

The copyright © of this thesis belongs to its rightful author and/or other copyright owner. Copies can be accessed and downloaded for non-commercial or learning purposes without any charge and permission. The thesis cannot be reproduced or quoted as a whole without the permission from its rightful owner. No alteration or changes in format is allowed without permission from its rightful owner.



**INFORMATION AND COMMUNICATION TECHNOLOGY
ADOPTION AMONG SMALL AND MEDIUM ENTERPRISES IN
THE NORTHERN REGION OF MALAYSIA**



By
Mathivannan Jaganathan
(94375)

UUM

Universiti Utara Malaysia

**Thesis Submitted to
School of Business Management
Universiti Utara Malaysia,
in Fulfilment of the Requirement for the Degree of Doctor of Philosophy**



Pusat Pengajian Pengurusan Perniagaan
(School of Business Management)

Kolej Perniagaan
(College of Business)

Universiti Utara Malaysia

PERAKUAN KERJA TESIS / DISERTASI
(Certification of thesis / dissertation)

Kami, yang bertandatangan, memperakukan bahawa
(We, the undersigned, certify that)

MATHIVANNAN A/L JAGANATHAN (94375)

calon untuk Ijazah
(candidate for the degree of)

DOCTOR OF PHILOSOPHY (MANAGEMENT)

telah mengemukakan tesis / disertasi yang bertajuk:
(has presented his/her thesis / dissertation of the following title):

**INFORMATION AND COMMUNICATION TECHNOLOGY ADOPTION AMONG SMALL AND
MEDIUM ENTERPRISES IN THE NORTHERN REGION OF MALAYSIA**

seperti yang tercatat di muka surat tajuk dan kulit tesis / disertasi.
(as it appears on the title page and front cover of the thesis / dissertation).

Bahawa tesis/disertasi tersebut boleh diterima dari segi bentuk serta kandungan dan meliputi bidang ilmu dengan memuaskan, sebagaimana yang ditunjukkan oleh calon dalam ujian lisan yang diadakan pada:

29 September 2019.

(That the said thesis/dissertation is acceptable in form and content and displays a satisfactory knowledge of the field of study as demonstrated by the candidate through an oral examination held on:

29 September 2019.

Pengerusi Viva : Prof. Dr. Rushami Zien Yusoff
(Chairman for Viva)

Tandatangan
(Signature)

Pemeriksa Luar : Assoc. Prof. Dr. Mohd. Hizam Hanafiah (UKM)
(External Examiner)

Tandatangan
(Signature)

Pemeriksa Luar : Assoc. Prof. Dr. Ilham Sentosa (UniKL)
(External Examiner)

Tandatangan
(Signature)

Tarikh: **29 September 2019**
(Date)

Nama Nama Pelajar
(Name of Student) : **Mathivannan A/L Jaganathan (94375)**

Tajuk Tesis / Disertasi
(Title of the Thesis /
Dissertation) : **Information and Communication Technology Adoption Among Small and
Medium Enterprises in the Northern Region of Malaysia**

Program Pengajian
(Programme of Study) : **Doctor of Philosophy (Management)**

Nama Penyelia
(Name of Supervisor) : **Dr. Khairul Anuar Ishak**



Tandatangan



PERMISSION TO USE

In presenting this thesis in fulfilment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the Universiti Library may make it freely available for inspection. I further agree that permission for the copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence, by the Dean of School of Business Management. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part should be addressed to:

Dean of School of Business Management
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman



UUM
Universiti Utara Malaysia

ABSTRACT

Malaysian small and medium enterprises (SMEs) still have not fully utilized the information and communications technology (ICT) tools to their fullest potential. Hence, there is a need to determine the factors that contribute to ICT adoption among SMEs. This study was undertaken to examine the variables that contribute to the ICT adoption among the SMEs in Malaysia by examining the relationships between relative advantage, security, compatibility, complexity, cost and environmental pressure (normative, mimetic and coercive) and ICT adoption. Additionally, government support was examined as a moderator. The triangulation theory approach, which integrates technology-organization-environment, diffusion of innovation and the institutional theory was used to explain the relationships between the variables. A total of 183 owners-managers of SMEs, representing a response rate of 47.6 percent, participated in this study. The data was collected via self-administered questionnaires, and PLS-SEM was used to analyze them and test the hypotheses. Statistical results indicated that relative advantage and security are positively related while complexity is negatively related to ICT adoption. Conversely, compatibility, cost and environmental pressure (normative, mimetic and coercive) are not related to ICT adoption. Moreover, the moderating test result reveals that government support only moderates the relationship between security, compatibility, complexity and cost, and ICT adoption. Conversely, no empirical support is found for the moderating effect of government support on the relationship between relative advantage and environmental pressure, and ICT adoption. The major theoretical contribution of this research is that it examines environmental pressure as a multidimensional independent variable. Besides that, the study also examines the role of government support as a moderating variable. This study also provides some suggestions to SMEs, policy-makers, ICT support system developers and vendors on ways to improve existing plan and policies for encouraging ICT adoption among SMEs. Finally, recommendations for future research are discussed.

Keywords: Information and communications technology adoption, government support, environmental pressure, technological and organizational.

ABSTRAK

Perusahaan kecil dan sederhana Malaysia (PKS) masih belum memanfaatkan sepenuhnya alatan teknologi maklumat dan komunikasi (*information and communications technology* (ICT)) . Oleh itu, terdapat keperluan untuk menentukan faktor-faktor yang menyumbang kepada penggunaan ICT dalam kalangan PKS. Kajian ini dijalankan untuk mengkaji pemboleh ubah yang menyumbang kepada penggunaan ICT dalam kalangan PKS di Malaysia dengan mengkaji hubungan antara kelebihan relatif, keselamatan, keserasian, kerumitan, kos dan tekanan persekitaran (mimetik, normatif dan pemaksaan), dan penggunaan ICT. Di samping itu, sokongan kerajaan dikaji sebagai penyederhana kajian. Pendekatan teori penyegitigaan dengan mengintegrasikan teknologi-organisasi-persekitaran, penyebaran inovasi dan teori institusi digunakan untuk menjelaskan hubungan antara pemboleh ubah dalam model penyelidikan. Seramai 183 pemilik-pengurus PKS, mewakili kadar maklum balas sebanyak 47.6 peratus, mengambil bahagian dalam kajian ini. Data dikumpulkan melalui kaedah soal selidik yang ditadbir sendiri, dan PLS-SEM digunakan untuk menganalisis data serta menguji hipotesis. Keputusan statistik menunjukkan kelebihan relatif dan keselamatan mempunyai hubungan positif manakala kerumitan mempunyai hubungan negatif berkaitan dengan penggunaan ICT. Sebaliknya, keserasian, kos dan tekanan persekitaran (mimetik, normatif dan pemaksaan) tidak berkaitan dengan penggunaan ICT. Tambahan pula, keputusan penyederhanaan menunjukkan bahawa sokongan kerajaan hanya menyederhanakan hubungan antara keselamatan, keserasian, kerumitan, dan kos serta penggunaan ICT. Sebaliknya, didapati tiada sokongan empirikal untuk kesan penyederhanaan sokongan kerajaan dalam hubungan kelebihan relatif dan tekanan persekitaran dan penggunaan ICT. Sumbangan teori utama kajian ini ialah ia mengkaji tekanan persekitaran sebagai pemboleh ubah bebas multidimensi. Selain itu, kajian juga mengkaji peranan sokongan kerajaan sebagai pemboleh ubah sederhana. Kajian ini juga memberikan cadangan kepada PKS, pengubal dasar, pemaju sistem sokongan ICT, dan juga pembekal tentang cara menambahbaik rancangan dan polisi sedia ada bagi meningkatkan penggunaan ICT dalam kalangan PKS. Akhir sekali, cadangan untuk kajian masa depan dibincangkan.

Kata Kunci: Penggunaan teknologi maklumat dan komunikasi, sokongan kerajaan, tekanan persekitaran, teknologi dan organisasi

ACKNOWLEDGEMENT

I owe a mountain of gratitude to a good number of people who in one way or the other have helped me on this academic voyage. First and foremost, my unalloyed thanks to the almighty God. With bless and will, I have completed this thesis.

Very special thanks to my beloved father Mr. Jaganathan Velloo and also in loving memory of my late mother Madam Letchimee Perumal.

The author would like to express his profound appreciation and gratitude to my supervisor, Dr. Khairol Anuar Ishak who not only believed in him but also in providing excellent direction, guidance, supervision and constant encouragement towards finishing this thesis. Special thanks are also extended to my former supervisor Professor Dr. Rosli Mahmood.

I would also like to convey my deepest appreciation to the most respected Dean of School of Business Management, Professor Dr. Rushami Zien Yusoff and School Committee of Human Capital Development, who have continually and persuasively conveyed a spirit of adventure in regard to research and excitement to research. Without their supervision and constant help, this thesis would not have been possible.

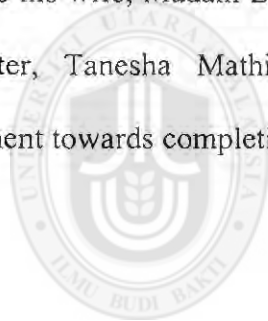
Thanks are also due to my Associate Professor Dr. Hoe Chee Hee, Dr. Hanissah Abdul Razak, Dr. Nazlina Zakaria, Associate Professor Dr. Thi Lip Sam, Dr. Muhammad Shukri Bakar, Dr. Salisu Isyaku, Dr Siti Noratisah Mohd Nafi, Dr. Associate Professor Dr. Salniza Md. Salleh Dr. Mohamad Zainol Abidin Adam Dr. Wan Shakizah Wan Mohd. Noor, Prof. Madya Dr. Mohd Faizal Mohd Isa, Dr. Awanis Ku Ishak, Dr. Francis Chuah Chin Wei, Associate Professor Dr. Filzah Md Isa, Norizan bt. Haji Azizan, Dr. Daratul Ambia Che Mit, Azanin Ahmad, Khalilah Abd Hafiz, Mohd Abidzar Zainol Abidin, Mohd Salahudin

Shamsudin, Associate Professor Dr. Chandrakantan Subramaniam and Associate Professor Dr. Selvan Perumal.

Special thanks and gratitude are also extended to School of Business Management (SBM), Universiti Utara Malaysia, the Entrepreneurship Department of SBM, faculty members, the administrative officers and staff of SBM and Othman Yeop Abdullah Graduate School of Business (OYAGSB).

Special thanks to all research respondents who graciously responded and willingly shared their invaluable insights.

The author would like to specially dedicate this thesis and thank his family members especially to his wife, Madam Logeswari Uthamaputhran, son, Pranesh Jaii Mathivannan and daughter, Tanesha Mathivannan for all their love, support, assistance and encouragement towards completing this thesis.



UUM
Universiti Utara Malaysia

TABLE OF CONTENTS

PERMISION TO USE	iii
ABSTRACT	iv
ABSTRAK	iv
ACKNOWLEDGEMENT	vi
TABLE OF CONTENTS	vii
LIST OF FIGURES	vii
LIST OF TABLES	viii
LIST OF ABBREVIATIONS	x
CHAPTER ONE INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	14
1.3 Research Questions	23
1.4 Research Objectives	24
1.5 Scope of the Study	25
1.6 Significance of the study	26
1.7 Definition of Key Terms	28
CHAPTER TWO LITERATURE REVIEW	30
2.1 Introduction	30
2.2 ICT Progress and Scenario in Malaysia	30
2.3 Overview of SME`s in Malaysia	34
2.4 Information and Communication Technology Adoption	38
2.5 Technology Context	41
2.5.1 Relative Advantage	42
2.5.2 Security	46
2.5.3 Compatibility	49
2.5.4 Complexity	53
2.6 Organisational Context	56
2.6.1 Cost	57
2.7 Environmental Context	60
2.7.1 Normative Pressure	61

2.7.2 Mimetic Pressure	66
2.7.3 Coercive Pressure	70
2.8 Government Support as a moderator.....	73
2.9 Related Theories to ICT Adoption	78
2.9.1 Theory of Reasoned Action (TRA)	79
2.9.2 Theory of Planned Behaviour	81
2.9.3 Technology Acceptance Model (TAM).....	83
2.9.4 Technology-Organization-Environment.....	86
2.9.5 Diffusion of Innovation Theory (DIT).....	88
2.9.6 Institutional Theory.....	92
2.10 Related Underpinning Theories	95
2.10.1 How does integrated TOE, DOI and institutional theory relate this study?.....	96
CHAPTER THREE METHODOLOGY	102
3.1 Introduction	102
3.2 Research Framework.....	102
3.3 Hypotheses Development.....	106
3.3.1 Relationship between Relative Advantage and ICT Adoption.....	107
3.3.2 Relationship between Security and ICT Adoption	108
3.3.3 Relationship between Compatibility and ICT Adoption	109
3.3.4 Relationship between Complexity and ICT Adoption.....	110
3.3.5 Relationship between Cost and ICT Adoption	111
3.3.6 Relationship Between Environmental Pressure and ICT Adoption.....	112
3.3.7 The moderating role of Government Support.....	115
3.4 Research Design.....	118
3.5 Population and Sampling Procedure	120
3.5.1 Population	121
3.5.2 Sampling Frame.....	122
3.5.3 Unit of Analysis	124
3.5.4 Sample Size.....	124
3.5.5 Sampling Procedure.....	127
3.6 Data Collection Procedure	128

3.7 Research Instrument	129
3.7.1 Relative Advantage	132
3.7.2 Security	132
3.7.3 Compatibility	133
3.7.4 Complexity	134
3.7.5 Cost	135
3.7.6 Environmental pressure	136
3.7.7 Government Support	137
3.7.8 ICT adoption	138
3.8 Pre-test	140
3.9 Data Analysis Method	141
3.9.1 Assessment of Construct Reliability	144
3.9.2 Assessment of Convergent Validity	144
3.9.3 Assessment of Discriminant Validity	145
3.9.4 Structural Model Analysis using Partial Least Square Structural Equation Modelling (PLS - SEM)	146
3.10 Chapter Summary	147
CHAPTER FOUR FINDINGS	148
4.1 Introduction	148
4.2 Response Rate	148
4.3 Profile of Respondents	149
4.4 Profile of SMEs	151
4.5 Non-Response Bias	154
4.6 Common method variance	154
4.7 Testing of Goodness of Measurement	155
4.7.1 Assessment of Reflective Measurement Model	158
4.7.1.1 Composite Reliability	158
4.7.1.2 Convergent Validity	159
4.7.1.3 Assessment of Constructs	160
4.7.1.4 Discriminant Validity	162
4.7.2 Establishing Higher-Order Constructs	165
4.8 Assessment of Structural Model	167
4.8.1 Direct Relationship	167

