corporation
SPC	: Statistical Process Control
SQR	: Square Root
TLC	: Technology Life Cycle
TQM	: Total Quality Management

## LIST OF TABLES

TABLE	TITLE	PAGE
2.1	Benefit, Sub-benefit, and Best Indicator	34
2.2	SME Definitions in Terms of Annual Sales Turnover	42
2.3	SME Definitions in Terms of Full-Time Employees	42
2.4	SME Definition according to Ministry of Cooperative and SME and Bank of Indonesia	43
2.5	Behaviors Perceived Associated with SME Failure	48
2.6	Success criteria among SME in Australia and Malaysia	50
3.1	Summaries of AMT implementation and its impact.	57
3.2	Classification of AMT Implementation on Input	64
3.3	Classification of AMT implementation on Transformation	65
3.4	Classification of AMT implementation on Output	65
3.5	Classification of AMT implementation on Environment	65
4. 1	List of Participants and Sample Size in Malaysian Expos and Exhibitions	74
4.2	List of Participant and Sample Size in Indonesian Expos and Exhibitions	74
4.3	Statistical Test for Hypothesis Testing	81
4.4	Comparison between PLS-SEM and CB-SEM	84
5.1	Profile of the Respondents based on the Sales Turnover	92
5.2	Profitability Rate	92

5.3	Use of AMT	93
5.4	Percentages of the overall reason	94
5.5	Percentage of High Usage of AMT Technique	99
5.6	Percentage of high usage of Hard and Soft Technology	99
5.7	Relationship Between the use of AMT and Org Sales Turnover	100
5.8	Chi-Square Tests for Org. Sales turnover with Use of AMT	101
5.9	Relationship Between the use of AMT and Profitability Rate	102
5.10	Chi-Square Tests for profitability with Use of AMT	102
5.11	Relationship Between the use of AMT with the Organizational Performance	103
5.12	Wilcoxon Signed Rank Test	104
5.13	Regression Analysis Impact of Soft & Hard Technology on Sales turnover growth	105
5.14	AMT impact on Sales turnover growth, Profitability and Organizational Performance	106
5.15	Participation and contribution of partnerships	108
5.16	The percentage of partnership motivation	109
5.17	The percentage of partnerships participation on each AMT implementation stage	110
5.18	Impact of Strategic Partnerships on Company Performance	112
5.19	Descriptive Statistics for Monitoring	113
5.20	Descriptive Statistics for Technoware Monitoring	113
5.21	Descriptive Statistics for Humanware Monitoring	114
5.22	Descriptive Statistics for Inforware Monitoring	115
5.23	Descriptive Statistics for Orgaware Monitoring	116

5.24	Average importance level of Monitoring of AMT implementation on each stage	116
5.25	Priority order of Monitoring AMT Implementation on each stage	117
5.26	Testing of priority order between two stages of AMT implementation process	118
5.27	Value of Significance on the impact of Monitoring on Company Performance	119
5.28	Descriptive Statistics for Critical Success Factors	121
5.29	Five Rank Critical Success Factors at every stage	121
5.30	Descriptive of Obstacles	123
5.31	Descriptive of Obstacles on Financial	123
5.32	Descriptive of Obstacles on Human Resources	124
5.33	Description of Obstacles in Organization	124
5.34	Descriptive of Obstacles on External Support	125
5.35	Reliability and Validity Test for AMT Implementation	126
5.36	Reliability Test for Latent Variable	127
5.37	Validity Test for Indicators	128
5.38	Cross Loading of Initial Model	137
5.39	Matrix Correlation and SQR AVE	138
5.40	Average Variance Extracted (AVE) on Initial Model	138
5.41	Value of Composite reliability on Latent Variable	139
5.42	Cross Loading of the Second Model	141
5.43	Matrix Correlation and SQR AVE of second model	142
5.44	AVE of Second Model	142
5.45	Composite Reliability of Second Model	143

5.46	Results for inner weights	145
5.47	Results for outer loadings	146
5.48	Value of R-square	147
5.49	Hypotheses Testing	162
6.1	Organizational Sales Turnover	165
6.2	Descriptions of Profitability Rate	166
6.3	Use of AMT	166
6.4	Percentage of the overall reasons	167
6.5	Percentage of High Usage of AMT Technique	172
6.6	Percentage of Hard and Soft Technology Use	173
6.7	Relationship Between the use of AMT and Org Sales Turnover	174
6.8	Chi-Square Tests for Org. Sales turnover with Use of AMT	174
6.9	Relationship Between the Use of AMT and Profitability	175
6.10	Chi-Square Tests for profitability with Use of AMT	176
6.11	Relationship Between the use of AMT with the Organizational Performance	176
6.12	Wilcoxon Signed Rank Test	177
6.13	Result of Regression Analysis: Impact of Soft & Hard Technology on Growth Sales Turnover	178
6.14	Summarized AMT impact on Growth Sales Turnover, Profitability and Organizational Performance	179
6.15	Participation and contribution of partnership	181
6.16	The percentage of partnership motivation	182
6.17	The percentage of partnership participation on each AMT implementation stages	183