4.8.2 Assessment of Variance Explained in the Endogenous Variables	172
4.8.3 Assessment of the Effect Size (f^2) Effect.....	173
4.8.4 Testing Moderating Effect.....	174
4.9 Determining the Strength of the Moderating Effects	182
4.10 Summary of Findings	183
4.11 Summary of Chapter	184
CHAPTER FIVE DISCUSSION AND CONCLUSION	185
5.1 Introduction	185
5.2 Recap of Study	185
5.3 Discussion	186
5.3.1 Direct Relationship	186
5.3.1.1 Positive Relationship between Relative Advantage and ICT Adoption	186
5.3.1.2 Positive Relationship between Security and ICT Adoption	189
5.3.1.3 Negative Relationship between Complexity and ICT Adoption	191
5.3.2 Moderating Effects of Government Support	193
5.4 Contribution of the study.....	200
5.4.1 Theoretical Contribution.....	200
5.4.2 Practical Implication.....	202
5.5 Limitation of the Study	204
5.6 Recommendation for the Future Research	205
5.7 Conclusion.....	207
References	209

LIST OF FIGURES

Figure 1. 1 The heart of NITA	4
Figure 1. 2 8 Service areas.....	5
Figure 1. 3 Network Readiness Index	7
Figure 1. 4 Employment Share of SMEs to Total Employment (%)	8
Figure 1.5 New definition of SME	9
Figure 1.6 Percentage share of GDP of SMEs at constant 2010 prices for year 2014	10
Figure 2. 1 Society Paradigm of Malaysia.....	31
Figure 2. 2 K-Malaysia Migration Strategy.....	32
Figure 2. 3 Employment: SME vs Large Firms.....	36
Figure 2. 4 Growth for SME GDP, SME Employment and SME Productivity, %.....	37
Figure 2. 5 Theory of Reasoned Action (Fishbein & Ajzen, 1975).....	79
Figure 2. 6 Theory of Planned Behaviour (Ajzen, 1991)	82
Figure 2. 7 Original Technology Acceptance Model (Davis,1986,p.24).....	84
Figure 2. 8 Extended Technology Acceptance Model (Venkatesh&Davis, 1996).....	85
Figure 2. 9 TOE Framework by Tornatzky & Fleischer (1990)	87
Figure 2. 10 Diffusion of Innovation (Rogers, 1983;2003).....	90
Figure 3. 1 Research Framework.....	106
Figure 3. 2 The Output of a Priori Power Analysis	126
Figure 4. 1 Research Model of the Study	157
Figure 4. 2 Direct Path Coefficient and t-values of the Structural Model (Bootstrapping)....	171
Figure 4. 3 Structural Model with t-value (with Moderator)	175
Figure 4. 4 Interaction Effect of Security and Government Support on ICT adoption	177
Figure 4. 5 Interaction Effect of Compatibility and Government Support on ICT adoption..	178
Figure 4. 6 Interaction Effect of Complexity and Government Support on ICT adoption.....	179
Figure 4. 7 Interaction Effect of Cost and Government Support on ICT adoption	180

LIST OF TABLES

Table 2. 1 SME contribution.....	35
Table 2. 2 Selected studies: Relative Advantage.....	45
Table 2. 3 Selected studies: Security.....	48
Table 2. 4 Selected studies: Compatibility.....	52
Table 2. 5 Selected studies: Complexity.....	55
Table 2. 6 Selected studies: Cost.....	59
Table 2. 7 Selected studies: Normative Pressure.....	66
Table 2. 8 Selected studies: Mimetic Pressure.....	70
Table 2. 9 Selected studies: Coercive Pressure.....	73
Table 3. 1 Summary of the hypothesis.....	117
Table 3. 2 Number of Establishments by Sector and Size (excluding micro firms).....	122
Table 3. 3 Number of SME Establishments by State (including micro firms).....	122
Table 3. 4 Measure of the study.....	131
Table 3. 5 Relative Advantage Measurement Items.....	132
Table 3. 6 Security Measurement Items.....	133
Table 3. 7 Compatibility Measurement Items.....	134
Table 3. 8 Complexity Measurement Items.....	134
Table 3. 9 Cost Measurement Items.....	135
Table 3. 10 Environmental Pressure Measurement Items.....	136
Table 3. 11 Government Support Measurement Items.....	138
Table 3. 12 ICT Adoption Measurement Items.....	139
Table 3. 14 Rules of Thumb for Selecting CB-SEM or PLS-SEM (Hair, Ringle & Sarstedt, 2011).....	142
Table 4. 1 Response Rate.....	149
Table 4. 2 Profile of Respondents.....	150
Table 4. 3 Profile of SMEs.....	151
Table 4. 4 Business Activity of SMEs.....	153
Table 4. 5 Results Summary for Reliability and Validity of the Constructs First.....	160
Table 4. 6 Fornell-Larcker Criterion Analysis for Checking Discriminant Validity of First-order Constructs.....	163
Table 4. 7 Fornell-Larcker Criterion Analysis for Checking Discriminant Validity of Second-order Constructs.....	164
Table 4. 8 Second-order of ICT adoption and Environmental Pressure Construct and Its Relationship with First-order Constructs.....	166
Table 4. 9 Summary of Result for Direct Effect of Relative Advantage.....	167
Table 4. 10 Summary of Result for Direct Effect of Security.....	168
Table 4. 11 Summary of Result for Direct Effect of Compatibility.....	168
Table 4. 12 Summary of Result for Direct Effect of Complexity.....	169
Table 4. 13 Summary of Result for Direct Effect of Cost.....	169
Table 4. 14 Summary of Result for Direct Effect of Environmental Pressure.....	170
Table 4. 15 Summary of Results for All Direct Relationship.....	170
Table 4. 16 Variance Explained in the Endogenous Latent Variables Latent Variables.....	172

Table 4. 17 Effect Sizes of Exogenous Latent Constructs.....	173
Table 4. 18 Summary of Result for Moderating Effect of Relative Advantage	176
Table 4. 19 Summary of Result for Moderating Effect of Security.....	176
Table 4. 20 Summary of Result for Moderating Effect of Compatibility.....	178
Table 4. 21 Summary of Result for Moderating Effect of Complexity	179
Table 4. 22 Summary of Result for Moderating Effect of Cost.....	180
Table 4. 23 Summary of Result for Moderating Effect of Environmental Pressure.....	181
Table 4. 24 Summary of Result for All Moderating Effect	181
Table 4. 25 Strength of the Moderating Effects Based on Cohen's (1988).....	182
Table 4. 26 Summary of Direct Relationship and Moderation Effect	183



UUM
 Universiti Utara Malaysia

LIST OF ABBREVIATIONS

ACCCIM	Associated Chinese Chambers of Commerce and Industry of Malaysia
ATM	Automatic teller machine
AVE	Average Variance Extracted
BDT	Telecommunication Development Bureau
CB-SEM	Covariance based
CEO	Chief executive officer
CRM	Customer Relationship Management
DIT	Diffusion of Innovation Theory
DOI	Diffusion of innovations theory
DV	Dependent Variables
EDI	Electronic data interchange
ERP	Enterprise Resource Planning
ETP	Economic Transformation Programme
FEDI	Financial electronic data interchange
GDP	Gross Domestic Product
GLCs	Government-linked companies
HTMT	Heterotrait-monotrait ratio of correlations
HTTPS	Hypertext transfer protocol secure
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineers
IoT	Internet of Things
IS	Information System
ISACA	Information Systems Audit and Control Association
ISO	International Standardization Organization
IT	Information Technology
ITU	International Telecommunication Union
ITU	International Telecommunication Union
IV	Independent Variable
M&As	Mergers and acquisitions
MDEC	Malaysian Digital Economic Cooperation
MKDs	Syarikat Menteri Kewangan Diperbadankan
MNCs	Multinational corporations
MSC	Multimedia Super Corridor
MYICMS	Malaysian Information, Communications and Multimedia Services 886
NCCIM	National Chamber of Commerce and Industry of Malaysia
NEM	New Economic Model
NITA	National IT Agenda
NITC	National Information Technology Council
NSDC	National SME Development Council
PBC	Perceived behavioural control
PEOU	Perceived ease of use
PLS-SEM	Partial Least Squares Structural Equation Modelling
PU	Perceived usefulness
Q2	Predictive relevance of the model
R&D	Research and Development
R2	Squared correlation
RFID	Radio-frequency identification
SCM	Supply Chain Management

SEI	Software Engineering Institute
SEM	Structural Equation Modelling
SME	Small and Medium Enterprises
SMIDEC	Small and Medium Industries Development Corporation
SPSS	Statistical Package for Social Science
SSL	Secured socket layer
TAM	Technology Acceptance Model
TOE	Technological, organizational and environmental
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
VB-SEM	Variance based Component SEM



UUM
 Universiti Utara Malaysia

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

With the increasing digitalisation of commercial and industrial activities, information and communication technology provides unlimited opportunities and advantages for any type and size of businesses, including small and medium-sized businesses. Information and Communication Technology (ICT) defined as a “diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information.”

These technologies include computers, the Internet, broadcasting technologies (radio and television) and telephony (UNDP, 2000). ICT is a comprehensive concept that encompasses technology, people, processes and information such as radio, television, telephones, computers, mobile phone, tablet PC and the internet, which assist communication, gathering, processing and transmission of information via electronic mediums (Apulu, Latham, & Moreton, 2011; Oye, Aiahad, & Ab.rahim, 2011).

The advancement and day-to-day improvement on technology substantially changed the rhythm of running a business compared to the pre-millennial era. Specifically, the emergence of internet technology has significantly changed the manner of business transaction for both large and small medium enterprises (Aboelmaged, 2010; Abou-Shouk, Lim, & Megicks, 2013; Janita & Chong, 2013a; Nor & Pearson, 2009; Rahayu & Day, 2016; Rodríguez-Ardura & Meseguer-Artola, 2010). In specific, cutting edge ICT emerging technologies such as e-wallet, internet of things, blockchain and cloud computing also contributed to changes of the business landscape in the context of manufacturing,

The contents of
the thesis is for
internal user
only

References

- Abdul Tawab Khalil, M., Dominic, P. D. D., Hassan, M. F., & Kazemian, H. (2012). Perceived usefulness elevating responsiveness of SME Employees in Digital Business Ecosystem environment. In *2012 International Conference on Computer and Information Science, ICØIS 2012 - A Conference of World Engineering, Science and Technology Congress, ESTCON 2012* - (Vol. 1, pp. 160–163). <https://doi.org/10.1109/ICØISci.2012.6297231>
- Abdullah, F., Ward, R., & Ahmed, E. (2016). Investigating the influence of the most commonly used external variables of TAM on students' Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) of e-portfolios. *Computers in Human Behavior*, *63*, 75–90. <https://doi.org/10.1016/j.chb.2016.05.014>
- Abdullah, N. H., Wahab, E., & Shamsuddin, A. (2013). Exploring the Common Technology Adoption Enablers among Malaysian SMEs: Qualitative Findings. *Journal of Management and Sustainability*, *3*(4), 78–92. <https://doi.org/10.5539/jms.v3n4p78>
- Abdullah, T. M. C., & Hussin, Z. (2010). Moderating Effects of Government Assistance & Turnaround Strategies: A Research On Private Manufacturing Companies. *Journal of Global Strategic Management*, *7*(6), 64–73.
- Aboelmaged, M. G. (2010). Predicting e-procurement adoption in a developing country: An empirical integration of technology acceptance model and theory of planned behaviour. *Industrial Management & Data Systems*, *110*(3), 392–414. <https://doi.org/10.1108/02635571011030042>
- Aboelmaged, M. G. (2014). Predicting e-readiness at firm-level: An analysis of technological, organizational and environmental (TOE) effects on e-maintenance readiness in manufacturing firms. *International Journal of Information Management*, *34*(5), 639–651. <https://doi.org/10.1016/j.ijinfomgt.2014.05.002>
- Abou-Shouk, M., Lim, W. M., & Megicks, P. (2013). E-Commerce and Small Tourism Businesses in Developing Countries: Drivers versus Boundaries of Adoption. *Tourism Planning & Development*, *10*(3), 249–266. <https://doi.org/10.1080/21568316.2012.747983>
- Acarli, D. S., & Sağlam, Y. (2015). Investigation of Pre-service Teachers' Intentions to Use of Social Media in Teaching Activities within the Framework of Technology Acceptance Model. *Procedia - Social and Behavioral Sciences*, *176*, 709–713. <https://doi.org/10.1016/j.sbspro.2015.01.530>

ACCIM ,SME Survey. (2012). Retrieved from http://www.acccim.org.my/file/2012_SME_EN.pdf

Ackerman, M. S., & Davis, D. T. (2001). Privacy and Security Issues in E-Commerce. *IEEE Transactions on Computers*, C-25(12), 1353–1361.

Ahmad, S. Z., Abu Bakar, A. R., Faziharudean, T. M., & Mohamad Zaki, K. A. (2014a). An Empirical Study of Factors Affecting e-Commerce Adoption among Small- and Medium-Sized Enterprises in a Developing Country: Evidence from Malaysia. *Information Technology for Development*, 21(May 2015), 1–18. <https://doi.org/10.1080/02681102.2014.899961>

Ahmad, S. Z., Abu Bakar, A. R., Faziharudean, T. M., & Mohamad Zaki, K. A. (2014b). An Empirical Study of Factors Affecting e-Commerce Adoption among Small- and Medium-Sized Enterprises in a Developing Country: Evidence from Malaysia. *Information Technology for Development*, 1102(May 2015), 1–18. <https://doi.org/10.1080/02681102.2014.899961>

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. *EnglewoodCliffs NY Prentice Hall*. <https://doi.org/Z>

Akturan, U., & Tezcan, N. (2012). Mobile banking adoption of the youth market: Perceptions and intentions. *Marketing Intelligence & Planning*, 30(4), 444–459. <https://doi.org/10.1108/02634501211231928>

Al-qirim, N. (2006). Personas of E-Commerce Adoption in Small Businesses in New Zealand. *Journal of Electronic Commerce in Organizations*, 4(3), 17–45.

Al-Qirim, N. (2007a). A Research Trilogy into E-Commerce Adoption in Small Businesses in New Zealand. *Electronic Markets*, 17(4), 263–285. <https://doi.org/10.1080/10196780701635872>

Al-Qirim, N. (2007b). The adoption of eCommerce communications and applications technologies in small businesses in New Zealand. *Electronic Commerce Research and Applications*, 6(4), 462–473. <https://doi.org/10.1016/j.elerap.2007.02.012>

Al-zoubi, A. I., & Lip-Sam, T. (2011). E-Government Adoption Among Businesses in Jordan. *Academic Research Internationa*, 1(1), 141–156.

Al-zoubi, A. I., & Thi, L. S. (2011). E-Government Adoption Among Businesses in Jordan. *Academic Research Internationa*, 1(1), 141–156.

- Al-zoubi, A. I., Thi, L. S., & Lim, H. E. (2011). Analysis of E-government Adoption and Organization Performance in The Jordan usiness Sector. *Academic Research International*, 1(3), 334–348.
- Alain Yee, L. C., Keng Boon, O., Lin, B., & Raman, M. (2009). Factors Affecting the Adoption Level of C-Commerce: an Empirical Study. *The Journal of Computer Information Systems*, 50(2), 13–22. <https://doi.org/10.1080/08874417.2009.11645380>
- Alam, S. S. (2009). Adoption of internet in Malaysian SMEs. *Journal of Small Business and Enterprise Development*, 16(2), 240–255. <https://doi.org/10.1108/14626000910956038>
- Alam, S. S., Ali, Y., & Jani, M. F. M. (2011). An Empirical Study of Factors Affecting Electronic Commerce Adoption among SMEs in Malaysia. *Journal of Business Economics and Management*, 12(2), 375. <https://doi.org/10.3846/1611699.2011.576749>
- Alam, S. S., Khatibi, A., Ahmad, M. I. S., & Ismail, H. Bin. (2007). Factors affecting e-commerce adoption in the electronic manufacturing companies in Malaysia. *International Journal of Commerce and Management*, 17(1/2), 125–139. <https://doi.org/10.1108/10569210710776503>
- Alam, S. S., & Noor, M. K. M. (2009). ICT adoption in Small and Medium Enterprises : An empirical evidence of service sectors in Malaysia. *International Journal of Business and Management*, 4(2), 112–125.
- Alan, C., Annear, J., Beck, E., & Beveren, J. van. (2009). A framework for the adoption of ICT and security technologies by SME's. In *16th Annual Conference of Small Enterprise Association of Australia and New Zealand* (pp. 1–10). Retrieved from <http://www.cric.com.au/seanz/resources/62AnnearetalFinal.pdf>
- AlBar, A. M., & Hoque, M. R. (2017). Factors affecting the adoption of information and communication technology in small and medium enterprises: a perspective from rural Saudi Arabia. *Information Technology for Development*, 0(0), 1–24. <https://doi.org/10.1080/02681102.2017.1390437>
- AlBar, A. M., & Hoque, M. R. (2019). Factors affecting cloud ERP adoption in Saudi Arabia: An empirical study. *Information Development*, 35(1), 150–164. <https://doi.org/10.1177/0266666917735677>
- Albayrak, T., Aksoy, Ş., & Caber, M. (2013). The effect of environmental concern and scepticism on green purchase behaviour. *Marketing Intelligence & Planning*, 31(1), 27–39. <https://doi.org/10.1108/02634501311292902>
- Aleke, B., Ojiako, U., & Wainwright, D. W. (2011a). ICT adoption in developing countries: perspectives from small-scale agribusinesses. *Journal of Enterprise Information Management*, 24(1), 68–84.

- Aleke, B., Ojiako, U., & Wainwright, D. W. (2011b). ICT adoption in developing countries: perspectives from small-scale agribusinesses. *Journal of Enterprise Information Management*, 24(1), 68–84. <https://doi.org/10.1108/17410391111097438>
- Ali, O., Soar, J., & Yong, J. (2016). An investigation of the challenges and issues influencing the adoption of cloud computing in Australian regional municipal governments. *Journal of Information Security and Applications*, 27–28, 19–34. <https://doi.org/10.1016/j.jisa.2015.11.006>
- Alkhater, N., Walters, R., & Wills, G. (2018). An empirical study of factors influencing cloud adoption among private sector organisations. *Telematics and Informatics*. <https://doi.org/10.1016/j.tele.2017.09.017>
- Alkhater, N., Wills, G., & Walters, R. (2014). Factors Influencing an Organisation's Intention to Adopt Cloud Computing in Saudi Arabia. In *2014 IEEE 6th International Conference on Cloud Computing Technology and Science* (pp. 1040–1044). IEEE. <https://doi.org/10.1109/CloudCom.2014.95>
- Alqahtani, S., & Wamba, S. F. (2012). Determinants of RFID technology adoption intention in the Saudi retail industry: Empirical study. In *2012 45th Hawaii International Conference on System Sciences* (pp. 4720–4729). <https://doi.org/10.1109/HICSS.2012.202>
- AlSharji, A., Ahmad, S. Z., & Abu Bakar, A. R. (2018). Understanding social media adoption in SMEs: Empirical evidence from the United Arab Emirates. *Journal of Entrepreneurship in Emerging Economies*, 10(2), 302–328. <https://doi.org/10.1108/JEEE-08-2017-0058>
- Alzougool, B., & Kurnia, S. (2008). Electronic Commerce Technologies Adoption by SMEs : A Conceptual Study. In *Australasian Conference on Information Systems* (pp. 1–10).
- Aman, A. H. L., Harun, A., & Hussein, Z. (2012). The Influence of Environmental Knowledge and Concern on Green Purchase Intention the Role of Attitude as a Mediating Variable. *British Journal of Arts and Social Sciences*, 7(II), 2046–9578. Retrieved from <http://www.bjournal.co.uk/BJASS.aspx>
- Aman, O., & Tahir, N. H. (2011). The success factors of food small medium entrepreneurs under the one district one industry programme: A case on food manufacturing entrepreneurs in Melaka. *Journal of Global Entrepreneurship*, 1(1), 44–64.
- Apulu, I., & Latham, A. (2009). Information and Communication Technology Adoption : Challenges for Nigerian SMEs. *TMC Academic Journal*, 4(2), 64–80.
- Apulu, I., Latham, A., & Moreton, R. (2011). Factors affecting the effective utilisation and adoption of sophisticated ICT solutions. *Journal of Systems and Information Technology*, 13(2), 125–143. <https://doi.org/10.1108/13287261111135972>

- Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: A meta-analytic review. *British Journal of Social Psychology*, 40, 471–499. <https://doi.org/10.1348/014466601164939>
- Arpaci, I., Kilicer, K., & Bardakci, S. (2015). Effects of security and privacy concerns on educational use of cloud services. *Computers in Human Behavior*. <https://doi.org/10.1016/j.chb.2014.11.075>
- Arpaci, I., Yardimci, Y. C., Ozkan, S., & Turetken, O. (2012). Organizational Adoption of Information Technologies: a Literature Review. *International Journal of EBusiness and EGovernment Studies*, 4(2), 37–50.
- Arshad Raza, S., & Standing, C. (2010). Towards a systemic model on information systems' adoption using critical systems thinking. *Journal of Systems and Information Technology*, 12(3), 196–209. <https://doi.org/10.1108/13287261011070821>
- Awa, Hart O, Eze, S. C., Urieto, J. E., & Inyang, B. J. (2011). Upper echelon theory (UET). *Journal of Systems and Information Technology*, 13(2), 144–162. <https://doi.org/10.1108/13287261111135981>
- Awa, Hart Okorie, Ojiabo, O. U., & Emecheta, B. C. (2015). Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs. *Journal of Science & Technology Policy Management*, 6(8), 76–94. <https://doi.org/10.1108/JSTPM-04-2014-0012>
- Awiagah, R., Kang, J., & Lim, J. I. (2015). Factors affecting e-commerce adoption among SMEs in Ghana. *Information Development*, 32(4), 1–22. <https://doi.org/10.1177/0266666915571427>
- Ayong, K. T., & Naidoo, R. (2019). Modeling the adoption of cloud computing to assess South African SMEs: An integrated perspective. In *Proceedings of 4th International Conference on the Internet, Cyber Security and Information Systems 201* (Vol. 12, pp. 43–56).
- Azadegan, A., & Teich, J. (2010). Effective benchmarking of innovation adoptions: A theoretical framework for e-procurement technologies. *Benchmarking: An International Journal*, 17(4), 472–490. <https://doi.org/10.1108/14635771011060558>
- Azam, M. S., & Quaddus, M. (2012). Effects of Internal and External Factors on Internet-Based Digital Technology Usage by SMEs in a Developing Country. *Communications of the IIMA*, 12(4).
- Baller, S., Dutta, S., & Lanvin, B. (2016). *The global information technology report 2016: Innovating in the digital economy*. Retrieved from www.weforum.org/gitr

- Bandura, A., Adams, N. E., Hardy, A. B., & Howells, G. N. (1980). Tests of the generality of self-efficacy theory. *Cognitive Therapy and Research*, 4(1), 39–66. <https://doi.org/10.1007/BF01173354>
- Barba-Sánchez, V. (2007). Drivers, benefits and challenges of ICT adoption by small and medium sized enterprises (SMEs): A literature review. *Problems and Perspectives in Management*, 5(1), 103–114. Retrieved from http://www.academia.edu/download/30924479/PPM_EN_2007_01_Barba-Sanchez.pdf
- Bayo-Moriones, A., Billon, M., & Leya-Lopez, F. (2013). Perceived performance effects of ICT in manufacturing SMEs. *Industrial Management & Data Systems*, 113(1), 117–135. <https://doi.org/10.1108/02635570710734262>
- Bayo-Moriones, A., & Pez, F. L.-L. (2007). A firm-level analysis of determinants of ICT adoption in Spain. *Technovation*, 27(6–7), 352–366. <https://doi.org/10.1016/j.technovation.2007.01.003>
- Beale, M. (1999). Survey Reveals Consumer Concern Over E-Commerce Security Issues. Retrieved June 25, 2016, from <http://www.ecommercetimes.com/story/1981.html>
- Beatty, R. C., Shim, J. P., & Jones, M. C. (2001). Factors Influencing Corporate Web Site Adoption: A Time Based Assessment. *Information and Management*, 38, 337–354. [https://doi.org/10.1016/S0378-7206\(00\)00064-1](https://doi.org/10.1016/S0378-7206(00)00064-1)
- Becker, J. M., Klein, K., & Wetzels, M. (2012). Hierarchical Latent Variable Models in PLS-SEM: Guidelines for Using Reflective-Formative Type Models. *Long Range Planning*, 45(5–6), 359–394. <https://doi.org/10.1016/j.lrp.2012.10.001>
- Beckinsale, M., Levy, M., Powell, P., Beckinsale, M., & Levy, M. (2006). Exploring internet drivers in SMEs. *Electronic Markets*, 16(4), 361–370. <https://doi.org/10.1080/10196780600999841>
- Bennett, J. A. (1997). A case for theory triangulation. *Nursing Science Quarterly*, 10(2), 97–102. <https://doi.org/10.1177/07399863870092005>
- Bergoeing, R., Loayza, N. V., & Piguillem, F. (2010). *Why are developing countries so slow in adopting new technologies? The aggregate and complementary impact of micro distortions.*
- Bhattacharjee, a., & Sanford, C. (2009). The intention–behaviour gap in technology usage: the moderating role of attitude strength. *Behaviour & Information Technology*, 28(4), 389–401. <https://doi.org/10.1080/01449290802121230>
- Birmingham, P., & Wilkinson, D. (2003). *Using Research Instruments: A Guide for Researchers.* Routledge.
- Bordonaba-Juste, V., Lucia-Palacios, L., & Polo-Redondo, Y. (2012). Antecedents and consequences of e-business adoption for European retailers. *Internet Research*, 22(5), 532–550. <https://doi.org/10.1108/10662241211271536>

- Boumediene, R., & Kawalek, P. (2008). Predicting SMEs Willingness to Adopt ERP, CRM, SCM & E-Procurement Systems. In *16th European Conference on Information Systems, ECIS 2008* (pp. 961–973).
- Brislin, R. W. (1970). *Back-Translation for Cross-Cultural Research*. *Journal of Cross-Cultural Psychology* (Vol. 1).
- <https://doi.org/10.1177/135910457000100301>
- Broos, A., & Roe, K. (2006). The digital divide in the playstation generation: Self-efficacy, locus of control and ICT adoption among adolescents. *Poetics*, *34*(4–5), 306–317. <https://doi.org/10.1016/j.poetic.2006.05.002>
- Building an inclusive digital future. (2016). Retrieved August 10, 2016, from <http://mdec.my/building-an-inclusive-digital-future>
- Busli, C., & Al-Hawamdeh, S. (2002). The development of e-commerce in Singapore: The impact of government initiatives. *Business Process Management Journal*, *8*(3), 278–288. <https://doi.org/10.1108/14637150210428970>
- Cáldeira, M. M., & Ward, J. M. (2003). Using resource-based theory to interpret the successful adoption and use of information systems and technology in manufacturing small and medium-sized enterprises. *European Journal of Information Systems*, *12*(2), 127–141. <https://doi.org/10.1057/palgrave.ejis.3000454>
- Carroll, W. R., & Wagar, T. H. (2003). Is there a relationship between information technology adoption and human resource management? *Journal of Small Business and Enterprise Development*, *17*(2), 218–229. <https://doi.org/10.1108/14626001011041229>
- Cavusoglu, H., Cavusoglu, H., Son, J.-Y., & Benbasat, I. (2015). Institutional pressures in security management: Direct and indirect influences on organizational investment in information security control resources. *Information & Management*, *52*(4), 385–400. <https://doi.org/10.1016/j.im.2014.12.004>
- Chan, F. T. S., Alain, Y.-L. C., & Zhou, L. (2012). An empirical investigation of factors affecting e-collaboration diffusion in SMEs. *International Journal of Production Economics*, *138*(2), 329–344. <https://doi.org/10.1016/j.ijpe.2012.04.004>
- Chan, F. T. S., & Chong, A. Y.-L. (2013). Determinants of mobile supply chain management system diffusion: a structural equation analysis of manufacturing firms. *International Journal of Production Research*, *51*(4), 1196–1213. <https://doi.org/10.1080/00207543.2012.693961>
- Chan, Y. E., Huff, S. L., Barclay, D. W., & Copeland, D. G. (1997). Business Strategic Orientation, Information Systems Strategic Orientation, and Strategic Alignment. *Information Systems Research*, *8*(2), 125–150. <https://doi.org/10.1287/isre.8.2.125>

- Chandra, S., & Kumar, K. N. (2018). Exploring factors influencing organizational adoption of augmented reality in e-commerce: empirical analysis using technology-organization environment model. *Journal of Electronic Commerce Research*, *19*(3), 237–265.
- Chang, H. H., & Chen, S. W. (2009). Consumer perception of interface quality, security, and loyalty in electronic commerce. *Information and Management*, *46*(7), 411–417. <https://doi.org/10.1016/j.im.2009.08.002>
- Chege, S. M., Wang, D., & Suntu, S. L. (2019). Impact of information technology innovation on firm performance in Kenya. *Information Technology for Development*. <https://doi.org/10.1080/02681102.2019.1573717>
- Chen, L., & Holsapple, C. W. (2013). E-business adoption research: State of the art. *Journal of Electronic Commerce*, *14*(3), 261–286.
- Cheong, T. Y., Sulaiman, A., & Parveen, F. (2009). Internet Adoption Among Malaysian Companies. *Journal of Asia-Pacific Business*, *10*(2), 166–185. <https://doi.org/10.1080/10599230902885713>
- Chiemeke, S., & Ewwiekpaefe, A. (2011). A conceptual framework of a modified unified theory of acceptance and use of technology (UTAUT) Model with Nigerian factors in E-commerce adoption. *Educational Research*, *2*(December), 1719–1726. Retrieved from [http://interesjournal.org/ER/pdf/2011/December/Chiemeke and Ewwiekpaefe.pdf](http://interesjournal.org/ER/pdf/2011/December/Chiemeke%20and%20Ewwiekpaefe.pdf)
- Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–336). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Chin, W. W. (2010). How to Write Up and Report PLS Analyses. In V. E. Vinzi, W. W. Chin, J. Henseler, & H. Wang (Eds.), *Handbook of Partial Least Squares* (pp. 655–690). Heidelberg, Dordrecht, London, New York: Springer. https://doi.org/10.1007/978-3-540-32827-8_29
- Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/Adoption Study. *Information Systems Research*, *14*(2), 189–217. <https://doi.org/10.1287/isre.14.2.189.16018>
- Chiyangwa, T. B., & (Trish) Alexander, P. M. (2016). Rapidly co-evolving technology adoption and diffusion models. *Telematics and Informatics*, *33*(1), 56–76. <https://doi.org/10.1016/j.tele.2015.05.004>
- Chong, A. Y.-L., Ooi, K.-B., Lin, B., & Tang, S. Y. (2009a). Influence of interorganizational relationships on SMEs' e-business adoption. *Internet Research*, *19*(3), 313–331. <https://doi.org/10.1108/10662240910965379>