6.18	Value of Significance of Strategic Partnerships Impact on Company Performance	185
6.19	Descriptive Statistics for Monitoring	186
6.20	Descriptive Statistics for Monitoring on Technoware	187
6.21	Descriptive Statistics for Monitoring on Humanware	187
6.22	Descriptive Statistics for Monitoring on Inforware	188
6.23	Descriptive Statistics for Monitoring on Orgaware	189
6.24	The Average of the level of Importance of Monitoring in each stage	189
6.25	Priority order of Monitoring AMT Implementation on each stage	190
6.26	Testing the priority order between two stages	190
6.27	Descriptive Statistics for Critical Success Factors	192
6.28	Top Five of Critical Success Factors in every stage	192
6.29	Descriptive Statistics for Obstacles Variable	193
6.30	Descriptive Statistics for Obstacles on Finance	194
6.31	Descriptive Statistics for Obstacles on Human Resource	194
6.32	Descriptive of Obstacles on Organization	194
6.33	Descriptive Statistics for Obstacles from External Support	195
6.34	Reliability and Validity Test for AMT Implementation	196
6.35	Reliability Test for Latent Variables	197
6.36	Validity Test for Indicators	198
6.37	Cross Loading of Initial Model	208
6.38	Matrix Correlation and SQR AVE	209
6.39	Average Variance Extracted (AVE) on Initial Model	209
6.40	Value of Composite reliability on Latent Variable	210
6.41	Cross Loading of Second Model	212

6.42	Matrix Correlation and SQR AVE of second model	213
6.43	AVE of the Second Model	213
6.44	Composite Reliability of Second Model	214
6.45	Results of T Statistics for inner weights	216
6.46	Results for outer loadings	217
6.47	Value of R-square	218
6.48	Hypotheses Testing	229
7.1	Comparison between Respondent Profile in Malaysian and Indonesian SME	248



## LIST OF FIGURE

FIGURE	TITLE	PAGE
2.1	Six stages model of Technology Implementation. Kwon &Zmud Model.	21
2.2	Technological Life Cycle S curve Model	22
2.3	The S-curve of Technological Progress	23
2.4	Model of AMT Implementation Process	24
2.5	Previous Research in AMT	36
3.1	Resource Based View of The Firm Model	55
3.2	Theoretical Framework	56
4.1	Research Design	70
4.2	Path Diagram for Structural Model	85
5.1	The Use of AMT in Input	95
5.2	The Use of AMT in Transformation Process	97
5.3	The Use of AMT in Output stage	97
5.4	The Use of AMT in Environment	98
5.5	Indicators of AMT Implementation	126
5.6	Indicators of Organizational	127
5.7	Indicators of Critical Success Factors	130
5.8	Indicators of Obstacles	131
5.9	Indicators of Alliances	131
5.10	Indicators of Monitoring	133

5.11	Indicators of Performance	134
5.12	Initial Model of AMT Implementation	135
5.13	Second Order Model of AMT Implementation	140
5.14	Factor Loading for every Variable	144
5.15	Impact of AMT implementation to the performance of Malaysian SME	148
5.16	Relationship Between CSF and AMT implementation in Malaysian SME	151
5.17	Relationship Between Obstacles and AMT implementation in Malaysian SME	153
5.18	Relationship Between Alliances and AMT implementation in Malaysian SME	155
5.19	Relationship Between Monitoring and AMT implementation in Malaysian SME	156
6.1	The Use of AMT in the Input stage	168
6.2	The Use of AMT in Transformation Process	170
6.3	The Use of AMT in Output stage	171
6.4	The Use of AMT in Environment	171
6.5	Indicators of AMT Implementation	196
6.6	Indicators of Organizational Characteristics	199
6.7	Indicators of Critical Success Factors	200
6.8	Indicators of Obstacles	202
6.9	Indicators of Alliances	202
6.10	Indicators of Monitoring	204
6.11	Indicators of Performance	205
6.12	Initial Model of AMT Implementation	206
6.13	Second Model of AMT Implementation	211