- Chong, A. Y.-L., Ooi, K.-B., Lin, B., & Tang, S. Y. (2009b). Influence of interorganizational relationships on SMEs' e-business adoption. *Internet Research, 19*(3), 313–331. <https://doi.org/10.1108/10662240910965379>
- Chong, W. K., Man, K. L., Chen, C., & Lai, H. Y. (2011). Design and Development of B2B e-Commerce Framework for Malaysian SMEs. *Proceedings of the International MultiConference of Engineers and Computer Scientists, II*, 16–19.
- Churchill, G. . (1999). *Marketing research methodological foundations*. Fort Worth: T: The Dryden Press.
- Chwelos, P., Benbasat, I., & Dexter, A. S. (2001). Empirical Test of an EDI Adoption Model. *Information System Research, 12*(3), 304–321.
- Cohen, J. (1988). Statistical Power Analysis for the Behavioural Science (2nd Edition). In *Statistical Power Analysis for the Behavioural Science* (2nd ed.). Routledge.
- Cooper, R. B., & Zmud, R. W. (1990). Information Technology Implementation Research : A Technological Diffusion Approach. *Management Science, 36*(2), 123–139.
- Corley, K., & Gioia, D. (2011). Building theory about theory building: What constitutes a theoretical contribution? *Academy of Management Review, 36*(1), 12–32. <https://doi.org/10.5465/amr.2009.0486>
- Creswell, J.W. (1994). *Research Design: Qualitative and Quantitative approaches*. Thousand Oaks: Sage.
- Creswell, John W., & Creswell, D. J. (2017). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (2nd Edition)*. *Organizational Research Methods*.
- Cripps, H. (2009). Enablers and impediments to IT adoption in business relationships Evidence from Australia and Finland, *11*(2), 185–200. <https://doi.org/10.1108/13287260910955138>
- Cruz-Jesus, F., Pinheiro, A., & Oliveira, T. (2019). Understanding CRM adoption stages: empirical analysis building on the TOE framework. *Computers in Industry, 109*, 1–13. <https://doi.org/10.1016/j.compind.2019.03.007>
- Currivan, D. B. (2011). *Sampling frame*. (M. S. Lewis-Beck, A. Bryman, & T. F. L. Book, Eds.). Sage Publications, Inc. <https://doi.org/http://dx.doi.org/10.4135/9781412950589.n884>
- Damanpour, F., & Schneider, M. (2006). Phases of the Adoption of Innovation in Organizations: Effects of Environment, Organization and Top Managers. *British Journal of Management, 17*(3), 215–236. <https://doi.org/10.1111/j.1467-8551.2006.00498.x>

- Darbanhosseiniamirkhiz, M., & Wan Ismail, W. K. (2012). Advanced Manufacturing Technology Adoption in SMEs: an Integrative Model. *Journal of Technology Management & Innovation*, 7(4), 112–120. <https://doi.org/10.4067/S0718-27242012000400009>
- David, Y. K. T. (2009). A study of e-recruitment technology adoption in Malaysia. *Industrial Management & Data Systems*, 109(2), 281–300. <https://doi.org/10.1108/02635570910930145>
- Davis, F. D. (1986). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Massachusetts Institute of Technology.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance. *MIS Quarterly*, 13(3), 319–339. <https://doi.org/10.2307/249008>
- Davis, F. D., & Morris, M. G. (2007). Dead or alive? The development, trajectory and future of technology adoption research. *Journal of the Association for Informaiton Systems*, 8(4), 267–286.
- de Búrca, S., Fynes, B., & Marshall, D. (2005). Strategic technology adoption: extending ERP across the supply chain. *Journal of Enterprise Information Management*, 18(4), 427–440. <https://doi.org/10.1108/17410390510609581>
- Dimaggio, P. J., & Powell, W. W. (1983). The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. *American Sociological Review*, 48(2), 147–160. Retrieved from <http://www.jstor.org/stable/2095101>
- Doh, S., & Kim, B. (2014). Government support for SME innovations in the regional industries: The case of government financial support program in South Korea. *Research Policy*, 43(9), 1557–1569. <https://doi.org/10.1016/j.respol.2014.05.001>
- Duffy, S. (2010). Factors Influencing Technology Adoption Amongst Tourism SMEs. In *Tourism and Hospitality Research in Ireland Conference* (pp. 1–23).
- Dunt, E. S., & Harper, I. R. (2002). E-Commerce and the Australian Economy. *Economic Record*, 78(242), 327–342. <https://doi.org/10.1111/1475-4932.00061>
- Dyerson, R., Spinelli, R., & G. Harindranath. (2016). Revisiting IT readiness: An approach fro small firms. *Industrial Management & Data Systems*, 116(7), 546–563. <https://doi.org/10.1108/02635570710734262>
- Economic and Financial Developments in the Malaysian Economy in the First Quarter of 2018*. (2018). Retrieved from http://www.bnm.gov.my/index.php?ch=en_publication&pg=en_qb&ac=173&lang=en&uc=2

- El Kadiri, S., Grabot, B., Thoben, K. D., Hribernik, K., Emmanouilidis, C., Von Cieminski, G., & Kiritsis, D. (2016). Current trends on ICT technologies for enterprise information systems. *Computers in Industry*, 79, 14–33. <https://doi.org/10.1016/j.compind.2015.06.008>
- Elbeltagi, I., Sharji, Y. Al, & Elsetouhi, A. (2013). The Role of the Owner-Manager in SMEs' Adoption of Information and Communication Technology in the United Arab Emirates. *Journal of Global Information Management*, 21(June), 23–50. <https://doi.org/10.4018/jgim.2013040102>
- Eleventh Malaysia Plan: Driving ICT in the Knowledge Economy*. (2015). Retrieved from <http://rmk11.epu.gov.my/pdf/strategy-paper/Strategy Paper 15.pdf>
- Eze, S. C., Olatunji, S., Chinedu-Eze, V. C., & Bello, A. O. (2018). Key success factors influencing SME managers' information behaviour on emerging ICT (EICT) adoption decision-making in UK SMEs. *Bottom Line*. <https://doi.org/10.1108/BL-02-2018-0008>
- Fallis, A. . (2013). *Research Design Qualitative, Quantitative and Mixed Methods Approaches*. *Journal of Chemical Information and Modeling* (Vol. 53). <https://doi.org/10.1017/CBO9781107415324.004>
- Farhoomand, A. (2009). Study on ICT Adoption in Hong Kong SMEs. *Office of the Government Chief Information Officer The Government of Hong Kong*. Retrieved from [http://www.digital21.gov.hk/eng/statistics/download/Adoption Study Final Report \(web Version\).pdf](http://www.digital21.gov.hk/eng/statistics/download/Adoption Study Final Report (web Version).pdf)
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behavior Research Methods*, 41(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*.
- Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley. <https://doi.org/10.1017/CBO9781107415324.004>
- Folorunso, O., Vincent, R. O., Adekoya, F. A., & Ogunde, A. O. (2009). Diffusion of Innovation in Social Networking Sites among University Students. *International Journal of Computer Science and Security*, 4(3), 361–372.
- Fornell, C., & Larcker, D. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.2307/3151312>
- Forth, J., & Mason, G. (2004). Information and Communication Technology (ICT) Adoption and Utilisation , Skill Constraints and Firm- Level Performance : Evidence from UK Benchmarking Surveys, 1–40.

- Fyrberg, A., & Jürriado, R. (2009). What about interaction?: Networks and brands as integrators within service-dominant logic. *Journal of Service Management*, 20(4), 420–432. <https://doi.org/10.1108/09564230910978511>
- Gangwar, H., Date, H., & Raoot, A. D. (2014). Review on IT adoption: insights from recent technologies. *Journal of Enterprise Information Management*, 27(4), 488–502. <https://doi.org/10.1108/JEIM-08-2012-0047>
- Gao, T., Leichter, G., & Wei, Y. (Susan). (2012). Countervailing effects of value and risk perceptions in manufacturers' adoption of expensive, discontinuous innovations. *Industrial Marketing Management*, 41(4), 659–668. <https://doi.org/10.1016/j.indmarman.2011.09.014>
- Gao, T. T., Leichter, G., & Wei, Y. S. (2012). Countervailing effects of value and risk perceptions in manufacturers' adoption of expensive, discontinuous innovations. *Industrial Marketing Management*, 41(4), 659–668. <https://doi.org/10.1016/j.indmarman.2011.09.014>
- Gay, L. R., & Diehl, P. L. (2017). *Research Methods for Business and Management*. *Research Methods for Business and Management*. New York: Macmillan. <https://doi.org/10.23912/978-1-910158-51-7-2736>
- Gharavi, H., Love, P. E. D., & Cheng, E. W. L. (2004). Information and communication technology in the stockbroking industry: an evolutionary approach to the diffusion of innovation. *Industrial Management & Data Systems*, 104(9), 756–765. <https://doi.org/10.1108/02635570410567748>
- Ghobakhloo, M., Arias-Aranda, D., & Benitez-Amado, J. (2011). *Adoption of e-commerce applications in SMEs*. *Industrial Management & Data Systems* (Vol. 111). <https://doi.org/10.1108/02635571111170785>
- Ghobakhloo, M., Hong, T. S., Sabouri, M. S., & Zulkifli, N. (2012). Strategies for Successful Information Technology Adoption in Small and Medium-sized Enterprises. *Information*, 3(1), 36–67. <https://doi.org/10.3390/info3010036>
- Ghobakhloo, M., Sabouri, M. S., Tang, S. H., & Zulkifli, N. (2011). Information Technology Adoption in Small and Medium-sized Enterprises; An Appraisal of Two Decades Literature. *Interdisciplinary Journal of Research in Business*, 1(7), 53–80.
- Gholami, R., Sulaiman, A. B., Ramayah, T., & Molla, A. (2013). Senior managers' perception on green information systems (IS) adoption and environmental performance: Results from a field survey. *Information & Management*, 50(7), 431–438. <https://doi.org/10.1016/j.im.2013.01.004>
- Gibbs, J., & Kraemer, K. (2004). A cross-country investigation of the determinants of scope of e-commerce use: An institutional approach. *Electronic Markets*, 14(2), 124–137. <https://doi.org/10.1080/10196780410001675077>

- Gilaninia, S., Mousavian, S. J., Omidvari, N., Bakhshalipour, A., Bakhshalipour, A., Eftekhari, F.; & Seighalani, F. Z. (2012). The Role of ICT in Performance of Small and Medium Enterprises. *Interdisciplinary Journal of Contemporary Research in Business*, 3(9), 833–839.
- Gill, S. S., Tuli, S., Xu, M., Singh, I., Singh, K. V., Lindsay, D., ... Garraghan, P. (2019). Transformative Effects of IoT, Blockchain and Artificial Intelligence on Cloud Computing: Evolution, Vision, Trends and Open Challenges. *Internet of Things*, 100118. <https://doi.org/10.1016/j.iot.2019.100118>
- Giropoulos, I., Kontolaimou, A., Korra, E., & Tsakanikas, A. (2017). What drives ICT adoption by SMEs? Evidence from a large-scale survey in Greece. *Journal of Business Research*, 81(August), 60–69. <https://doi.org/10.1016/j.jbusres.2017.08.007>
- Golding, P., Donaldson, O., Tennant, V., & Black, K. (2008). an Analysis of Factors Affecting the Adoption of Ict By Msmes in Rural and Urban Jamaica. *ECIS 2008 Proceedings Website*, 237.
- Grewal, R., & Dharwadkar, R. (2002). The Role of the Institutional Environment in Marketing Channels. *Journal of Marketing*, 66(3), 82–97. <https://doi.org/10.1509/jmkg.66.3.82.18504>
- Gusaptono, R. H., Effendi, M. I., & Charibaldi, N. (2012). The Information Technology (IT) Adoption Process and E- Readiness to Use within Yogyakarta Indonesian Small Medium Enterprises (SME). *JICT-International Journal of Information and Communication Technology Research*, 2(1), 29–37.
- Gye-Soo, K. (2016). Partial Least Squares Structural Equation Modeling(PLS-SEM): An application in Customer Satisfaction Research. *International Journal of U- and e- Service, Science and Technology*, 9(4), 61–68. <https://doi.org/10.14257/ijunesst.2016.9.4.07>
- H. Zaied, A. N. (2012). Barriers to E-Commerce Adoption in Egyptian SMEs. *International Journal of Information Engineering and Electronic Business*, 4(3), 9–18. <https://doi.org/10.5815/ijieeb.2012.03.02>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). Partial least squares structural equation modeling (PLS-SEM). *Sage Publisher*, 1–329. <https://doi.org/10.1108/EBR-10-2013-0128>
- Hair, Black, W., Babin, B., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). Prentice Hall.
- Hair, F. J., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. SAGE Publications. <https://doi.org/10.1016/j.lrp.2013.01.002>
- Hair, J., Celsi, M., Money, A., Samouel, P., & Page, M. (2014). *Essentials of business research methods. Essentials of business research methods*.

- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate Data Analysis*. Prentice Hall (7th ed.). Prentice Hall.
- Hair, J. F., Hult, T. M., Ringle, C. M., & Sarstedt, M. (2014). *A primer on partial least square structural equation modeling (PLS-SEM)*. Sage Publications.
- Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, 26(2), 106–121.
- Hair, J.F., Ringle, C. M., & Sarstedt, M. (2013). Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. *Long Range Planning*, 46(1–2), 1–12. <https://doi.org/10.1016/j.lrp.2013.01.001>
- Hair, Joe F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *The Journal of Marketing Theory and Practice*, 19(2), 139–152. <https://doi.org/10.2753/MTP1069-6679190202>
- Hair, Joe F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*. <https://doi.org/10.1007/s11747-011-0261-6>
- Hair, Joseph. F, Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Hameed, M. A., & Counsell, S. (2014). Establishing relationships between innovation characteristics and it innovation adoption in organisations: A meta-analysis approach. *International Journal of Innovation Management*, 18(1), 1450007. <https://doi.org/10.1142/S1363919614500078>
- Hanafizadeh, P., Keating, B. W., & Khedmatgozar, H. R. (2014). A systematic review of Internet banking adoption. *Telematics and Informatics*, 31(3), 492–510. <https://doi.org/10.1016/j.tele.2013.04.003>
- Hansen, T., Jensen, J. M., & Solgaard, H. S. (2004). Predicting online grocery buying intention: A comparison of the theory of reasoned action and the theory of planned behavior. *International Journal of Information Management*, 24(6), 539–550. <https://doi.org/10.1016/j.ijinfomgt.2004.08.004>
- Harrigan, P., Schroeder, A., Qureshi, I., Fang, Y., Ibbotson, P., Ramsey, E., & Meister, D. (2010). Internet Technologies, ECRM Capabilities, and Performance Benefits for SMEs: An Exploratory Study. *International Journal of Electronic Commerce*, 15(2), 7–46. <https://doi.org/10.2753/jec1086-4415150201>
- Hartono, E., Holsapple, C. W., Kim, K. Y., Na, K. S., & Simpson, J. T. (2014). Measuring perceived security in B2C electronic commerce website usage: A respecification and validation. *Decision Support Systems*, 62, 11–21. <https://doi.org/10.1016/j.dss.2014.02.006>

- Hashim, J. (2007). Information Communication Technology (ICT) Adoption Among SME Owners in Malaysia. *International Journal of Business and Information*, 2(2), 221–240.
- Hashim, N. A. (2011). E-commerce and government policy initiatives for Malaysian SMEs: the need for assessment. *Science and Public Policy*, 38(10), 807–816. <https://doi.org/10.3152/030234211X13122939587752>
- Hashim, N. H., Murphy, J., Purchase, S., & O'Connor, P. (2010). Website and email adoption by Malaysian hotels. *International Journal of Hospitality Management*, 29(1), 194–196. <https://doi.org/10.1016/j.ijhm.2009.05.003>
- Hassan, D., & Ali, S. (2012). Exploring E-commerce commerce Activity in Malaysia : Challenges and Opportunities. *Journal of Economics and Sustainable Development*, 3(10), 48–53.
- Haug, A., Pedersen, S. G., & Arlbjørn, J. S. (2011). IT readiness in small and medium-sized enterprises. *Industrial Management & Data Systems*, 111(4), 490–508. <https://doi.org/10.1108/02635571111133515>
- Haunschild, P. R., & Miner, A. S. (1997). Modes of Interorganizational Imitation : The Effects of Outcome Salience and Uncertainty. *Administrative Science Quarterly*, 42(3), 472–500.
- Henseler, J., & Chin, W. W. (2010). A comparison of approaches for the analysis of interaction effects between latent variables using partial least squares path modeling. *Structural Equation Modeling*. <https://doi.org/10.1080/10705510903439003>
- Henseler, J., & Fassott, G. (2010). Testing Moderating Effects in PLS Path Models: An Illustration of Available Procedures. In *Handbook of Partial Least Squares* (pp. 713–735). https://doi.org/10.1007/978-3-540-32827-8_31
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hill, S. R., Burgan, B., & Troshani, I. (2011). Understanding broadband adoption in rural Australia. *Industrial Management & Data Systems*, 111(7), 1087–1104. <https://doi.org/10.1108/02635571111161307>
- Hoejmose, S. U., Grosvold, J., & Millington, A. (2014). The effect of institutional pressure on cooperative and coercive “green” supply chain practices. *Journal of Purchasing and Supply Management*, 20(4), 215–224. <https://doi.org/10.1016/j.pursup.2014.07.002>

- Hong, C. L. (2005). E-Commerce adoption in Brunei Darussalam: A quantitative analysis of factors influencing its adoption. *Communications of the Association for Information Systems, 15*, 61–81.
- Hoti, E. (2015). The technological, organizational and environmental framework of IS innovation adaption in small and medium enterprises. Evidence from research over the last 10 years. *International Journal of Business and Management, III(4)*, 1–14. <https://doi.org/10.20472/BM.2015.3.4.001>
- Houghton, K. a. (2004). The Effect of Website and E-Commerce Adoption on the Relationship between SMEs and Their Export Intermediaries. *International Small Business Journal, 22(4)*, 369–388. <https://doi.org/10.1177/0266242604044305>
- Hsiao, K.-L. (2013). Android smartphone adoption and intention to pay for mobile internet: Perspectives from software, hardware, design, and value. *Library Hi Tech, 31(2)*, 216–235. <https://doi.org/10.1108/07378831311329022>
- Hua, S. C., Rajesh, M. J., & Theng, L. B. (2009). Determinants of E-Commerce Adoption Among Small and Medium-Sized Enterprises in Malaysia. *International Journal of E-Adoption, 1(4)*, 1–18. <https://doi.org/10.4018/jea.2009100101>
- Huang, Z., Janz, B. D., & Frolick, M. N. (2008). A Comprehensive Examination of Internet-EDI Adoption. *Information Systems Management, 25(3)*, 273–286. <https://doi.org/10.1080/10580530802151228>
- Huff, S. L., & Munro, M. C. (1985). Information Technology Assessment and Adoption: A Field Study. *MIS Quarterly, 9(4)*, 327–340.
- Hulland, J. (1999). Use of Partial Least Squares (PLS) in Strategic Management Research: A Review of Four Recent Studies. *Strategic Management Journal, 20(2)*, 195–199. <https://doi.org/10.1007/s13398-014-0173-7.2>
- Huo, B., Han, Z., Zhao, X., Zhou, H., Wood, C. H., & Zhai, X. (2013). The impact of institutional pressures on supplier integration and financial performance: Evidence from China. *International Journal of Production Economics, 146(1)*, 82–94. <https://doi.org/10.1016/j.ijpe.2013.01.013>
- Husnayati, H., Rafidah, M. N., & Mohd Adam, S. (2008). Perceived Attributes of E-Commerce and the Adoption Decision : The Case of Malaysian SMEs. *Jurnal Teknologi Maklumat & Multimedia, 5*, 107–125. Retrieved from http://www.ukm.my/jitm/pdf_text/06.pdf
- Hussin, H., & Noor, R. M. (2005). Innovating Business Through E-commerce: Exploring the Willingness of Malaysian SMEs. In *The Second International Conference on Innovations in IT (IIT'05)* (pp. 1–10).

- Hussin, H., Nor, R. M., & Suhaimi, M. A. (2008). Perceived Attributes of E-Commerce and the Adoption Decision : The Case of Malaysian SMEs. *Jurnal Teknologi Maklumat & Multimedia*, 5, 107–125.
- Hwang, B.-N., Huang, C.-Y., & Chih-Hsiung Wu. (2016). A TOE approach to establish a green supply chain adoption decision model in the semiconductor industry. *Sustainability (Switzerland)*, 8(2). <https://doi.org/10.3390/su8020168>
- Hwang, Y. (2010). The moderating effects of gender on e-commerce systems adoption factors: An empirical investigation. *Computers in Human Behavior*, 26(6), 1753–1760. <https://doi.org/10.1016/j.chb.2010.07.002>
- Hyland, P. N., Harvie, C., & Macgregor, R. C. (2009). Do organisational characteristics explain the differences between drivers of ICT adoption in rural and urban general practices in Australia. *Australasian Journal of Information Systems*, 16(1), 77–97.
- Iacovou, C. L., Benbasat, I., & Dexter, A. S. (1995). Electronic Data Interchange and Small Organizations : and Impact Adoption of Technology. *MIS Quarterly*, 19(4), 465–485.
- ICT facts and figures 2016*. (2016). Retrieved from <http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2016.pdf>
- Ifinedo, P. (2011). An Empirical Analysis of Factors Influencing Internet/E-Business Technologies Adoption by SMEs in Canada. *International Journal of Information Technology & Decision Making*, 10(4), 731–766. <https://doi.org/10.1142/S0219622011004543>
- Ifinedo, P. (2012). Internet/E-Business Technologies Acceptance in Canada's SMEs: Focus on Organizational and Environmental Factors. In *E-Business - Applications and Global Acceptance* (pp. 1–19). InTech. <https://doi.org/10.5772/34108>
- Indrayanto. (2013). Policing : An International Journal of Police Strategies & Management Article information : *Occupational Stress and Burnout between Male and Female Police Officers: Are There Any Gender Differences?*, 30(4), 672–691. <https://doi.org/10.1108/13639510210450631>
- Iqbal, S., & Qureshi, I. a. (2012). M-learning adoption: A perspective from a developing country. *International Review of Research in Open and Distance Learning*, 13(3), 147–164.
- Islam, M. A., Ahmad, T. S., Khan, M. A., & Ali, M. H. (2010). Adoption Of M-Commerce Services : The Case Of Bangladesh. *World Journal of Management*, 2(1), 37–54.

- Ismail, A. F., Murphy, J., Chern, B. H., & Sambivan, M. (2013). The diffusion of information technology applications in Malaysia's foodservice industry. *Journal of Hospitality and Tourism Technology*, 4(3), 1–8. <https://doi.org/10.1108/JHTT-06-2011-0020>
- Jaganathan, M., Mahmood, R., & Ahmad, S. (2013). The Effect of Environmental Factors on ICT Adoption Among Rural-based Small and Medium Enterprises in Malaysia. *Adv. Environ. Biol*, 8(9), 563–569.
- Jalaludin, D., Sulaiman, M., & Ahmad, N. N. N. (2011). Understanding environmental management accounting (EMA) adoption: a new institutional sociology perspective. *Social Responsibility Journal*, 7(4), 540–557. <https://doi.org/10.1108/174711111111175128>
- James, J. (2003). Sustainable Internet access for the rural poor? Elements of an emerging Indian model. *Futures*, 35(5), 461–472. [https://doi.org/10.1016/S0016-3287\(02\)00092-7](https://doi.org/10.1016/S0016-3287(02)00092-7)
- Janita, I., & Chong, W. K. (2013a). Barriers of B2B e-business adoption in Indonesian SMEs: A literature analysis. In *Procedia Computer Science* (Vol. 17). <https://doi.org/10.1016/j.procs.2013.05.073>
- Janita, I., & Chong, W. K. (2013b). Barriers of B2B e-Business Adoption in Indonesian SMEs: A Literature Analysis. *Procedia Computer Science*, 17, 571–578. <https://doi.org/10.1016/j.procs.2013.05.073>
- Jardali, H. Al, Abdallah, F., & Barbar, K. (2015). Measuring Intentions among Employees toward the Use of a Balanced Scorecard and Information System: A Conceptual Approach Using the Theory of Planned Behavior and the Technology Acceptance Model. *Procedia Economics and Finance*, 26, 1146–1151. [https://doi.org/10.1016/S2212-5671\(15\)00944-2](https://doi.org/10.1016/S2212-5671(15)00944-2)
- Jeon, B. N., Han, K. S., & Lee, M. J. (2006). Determining factors for the adoption of e-business: the case of SMEs in Korea. *Applied Economics*, 38(16), 1905–1916. <https://doi.org/10.1080/00036840500427262>
- Jerald, H., & Michael, A. (1970). *Social change in complex organization*. New York: Random House.
- Jeyaraj, A., Rottman, J. W., & Lacity, M. C. (2006). A review of the predictors, linkages, and biases in IT innovation adoption research. *Journal of Information Technology*, 21(1), 1–23. <https://doi.org/10.1057/palgrave.jit.2000056>
- Jick, T. D. (1979). Mixing Qualitative and Quantitative Methods: Triangulation in Action. *Administrative Science Quarterly*, 24(4), 602. <https://doi.org/10.2307/2392366>

- Jon, K. J. K., Lai, T. L. L. T. L., Hui, C. K. H. C. K., Dennis, N. C. H. D. N. C. H., & Meng, T. S. M. T. S. (2001). Electronic commerce adoption by SMEs in Singapore. *Proceedings of the 34th Annual Hawaii International Conference on System Sciences*. <https://doi.org/10.1109/HICSS.2001.927068>
- Joo, J., & Sang, Y. (2013). Exploring Koreans' smartphone usage: An integrated model of the technology acceptance model and uses and gratifications theory. *Computers in Human Behavior*, 29(6), 2512–2518. <https://doi.org/10.1016/j.chb.2013.06.002>
- Juárez-Luis, G., Sánchez-Medina, P. S., & Díaz-Pichardo, R. (2018). Institutional pressures and green practices in small agricultural businesses in Mexico: The mediating effect of farmers' environmental concern. *Sustainability (Switzerland)*, 10(12). <https://doi.org/10.3390/su10124461>
- Kader, R. A., Azid, A., & Che, H. (2009). Success Factors for Small Rural Entrepreneurs under the One- District-One-Industry Programme in Malaysia. *Contemporary Management Research*, 5(2), 147–162.
- Kakroo, U. (2007). *ICT empowering citizens of Malaysia : Development with Destiny*.
- Kannabiran, G., & Dharmalingam, P. (2012). Enablers and inhibitors of advanced information technologies adoption by SMEs: An empirical study of auto ancillaries in India. *Journal of Enterprise Information Management*, 25(2), 186–209.
- Katherine, J. K., & Sorra, J. S. (1996). The Challenge of Innovation Implementation. *Academy of Management Review*, 21(4), 1055–1080.
- Khalifa, M., & Davison, R. M. (2006). SME adoption of IT: The case of electronic trading systems. *IEEE Transactions on Engineering Management*, 53(2), 275–284. <https://doi.org/10.1109/TEM.2006.872251>
- Khan, M. J., Dominic, P. D. D., Khan, A., & Naseebullah. (2010). Adoption of e-commerce in Malaysia and its affect on the business performance: An organizational perspective. In *Proceedings 2010 International Symposium on Information Technology - Visual Informatics, ITSIM'10* (Vol. 1). <https://doi.org/10.1109/ITSIM.2010.5561340>
- Khan, M. J., P.D.D., D., Khan, A., & Naseebullah. (2010). Adoption of e-commerce in Malaysia and its affect on the business performance: An organizational perspective. In *Proceedings 2010 International Symposium on Information Technology - Visual Informatics*. <https://doi.org/10.1109/ITSIM.2010.5561340>
- Khan, M. W. J., & Muhammad, K. (2014). An Overview of Small and Medium Enterprises in Malaysia and Pakistan: Past, Present and Future Scenario. *Business and Management Horizons*, 2(2), 38–49. <https://doi.org/10.5296/bmh.v2i2.5792>

- Khong, S. T., Choy Chong, S., Lin, B., & Cyril Eze, U. (2010). Internet based ICT adoption among SMEs. *Journal of Enterprise Information Management*, 23(1), 27–55. <https://doi.org/10.1108/17410391011008897>
- Khong, S. T., & Eze, U. C. (2008). An empirical study of internet-based ICT adoption among Malaysian SMEs. *Communications of the IBIMA*, 1, 1–12.
- Khong, S. T., Siong, C. C., Binshan, L., & Uchenna, C. E. (2009). Internet-based ICT adoption: evidence from Malaysian SMEs. *Industrial Management & Data Systems*, 109(2), 224–244. <https://doi.org/10.1108/02635570910930118>
- Khong, S. T., Siong, C. C., Lin, B., & Cyril Eze, U. (2010). Internet-based ICT adoption among SMEs. *Journal of Enterprise Information Management*, 23(1), 27–55. <https://doi.org/10.1108/17410391011008897>
- Khong, S. T., Uchenna, C. E., & Siong, C. C. (2012). Effects of Industry Type on ICT Adoption among Malaysian SMEs. *Journal of Supply Chain and Customer Relationship Management*, 1–12. <https://doi.org/10.5171/2012.113797>
- Kijsanayotin, B., Pannarunothai, S., & Speedie, S. M. (2009). Factors influencing health information technology adoption in Thailand's community health centers: Applying the UTAUT model. *International Journal of Medical Informatics*, 78(6), 404–416. <https://doi.org/10.1016/j.ijmedinf.2008.12.005>
- Kim, D., & Ammeter, T. (2014). Predicting personal information system adoption using an integrated diffusion model. *Information and Management*, 51(4), 451–464. <https://doi.org/10.1016/j.im.2014.02.011>
- Kim, H.-C. (2005). *Factors influencing the adoption of new information technology in college and university foodservices*. Oklahoma State University.
- Kim, S., Kim, E., Suh, Y., & Zheng, Z. (2016). The effect of service innovation on R&D activities and government support systems: the moderating role of government support systems in Korea. *Journal of Open Innovation: Technology, Market, and Complexity*, 2(1), 5. <https://doi.org/10.1186/s40852-016-0032-1>
- Kimchi, J., Polivka, B., & Stevenson, J. S. (1991). Triangulation: Operational definitions. *Nursing Research*, 40(6), 364–366.
- Kinnunen, J. (1996). Gabriel Tarde as a Founding Father of Innovation Diffusion Research. *Acta Sociologica*, 39(4), 431–442. <https://doi.org/10.1177/000169939603900404>
- Kiveu, M., & Ofafa, G. (2013). Enhancing market access in Kenyan SMEs using ICT. *Global Business and Economic Research Journal*, 2(9), 29–46.

- Kocyigit, O., & Ringle, C. M. (2011). The impact of brand confusion on sustainable brand satisfaction and private label proneness: A subtle decay of brand equity. *Journal of Brand Management*, 19(3), 195–212. <https://doi.org/10.1057/bm.2011.32>
- Kollmann, T., Kuckertz, A., & Breugst, N. (2009a). Organizational readiness and the adoption of electronic business. *ACM SIGMIS Database*, 40(4), 117. <https://doi.org/10.1145/1644953.1644961>
- Kollmann, T., Kuckertz, A., & Breugst, N. (2009b). Organizational Readiness and the Adoption of Electronic Business – The Moderating Role of National Culture in 29 European Countries, 40(4), 117–132.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, 38(1), 607–610. <https://doi.org/10.1177/001316447003000308>
- Krell, K., Matook, S., & Rohde, F. (2016). The impact of legitimacy-based motives on IS adoption success: An institutional theory perspective. *Information & Management*, 53(6), 683–697. <https://doi.org/10.1016/j.im.2016.02.006>
- Kuan, K. K. Y., & Chau, P. Y. K. (2001). A perception-based model for EDI adoption in small businesses using a technology-organization-environment framework. *Information and Management*, 38(8), 507–521. [https://doi.org/10.1016/S0378-7206\(01\)00073-8](https://doi.org/10.1016/S0378-7206(01)00073-8)
- Kumar, R. (2015). *Research Methodology: A Step-by-Step Guide for Beginners* (4th ed.). Sage Publication Ltd.
- Kung, L., Cegielski, C. G., & Kung, H.-J. (2015). An integrated environmental perspective on software as a service adoption in manufacturing and retail firms. *Journal of Information Technology*, 30(4), 352–363. <https://doi.org/10.1057/jit.2015.14>
- Kuppusamy, M., Raman, M., & Lee, G. (2009). Whose Ict Investment Matters To Economic Growth: Private or Public? the Malaysian Perspective. *The Electronic Journal of Information Systems in Developing Countries*, 37(7), 1–19.
- Kurnia, S., Alzougool, B., Ali, M., & Alhashmi, S. M. (2009). Adoption of electronic commerce technologies by SMEs in Malaysia. In *Proceedings of the 42nd Annual Hawaii International Conference on System Sciences, HICSS* (pp. 19–21). <https://doi.org/10.1109/HICSS.2009.49>
- Kurnia, S., Choudrie, J., Mahbubur, R. M., & Alzougool, B. (2015). E-commerce technology adoption: A Malaysian grocery SME retail sector study. *Journal of Business Research*, 68(9), 1906–1918. <https://doi.org/10.1016/j.jbusres.2014.12.010>

- Kusumaningtyas, N., & Suwanto, D. H. (2015). ICT Adoption, Skill and Use Differences among Small and Medium Enterprises Managers Based on Demographic Factors. *Procedia - Social and Behavioral Sciences*, 169(August 2014), 296–302. <https://doi.org/10.1016/j.sbspro.2015.01.313>
- Lai, V. S. (2008). The Information System Strategies of MNC Affiliates. *Journal of Global Information Management*, 16(3), 74–96. <https://doi.org/10.4018/jgim.2008070104>
- Lai, V. S., & Guynes, J. L. (1994). A model of ISDN (integrated services digital network) adoption in U.S. corporations. *Information and Management*, 26(2), 75–84. [https://doi.org/10.1016/0378-7206\(94\)90055-8](https://doi.org/10.1016/0378-7206(94)90055-8)
- Lane, D. M. (2011). Online Statistics Education: Interpreting Non-Significant Results. In M. Lovric (Ed.) (pp. 386–388). Berlin, Heidelberg: Springer Berlin Heidelberg. <https://doi.org/10.1007/978-3-642-04898-2>
- Le, V. H., Rowe, F., Truex, D., & Huynh, M. Q. (2012). An Empirical Study of Determinants of E-Commerce Adoption in SMEs in Vietnam. *Journal of Global Information Management*, 20(3), 23–54. <https://doi.org/10.4018/jgim.2012070102>
- Lee, D., Ahn, H., & Kim, C. (2009). *The Effect of Government Support on e - Business. Informatization Policy.*
- Lee, M. C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*, 8(3), 130–141. <https://doi.org/10.1016/j.elerap.2008.11.006>
- Lee, S., & Kim, K. jae. (2007). Factors affecting the implementation success of Internet-based information systems. *Computers in Human Behavior*, 23(4), 1853–1880. <https://doi.org/10.1016/j.chb.2005.12.001>
- Lee, Y., Kozar, K. A., & Larsen, K. R. T. (2003). The Technology Acceptance Model: Past, Present, and Future. *Communications of the Association for Information Systems*, 12(50), 752–780. <https://doi.org/10.1037/0011816>
- Lertwongsatien, C., Wongpinunwatana, N., & Achakulwisut, A. (2004). Factors influencing electronic commerce adoption in small and medium businesses: an empirical study in Thailand. In *Electronic commerce in Small to Medium-Sized Enterprises: Frameworks, Issues and Implications* (pp. 106–127).
- Li, F., & Ding, D. Z. (2013). The effect of institutional isomorphic pressure on the internationalization of firms in an emerging economy: evidence from China. *Asia Pacific Business Review*, 19(4), 506–525. <https://doi.org/10.1080/13602381.2013.807602>

- Li, X., Pillutla, S., Zhou, H., & Yao, D.-Q. (2015). Drivers of Adoption and Continued Use of E-Procurement Systems: Empirical Evidence from China. *Journal of Organizational Computing and Electronic Commerce*, 25(3), 262. <https://doi.org/10.1080/10919392.2015.1058113>
- Li, Y. H. (2008). An empirical investigation on the determinants of E-procurement adoption in Chinese manufacturing enterprises. In *2008 International Conference on Management Science and Engineering* (pp. 32–37). <https://doi.org/10.1109/ICMSE.2008.4668890>
- Li, Z., Millman, C., & Chi, R. (2013). Government support, international trade and firm's R&D investment. *Journal of Science and Technology Policy in China*, 2(2), 146–158. <https://doi.org/http://dx.doi.org/10.1108/17585521111155200>
- Liang, H., Saraf, N., Hu, Q., & Xue, Y. (2007). Assimilation of Enterprise Systems: the Effect of Institutional Pressures and the Mediating Role of Top Management. *MIS Quarterly*, 31(1), 59–89.
- Lim, S. C., & Baharudin, A. S. (2013). Factors influence small medium enterprises in Penang Island reluctant to use e-Commerce: A research proposal. *Jurnal Teknologi*, 64(2), 55–59. <https://doi.org/10.11113/jt.v64.2236>
- Lin, C.-Y. (2007). Adoption of Green Supply Chain Practices in Taiwan ' s Logistics Industry. *Journal of International Management Studies*, (August), 90–98.
- Lin, C. A., & Kim, T. (2016). Predicting user response to sponsored advertising on social media via the technology acceptance model. *Computers in Human Behavior*, 64, 710–718. <https://doi.org/10.1016/j.chb.2016.07.027>
- Lin, C., & Jung, C. (2005). Influences of Individual , Organizational and Environmental Factors on Technological Innovation in Taiwan ' s Logistics Industry. *Journal of Statistics and Management Science*, 9(3), 613–631.
- Lin, L.-H., & Ho, Y.-L. (2016). Institutional Pressures and Environmental Performance in the Global Automotive Industry: The Mediating Role of Organizational Ambidexterity. *Long Range Planning*. <https://doi.org/10.1016/j.lrp.2015.12.010>
- Lippert, S. K., & Govindrajulu, C. (2006). Technological , Organizational , and Environmental Antecedents to Web Services Adoption. *Communications of the IIMA*, 6(1), 146–158.
- Liu, H., Ke, W., Wei, K. K., Gu, J., & Chen, H. (2010). The role of institutional pressures and organizational culture in the firm's intention to adopt internet-enabled supply chain management systems. *Journal of Operations Management*, 28(5), 372–384. <https://doi.org/10.1016/j.jom.2009.11.010>

- Low, C., Chen, Y., & Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial Management & Data Systems*, 111(7), 1006–1023. <https://doi.org/10.1108/02635571111161262>
- Lu, J., Yao, J. E., & Yu, C. (2005). Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. *The Journal of Strategic Information Systems*, 14(3), 245–268. <https://doi.org/10.1016/j.jsis.2005.07.003>
- Lucchetti, R., & Sterlacchini, A. (2004). The Adoption of ICT among SMEs: Evidence from an Italian Survey. *Small Business Economics*, 23(2), 151–168. <https://doi.org/10.1023/B:SBEJ.0000027667.55821.53>
- Luqman, A., & Abdullah, N. K. (2011). E-business adoption amongst SMEs: A Structural Equation Modeling approach. *Journal of Internet Banking and Commerce*, 16(2). https://doi.org/10.1007/978-3-531-92534-9_12
- Lyytinen, K., & Damsgaard, J. (2001). What's Wrong with the Diffusion of Innovation Theory? In *Diffusing Software Product and Process Innovations* (Vol. 187, pp. 173–190). Boston, MA: Springer US. https://doi.org/10.1007/978-0-387-35404-0_11
- Mackenzie, S. B., Podsakoff, P. M., & Jarvis, C. B. (2005). The Problem of Measurement Model Misspecification in Behavioral and Organizational Research and Some Recommended Solutions, 90(4), 710–730. <https://doi.org/10.1037/0021-9010.90.4.710>
- Maduku, D. K., Mpinganjira, M., & Duh, H. (2016). Understanding mobile marketing adoption intention by South African SMEs: A multi-perspective framework. *International Journal of Information Management*, 36(5), 711–723. <https://doi.org/http://dx.doi.org/10.1016/j.ijinfomgt.2016.04.018>
- Mahul, O., & Stutley, C. J. (2010). *Government support to agricultural insurance: Challenges and options for developing countries*. Washington, DC, USA. Retrieved from <https://openknowledge.worldbank.org/bitstream/handle/10986/2432/538810PUB0Gove101Official0Use0Only1.pdf?sequence=1>
- Malaysia: Gateway to the Fastest Growing Region In The World. (2018). Retrieved from <https://mdec.my/blog/?p=192>
- Malaysia is the most vulnerable country to internet scams in this region. (2016, March 11). Retrieved August 30, 2016, from <http://www.thestar.com.my/business/business-news/2016/03/11/malaysia-is-the-most-vulnerable-country-to-internet-scams-in-this-region/>

- Mandic, M. (2009). Privacy and Security in E-Commerce. *Trziste / Market*, 21(2), 247–260. Retrieved from <http://hrcak.srce.hr/file/81071>
- Marchany, R. C., & Tront, J. G. (2002). E-commerce security issues. In *Proceedings of the Annual Hawaii International Conference on System Sciences* (Vol. 2002-Janua, pp. 2500–2508). <https://doi.org/10.1109/HICSS.2002.994190>
- Martínez-Ferrero, J., & García-Sánchez, I.-M. (2016). Coercive, normative and mimetic isomorphism as determinants of the voluntary assurance of sustainability reports. *International Business Review*, (2015). <https://doi.org/10.1016/j.ibusrev.2016.05.009>
- Martins, R., Oliveira, T., & Thomas, M. A. (2016). An empirical analysis to assess the determinants of SaaS diffusion in firms. *Computers in Human Behavior*, 62, 19–33. <https://doi.org/10.1016/j.chb.2016.03.049>
- Martinsons, M. G. (2008). Relationship-based e-commerce: Theory and evidence from China. *Information Systems Journal*, 18(4), 331–356. <https://doi.org/10.1111/j.1365-2575.2008.00302.x>
- Masele, J. J. (2019). Modeling Green eBusiness Adoption among Small and Medium Tourism Enterprises in Tanzania. *The African Journal of Information Systems*, 11(3), 209–231.
- Matthews, L., Hair, J., & Matthews, R. (2018). PLS-SEM: The holy grail for advanced analysis. *The Marketing Management Journal*, 28(1), 1–13.
- Mazidah, S., Md Nor, H. T., & Burairah, H. (2014). Profile of ICT innovativeness in Malaysian SMEs from service sectors based on core ICT indicators. *The Journal of Technology Management and Technopreneurship (JTMT)*. Retrieved from <http://journal.utem.edu.my/index.php/jtmt/article/view/57>
- Measuring the information society report*. (2015). Retrieved from <https://www.itu.int/pub/D-IND-ICTOI>
- Middleton, C., & Chang, S. (2007). *The Adoption of Broadband Internet in Australia and Canada. Handbook of Research on Global Diffusion of Broadband Data Transmission*. Harrisburg, PA: Idea Group.
- Middleton, K. L., & Byus, K. (2011). Information and communications technology adoption and use in small and medium businesses: The influence of Hispanic ethnicity. *Management Research Review*, 34(1), 98–110. <https://doi.org/10.1108/01409171111096496>
- Migiro, S. O. (2006). Diffusion of ICTs and E-commerce adoption in manufacturing SMEs in Kenya. *South African Journal of Library and Information Science*, 72(1), 35–45.

- Miller, M. D., Rainer Jr., R. K., & Harper, J. (1997). The unidimensionality, validity, and reliability of Moore and Benbasat's relative advantage and compatibility scales. *The Journal of Computer Information Systems*, 38(1), 38–46. <https://doi.org/10.1080/08874417.1997.11647306>
- Mishra, D., Akman, I., & Mishra, A. (2014). Theory of Reasoned Action application for Green Information Technology acceptance. *Computers in Human Behavior*, 36, 29–40. <https://doi.org/10.1016/j.chb.2014.03.030>
- Mohamad, R., Building, A., & Ismail, N. A. (2010). Journal of Internet Banking and Commerce. *Journal of Internet Banking and Commerce*, 15(1), 1–11. https://doi.org/10.1007/978-3-531-92534-9_12
- Mohamad, R., & Norr Azizi, I. (2007). e-commerce practices among SMEs: A review of major themes and issues. *Business E-Bulletin*, 1(1), 7–13.
- Mohtaramzadeh, M., Ramayah, T., & Jun-Hwa, C. (2017). B2B E-Commerce Adoption in Iranian Manufacturing Companies: Analyzing the Moderating Role of Organizational Culture. *International Journal of Human-Computer Interaction*, 34(7), 621–639. <https://doi.org/10.1080/10447318.2017.1385212>
- Mokaya, S. O. (2012). The Adoption of Information and Communication Technology by Small Enterprises in Thika Municipality, Kenya. *International Journal of Business and Social Science*, 3(13), 172–177.
- Molina-Azorin, J. F., Tarí, J. J., Pereira-Moliner, J., López-Gamero, M. D., & Pertusa-Ortega, E. M. (2015). The effects of quality and environmental management on competitive advantage: A mixed methods study in the hotel industry. *Tourism Management*, 50, 41–54. <https://doi.org/10.1016/j.tourman.2015.01.008>
- Molla, A., & Heeks, R. (2007). Exploring E-Commerce Benefits for Businesses in a Developing Country. *The Information Society*, 23(2), 95–108. <https://doi.org/10.1080/01972240701224028>
- Molla, A., & Licker, P. S. (2005). eCommerce adoption in developing countries: a model and instrument. *Information & Management*, 42(6), 877–899. <https://doi.org/10.1016/j.im.2004.09.002>
- Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research*, 2, 192–220.
- Moorthy, M. K., Tan, A., Choo, C., Wei, C. S., Tan, J., Ping, Y., & Leong, T. K. (2012). A Study on Factors Affecting the Performance of SMEs in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 2(4), 224–239.

- Mwakaje, A. G. (2010). Information and Communication Technology for Rural Farmers Market Access in Tanzania. *Agnes Godfrey Mwakaje*, 10(2), 111–128.
- Nadzari, N. N. (2016, January 1). PKS digesa manfaatkan ICT perluas pasaran. *Utusan Malaysia*. Retrieved from <http://www.utusan.com.my/bisnes/korporat/pks-digesa-manfaatkan-ict-perluas-pasaran-1.337193>
- Nagy, D., Collins, R., & Nord, W. (2014). Extend your TOEs - An Organizational Approach to IT. In *Proceedings of the Southern Association for Information Systems Conference* (pp. 1–6). Macon, GA, USA.
- Nasco, S. A., Toledo, E. G., & Mykytyn, P. P. (2008). Predicting electronic commerce adoption in Chilean SMEs. *Journal of Business Research*, 61(6), 697–705. <https://doi.org/10.1016/j.jbusres.2007.06.047>
- Nejadirani, F., Behraves, M., & Rasouli, R. (2011). Developing countries and electronic commerce the case of SMEs. *World Applied Sciences Journal*, 15(5), 756–764.
- Nezakati, H., Jofreh, M., Liong, G. L. W., & Asgari, O. (2012). Assessing e-commerce adoption by small and medium enterprises in Malaysia, Singapore and Thailand. *World Applied Sciences Journal*, 19(10), 1406–1411. <https://doi.org/10.5829/idosi.wasj.2012.19.10.3659>
- Niranjanamurthy, M., & Chahar, D. (2013). The study of E-Commerce Security Issues and Solutions. *International Journal of Advanced Research in Computer and Communication Engineering*, 2(7), 2885–2895.
- Nor, K., & Pearson, J. M. (2009). *An Exploratory Study Into The Adoption of Internet Banking in a Developing Country: Malaysia*.
- Nugroho, M. A. (2015). Impact of Government Support and Competitor Pressure on the Readiness of SMEs in Indonesia in Adopting the Information Technology. In *The Third Information Systems International Conference Impact* (Vol. 72, pp. 102–111). Elsevier Masson SAS. <https://doi.org/10.1016/j.procs.2015.12.110>
- Nunnally, J. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.
- Obaji, N., Obiekwe, B., Olugu, M., Fatoki, F., & Odugbemi, A. (2015). Business support as a critical success factor for incubator performance , and moderating effect of government policy in Nigeria context : A conceptual model. *Australian Journal of Basic and Applied Sciences*, 9(32), 292–298.
- Okundaye, K., Fan, S. K., & Dwyer, R. J. (2019). Impact of information and communication technology in Nigerian small-to medium-sized enterprises. *Journal of Economics, Finance and Administrative Science*, 24(47), 29–46. <https://doi.org/10.1108/JEFAS-08-2018-0086>

- Olatokun, W., & Kebonye, M. (2010). e-Commerce Technology Adoption by SMEs in Botswana e-Commerce Technology Adoption by SMEs in Botswana Introduction. *International Journal of Emerging Technologies and Society*, 8(1), 42–56.
- Olise, M. C., Anigbogu, T. U., & Okoli, M. I. (2014). Determinants of ICT Adoption for Improved SME ' s Performance in Anambra. *American International Journal of Contemporary Research*, 4(7), 163–176.
- Oliveira, T., & Maria Fraga, M. (2011). Literature Review of Information Technology Adoption Models at Firm Level. *The Electronic Journal Information Systems Evaluation*, 14(1), 110–121.
- Oliveira, T., Martins, M. F., & Lisboa, U. N. De. (2011). Ejise-Volume14-Issue1-Article705 (2), 14(1), 110–121.
- Oliveira, T., Martins, R., Sarker, S., Thomas, M., & Popovič, A. (2019). Understanding SaaS adoption: The moderating impact of the environment context. *International Journal of Information Management*, 49(June 2018), 1–12. <https://doi.org/10.1016/j.ijinfomgt.2019.02.009>
- Oliveira, T., Thomas, M., & Espadanal, M. (2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information and Management*, 51(5), 497–510. <https://doi.org/10.1016/j.im.2014.03.006>
- Oliver, C. (1997). Sustainable competitive advantage: Combining institutional and resource-based views. *Strategic Management Journal*, 18(9), 697–713. <https://doi.org/10.2307/3088134>
- Ong, J., Poong, Y., & Ng, T. (2008). 3G services adoption among university students: Diffusion of innovation theory. *Communications of the IBIMA*, 3(16), 114–121. Retrieved from <http://www.ibimapublishing.com/journals/CIBIMA/volume3/v3n16.pdf>
- Ongori, H., & Migiro, S. O. (2010). Information and communication technologies adoption in SMEs: literature review. *Journal of Chinese Entrepreneurship*, 2(1), 93–104. <https://doi.org/10.1108/17561391011019041>
- Osakwe, C. N., Chovancova, M., & Agu, M. (2015). Can micro-enterprises leverage on the adoption of corporate websites to bolster their brand visibility? Examining salient adoption issues in Nigeria. *Information Development*, 32(4), 904–919. <https://doi.org/10.1177/0266666915573551>
- Osorio-Gallego, C. A., Londoño-Metaute, J. H., & López-Zapata, E. (2016). Analysis of factors that influence the ICT adoption by SMEs in Colombia. *Intangible Capital*, 12(2), 666–698.

- Oye, N. D., Aiahad, N., & Ab.rahim, N. (2011). Awareness , Adoption and Acceptance of ICT Innovation in Higher Education Institutions. *International Journal of Engineering Research and Applications*, 1(4), 1393–1409.
- Paige Leskin. (2018). The 21 scariest data breaches of 2018. *Business Insider US*. Retrieved from <https://www.businessinsider.my/data-hacks-breaches-biggest-of-2018-2018-12/?r=US&IR=T>
- Pan, M.-J., & Jang, W.-Y. (2008). Determinants of the adoption of enterprise resource planning within the technology-organization-environment framework: Taiwan's communications industry. *The Journal of Computer Information Systems*, 48(3), 94–102. <https://doi.org/10.1080/08874417.2008.11646025>
- Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society*, 12, 150–162. <https://doi.org/10.1007/s00340-009-3513-0>
- Parker, C. M., Burgess, S., & Al-Qirim, N. (2015). A review of studies on information systems and SMEs in high ranked IS journals (2000-2014). *Australasian Journal of Information Systems*, 19(2007), S153–S173. <https://doi.org/10.3127/ajis.v19i0.1219>
- Parker, C. M., & Castleman, T. (2009). Small firm e-business adoption: a critical analysis of theory. *Journal of Enterprise Information Management*, 22(1/2), 167–182. <https://doi.org/10.1108/17410390910932812>
- Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, 29, 123–134. <https://doi.org/10.1016/j.jretconser.2015.11.006>
- Pavlou, P., & Fygenson, M. (2006). Understanding and predicting electronic commerce adoption: an extension of the theory of planned behavior. *MIS Quarterly*, 30(1), 115–143. Retrieved from <http://www.jstor.org/stable/25148720>
- Pearson, J. M., & Grandon, E. E. (2005). An empirical study of factors that influence e-commerce adoption / non-adoption in small and medium sized businesses. *Journal of Internet Commerce*, 4(4), 1–21. <https://doi.org/10.1300/J179v04n04>
- Persico, D., Manca, S., & Pozzi, F. (2014). Adapting the Technology Acceptance Model to evaluate the innovative potential of e-learning systems. *Computers in Human Behavior*, 30, 614–622. <https://doi.org/10.1016/j.chb.2013.07.045>

- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *The Journal of Applied Psychology, 88*(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Podsakoff, P. M., & Organ, D. W. (1986). Self-Reports in Organizational Research: Problems and Prospects. *Journal of Management, 12*(4), 531–544. <https://doi.org/10.1177/014920638601200408>
- Poorangi, M. M., Khin, E. W. S., Nikoonejad, S., & Kardevani, A. (2013). E-commerce adoption in Malaysian small and medium enterprises practitioner firms: A revisit on Rogers' model. *Anais Da Academia Brasileira de Ciencias, 85*(4). <https://doi.org/10.1590/0001-37652013103512>
- Porter, C. E., & Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. *Journal of Business Research, 59*(9), 999–1007. <https://doi.org/10.1016/j.jbusres.2006.06.003>
- Porter, M. E. (2001). Strategy and the Internet. *Harvard Business Review, 79*(3), 62–78, 164. <https://doi.org/10.1108/eb025570>
- Powelson, S. E., & Ness, L. R. (2011). *An Examination of Small Businesses' Propensity to Adopt Cloud-Computing Innovation*. Walden University. Retrieved from <http://search.proquest.com/docview/963525817?accountid=147552>
- Premkumar, G., Ramamurthy, K., & Nilakanta, S. (1994). Implementation of of Electronic Data Implementation An Innovation Interchange: Diffusion Perspective. *Journal of Management Information Systems, 11*(2), 157–186.
- Premkumar, G., & Roberts, M. (1999). Adoption of new information technologies in rural small businesses. *Omega, 27*(4), 467–484. [https://doi.org/10.1016/S0305-0483\(98\)00071-1](https://doi.org/10.1016/S0305-0483(98)00071-1)
- Profile and importance to the economy. (2011). Retrieved August 18, 2016, from <http://www.smecorp.gov.my/index.php/en/policies/2015-12-21-09-09-49/profile-and-importance-to-the-economy>
- Propelling SMEs in the digital world. (2018). Retrieved from <http://www.smecorp.gov.my/index.php/en/resources/2015-12-21-10-55-22/news/3475-propelling-smes-in-the-digital-world>
- Pudjianto, B. (2010). Factors Affecting e-Government Assimilation in Developing Countries. *Communication Policy Research, 1*–14. <https://doi.org/10.2139/ssrn.1553651>

- Pudjianto, B. W., & Hangjung, Z. (2010). Factors Affecting e-Government : Assimilation in Developing Countries. In *4th Communication Policy Research, South Conference* (pp. 1–14). Negombo, Sri Lanka. <https://doi.org/10.2139/ssrn.1553651>
- Qader, I., & Zainuddin, Y. (2011). The Impact of Media Exposure on Intention to Purchase Green Electronic Products amongst Lecturers. *International Journal of Business and Management*, 6(3), 240–249. Retrieved from <http://www.ccsenet.org/journal/index.php/ijbm/article/viewFile/9716/7055>
- Quaddus, M., & Hofmeyer, G. (2007). An investigation into the factors influencing the adoption of B2B trading exchanges in small businesses. *European Journal of Information Systems*, 16(3), 202–215. <https://doi.org/10.1057/palgrave.ejis.3000671>
- Qureshi, Z. H., & Qazi Abro, M. M. (2016). Efficient Use of Ict in Administration. *International Journal of Economics, Commerce and Management*, IV(10), 540–550.
- Rahayu, R., & Day, J. (2015). Determinant Factors of E-commerce Adoption by SMEs in Developing Country: Evidence from Indonesia. *Procedia - Social and Behavioral Sciences*, 195, 142–150. <https://doi.org/http://dx.doi.org/10.1016/j.sbspro.2015.06.423>
- Rahayu, R., & Day, J. (2016). E-commerce adoption by SMEs in developing countries: evidence from Indonesia. *Eurasian Business Review*. <https://doi.org/10.1007/s40821-016-0044-6>
- Rahim, A., Bakar, a B. U., & Ahmed, Z. U. (2015). Technology Motivation in E-Marketing Adoption Among Malaysian Manufacturers. *Journal of Transnational Management*, 20(April), 126–152. <https://doi.org/10.1080/15475778.2015.1038949>
- Rainey, C. (2012). Why You shouldn't conclude "no effect" from statistically insignificant slopes. Retrieved March 4, 2019, from <http://www.carlislerainey.com/2012/06/16/why-you-shouldnt-conclude-no-effect-from-statistically-insignificant-slopes/>
- Rajaguru, R., & Matanda, M. J. (2013). Effects of inter-organizational compatibility on supply chain capabilities: Exploring the mediating role of inter-organizational information systems (IOIS) integration. *Industrial Marketing Management*, 42(4), 620–632. <https://doi.org/10.1016/j.indmarman.2012.09.002>
- Ramanathan, R., Ramanathan, U., & Ko, L. W. L. (2014). Adoption of RFID technologies in UK logistics: Moderating roles of size, barcode experience and government support. *Expert Systems with Applications*, 41(1), 230–236. <https://doi.org/10.1016/j.eswa.2013.07.024>

- Ramayah, T., Lee, J. W. C., & Lim, S. (2012). Sustaining the environment through recycling: An empirical study. *Journal of Environmental Management*, 102, 141–147. <https://doi.org/10.1016/j.jenvman.2012.02.025>
- Ramayah, T., Ling, N. S., Taghizadeh, S. K., & Rahman, S. A. (2015). Factors influencing SMEs website continuance intention in Malaysia. *Telematics and Informatics*, 33(1), 150–164. <https://doi.org/10.1016/j.tele.2015.06.007>
- Ramayah, T., Mohamad, O., Omar, A., & Marimuthu, M. (2009). Technology Adoption among Small and Medium Enterprises (SME's): A Research Agenda. *World Academy of Science, Engineering and Technology*, 29(May), 937–940.
- Rao, S., & Goldsby, T. J. (2009a). Supply chain risks: a review and typology. *The International Journal of Logistics Management*, 20(1), 97–123. <https://doi.org/10.1108/09574090910954864>
- Rao, S., & Goldsby, T. J. (2009b). Supply chain risks: A review and typology. *The International Journal of Logistics Management*, 20(1), 97–123. <https://doi.org/10.1108/09574090910954864>
- Ratnasingham, P. (2001). Electronic commerce adoption in Australia and New Zealand. *Malaysian Journal of Computer Science*, 14(1), 1–8.
- Ringle, C M, Wende, S., & Decker, J. M. (2015). Smart PLS 3. *SmartPLS GmbH*. https://doi.org/10.15358/9783800644377_564
- Ringle, Christian M., Da Silva, D., & Bido, D. D. S. (2014). Structural Equation Modeling with the Smartpls. *Revista Brasileira de Marketing*, 13(02), 56–73. <https://doi.org/10.5585/remark.v13i2.2717>
- Riquelme, H. E., & Rios, R. E. (2010). The moderating effect of gender in the adoption of mobile banking. *International Journal of Bank Marketing*, 28(5), 328–341. <https://doi.org/10.1108/02652321011064872>
- Riyadh, A. N., Akter, S., & Islam, N. (2009). The Adoption of E-banking in Developing Countries : A Theoretical Model for SMEs. *International Review of Business Research Papers*, 5(6), 212–230.
- Rodríguez-Ardura, I., & Meseguer-Artola, A. (2010). Toward a Longitudinal Model of e-Commerce: Environmental, Technological, and Organizational Drivers of B2C Adoption. *The Information Society*, 26(3), 209–227. <https://doi.org/10.1080/01972241003712264>
- Rodríguez-ardura, I., Meseguer-artola, A., Vilaseca-requena, J., & Meseguer-artola, A. (2008). Factors Influencing the Evolution of Electronic Commerce : An Empirical Analysis in a Developed Market Economy, 3(2), 18–29.

- Rogers, E. M. (1983). *Diffusion of Innovations*. The Free Press.
- Rogers, E. M. M. (2003). *Diffusion of innovations* (5th ed.). New York: New York, Free Press.
- Rogers, E.M. (2003). *Diffusion of innovations* (5th ed.). New York: New York, Free Press.
- Rogers, Everett M. (1962). *Diffusion of Innovation* (1st ed.). New York, USA: The Free Press.
- Rogers, Everett M. (1995). *Diffusion of innovations*. Macmillian Publishing Co. <https://doi.org/citeulike-article-id:126680>
- Roscoe, J. T. (1975). *Fundamental research statistics for the behavioural sciences*. Holt Rinehart & Winston, (2nd ed.). New York: Holt Rinehart & Winston.
- Saif-Ur-Rehman, & Alam, R. (2012). A study of barriers to e-commerce adoption among SMEs in Malaysia, *1*(February), 2–5.
- Saldanha, T. J. V., & Krishnan, M. S. (2012). Organizational Adoption of Web 2.0 Technologies: An Empirical Analysis. *Journal of Organizational Computing and Electronic Commerce*, 22(4), 301–333. <https://doi.org/10.1080/10919392.2012.723585>
- Salkind, N. . (1997). *Exploring research* (3rd ed.). New Jersey: Prentice Hall.
- Saiwani, M. I., Marthandan, G., Norzaidi, M. D., & Chong, S. C. (2009). E-commerce usage and business performance in the Malaysian tourism sector: empirical analysis. *Information Management & Computer Security*, 17(2), 166–185. <https://doi.org/10.1108/09685220910964027>
- Schmidt, M., Chen, J., Phan, D., & Arnett, K. (2009). Security Perceptions of e-Commerce Users. *Journal of Internet Commerce*, 8(1), 44–57. <https://doi.org/10.1080/15332860903341307>
- Scott, W. R. (1995). *Institutions and organizations*. Thousand Oaks, CA: Sage.
- Scupola, A. (2009). SMEs' e-commerce adoption: perspectives from Denmark and Australia. *Journal of Enterprise Information Management*, 22(1/2), 152–166. <https://doi.org/10.1108/17410390910932803>
- Sekaran, U. (2003). *Research methods for business: A skill building approach* (4th ed.). John Wiley & Sons.

- Sekaran, U., & Bougie, R. (2010). *Research methods for business: A skill building approach* (5th ed.). West Sussex, UK: John Wiley & Sons Ltd.
- Sekaran, U., & Bougie, R. (2016). *Research Methods For Business: A Skill Building Approach* (7th ed.). Wiley.
- Selamat, Z., Jaffar, N., & Kadir, H. A. (2011). ICT Adoption in Malaysian SMEs. *2011 International Conference on Management and Service Science*, 8, 135–139.
- Sentosa, I., Nejatian, H., Piaralal, S. K., & Faisal, A. (2011). Empirical Study of Internet Adoption Among Small And Medium Entrepreneurs (SMEs) In Malaysia (A Structural Equation Modeling Approach). *2nd International Conference on Business and Economic Research (2nd ICBER 2011) Proceeding*, 1067–1082.
- Setiowati, R., Daryanto, H. K., & Arifin, B. (2015). Understanding ICT Adoption determinants among Indonesian SMEs in Fashion Subsector. *International Research Journal of Business Studies Vol.*, 8(1), 47–57.
- Setterstrom, A. J., Pearson, J. M., & Orwig, R. a. (2013). Web-enabled wireless technology: An exploratory study of adoption and continued use intentions. *Behaviour & Information Technology*, 32(11), 1139–1154. <https://doi.org/10.1080/0144929X.2012.708785>
- Seyal, A. H., Awais, M. M., Shamail, S., & Abbas, A. (2004). Determinants of Electronic Commerce in Pakistan: Preliminary Evidence from Small and Medium Enterprises. *Electronic Markets*, 14(4), 372–387. <https://doi.org/10.1080/10196780412331311801>
- Seyal, A. H., & Rahman, M. N. A. (2003). A Preliminary Investigation of E-Commerce Adoption in Small & Medium Enterprises in Brunei. *Journal of Global Information Technology Management*, 6(2), 6–26. <https://doi.org/10.1080/1097198X.2003.10856347>
- Seyal, A. H., Rahman, M. N. A., & Mohammad, H. A. Y. H. A. (2007). A quantitative analysis of factors contributing electronic data interchange adoption among Bruneian SMEs: A pilot study. *Business Process Management Journal*, 13(5), 728–746. <https://doi.org/10.1108/14637150710823183>
- Shaikh, A. A., Karjaluo, H., & Häkkinen, J. (2018). Understanding moderating effects in increasing share-of-wallet and word-of-mouth: A case study of Lidl grocery retailer. *Journal of Retailing and Consumer Services*, 44(February), 45–53. <https://doi.org/10.1016/j.jretconser.2018.05.009>
- Sharma, R., & Yetton, P. (2011). Top management support and IS implementation: further support for the moderating role of task interdependence. *European Journal of Information Systems*, 20(6), 703–712. <https://doi.org/10.1057/ejis.2011.39>

- Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research, *15*(3), 325–343.
- Shiau, W. L., & Chau, P. Y. K. (2016). Understanding behavioral intention to use a cloud computing classroom: A multiple model comparison approach. *Information and Management*, *53*(3), 355–365. <https://doi.org/10.1016/j.im.2015.10.004>
- Shroff, R. H., Deneen, C. C., & Ng, E. M. W. (2011). Analysis of the technology acceptance model in examining students' behavioural intention to use an e-portfolio system. *Australasian Journal of Educational Technology*, *27*(4), 600–618.
- Simmons, G., Armstrong, G. A., & Durkin, M. G. (2008). A Conceptualization of the Determinants of Small Business Website Adoption: Setting the Research Agenda. *International Small Business Journal*, *26*(3), 351–389. <https://doi.org/10.1177/0266242608088743>
- Sin, K. Y., Osman, A., Salahuddin, S. N., Abdullah, S., Lim, Y. J., & Sim, C. L. (2016). Relative advantage and competitive pressure towards implementation of e-commerce: Overview of small and medium enterprises (SMEs). In *7th International Economics & Business Management Conference* (Vol. 35, pp. 434–443). Elsevier B.V.
- Singh, K. (2016). Stuck in a rut: Malaysian SMEs and innovation. Retrieved July 15, 2016, from <http://www.smecorp.gov.my/index.php/en/resources/2015-12-21-10-55-22/news/1407-stuck-in-a-rut-malaysian-smes-and-innovation>
- SME Annual Report 2015/16*. (2016). Retrieved from <http://www.smecorp.gov.my/index.php/en/resources/2015-12-21-11-07-06/sme-annual-report>
- SME Annual Report 2017/2018*. (2019). Kuala Lumpur. Retrieved from <http://www.smecorp.gov.my/images/SMEAR/SMEAR2017/ENG/FULL.pdf>
- SME Corp. Malaysia. (2013). Guideline for New Sme Definition. *Economics and Policy Planning Division, SME Corp. Malaysia*, (October), 1–5. Retrieved from http://www.smecorp.gov.my/vn2/sites/default/files/Guideline_for_New_SME_Definition_7Jan2014.pdf
- SMEs in Asia Pacific: The Market for Cloud Computing*. (2015). Retrieved from <https://www.asiacloudcomputing.org/research/2015-research/smecloud2015>
- Soares-Aguiar, A., & Palma-dos-Reis, A. (2008). Why do firms adopt E-procurement systems? Using logistic regression to empirically test a conceptual model. *IEEE Transactions on Engineering Management*, *55*(1), 120–133. <https://doi.org/10.1109/TEM.2007.912806>

- Sohal, A. S., Sarros, J., Schroder, R., & O'neill, P. (2006). Adoption framework for advanced manufacturing technologies. *International Journal of Production Research*, 44(24), 5225–5246. <https://doi.org/10.1080/00207540600558320>
- Son, J.-Y., & Benbasat, I. (2007). Organizational Buyers' Adoption and Use of B2B Electronic Marketplaces: Efficiency- and Legitimacy-Oriented Perspectives. *Journal of Management Information Systems*, 24(1), 55–99. <https://doi.org/10.2753/MIS0742-1222240102>
- Spier, L. (1929). *American Anthropologist* (Vol. 31). Retrieved from <http://onlinelibrary.wiley.com/doi/10.1525/aa.1929.31.1.02a00130/pdf>
- Srinivasan, R., Lilien, G. L., & Rangaswamy, A. (2002). Technological Opportunism and Radical Technology Adoption: An Application to E-Business. *Journal of Marketing*, 66(3), 47–60. <https://doi.org/10.1509/jmkg.66.3.47.18508>
- Sun, S., Cegielski, C. G., Jia, L., & Hall, D. J. (2018). Understanding the Factors Affecting the Organizational Adoption of Big Data. *Journal of Computer Information Systems*, 58(3), 193–203. <https://doi.org/10.1080/08874417.2016.1222891>
- Sunday, C. E., & Vera, C. C.-E. (2018a). Examining information and communication technology (ICT) adoption in SMEs. *Journal of Enterprise Information Management*. <https://doi.org/10.1108/jeim-12-2014-0125>
- Sunday, C. E., & Vera, C. C. E. (2018b). Examining information and communication technology (ICT) adoption in SMEs: A dynamic capabilities approach. *Journal of Enterprise Information Management*, 31(2), 338–356. <https://doi.org/10.1108/JEIM-12-2014-0125>
- Sutanonpaiboon, J., & Pearson, A. M. (2008). E-Commerce adoption : perceptions of managers / owners of Small- and Medium-Sized Enterprises (SMEs) in Thailand. *Journal of Internet Commerce*, 5(3), 53–82. <https://doi.org/10.1300/J179v05n03>
- Sutton, S. (1998). Predicting and explaining intentions and behavior: How well are we doing? *Journal of Applied Social Psychology*, 28(15), 1317–1338. <https://doi.org/10.1111/j.1559-1816.1998.tb01679.x>
- Suwannapha, T. (2016). “Small is the new big” – Malaysian SMEs help energize, drive economy. Retrieved September 18, 2016, from <http://www.worldbank.org/en/news/feature/2016/07/05/small-is-the-new-big---malaysian-smes-help-energize-drive-economy>
- Swanson, E. B., & Ramiller, N. C. (1997). The Organizing Vision in Information Systems Innovation. *Organization Science*, 8(5), 458–474. <https://doi.org/10.1287/orsc.8.5.458>

- Tajudeen, F. P., Jaafar, N. I., & Ainin, S. (2018). Understanding the impact of social media usage among organizations. *Information and Management*, 55(3), 308–321. <https://doi.org/10.1016/j.im.2017.08.004>
- Tallon, P., Kraemer, K. L., & Gurbaxani, V. (2000). Executives' Perceptions of the Business Value of Information Technology: A Process-Oriented Approach. *Journal of Management Information Systems*, 16(4), 145–173. <https://doi.org/10.1080/07421222.2000.11518269>
- Tan, K. S., Eze, U. C., & Chong, S. C. (2009). Factors Influencing Internet-based Information and Communication Technologies Adoption Among Malaysian Small and Medium Enterprises. *International Journal of Management and Enterprise Development*, 6(4), 397. <https://doi.org/10.1504/IJMED.2009.024232>
- Tan, M. (2000). Factors Influencing the Adoption of Internet Banking. *Journal of the Association for Information Systems*, 1, 1–42.
- Taruté, A., & Gatautis, R. (2014). ICT Impact on SMEs Performance. In *Procedia - Social and Behavioral Sciences* (Vol. 110, pp. 1218–1225). <https://doi.org/10.1016/j.sbspro.2013.12.968>
- Taylor, P. (2015). The importance of information and communication technologies (ICTs): an integration of the extant literature on ICT adoption in small and medium enterprises. *International Journal of Economics, Commerce and Management*, III(5), 274–295.
- Teo, H. H., Wei, K. K., & Benbasat, I. (2003). Predicting intention to adopt interorganizational linkages: An institutional perspective. *MIS Quarterly*, 27(1), 1–6. <https://doi.org/10.2307/30036518>
- Teo, T. S. H. (2007). Organizational Characteristics, Modes of Internet Adoption and Their Impact. *Journal of Global Information Management*, 15(2), 91–117. <https://doi.org/10.4018/jgim.2007040104>
- Theodosiou, M., & Katsikea, E. (2012). Antecedents and performance of electronic business adoption in the hotel industry. *European Journal of Marketing*, 46(1/2), 258–283. <https://doi.org/10.1108/03090561211189329>
- Thi, L. S., Lim, H. E., & Al-zoubi, A. I. (2014). Estimating influence of toe factors on e-government usage: Evidence of Jordanian companies. *International Journal of Business and Society*, 15(3), 413–436.
- Thiesse, F., Staake, T., Schmitt, P., & Fleisch, E. (2011). The rise of the “next-generation bar code”: an international RFID adoption study. *Supply Chain Management: An International Journal*, 16(5), 328–345. <https://doi.org/10.1108/13598541111155848>

- Thompson, B. (2006). *F. of behavioral statistics: A. insight-based approach*. N. Y. G. (2006). *Foundations of behavioral statistics: An insight-based approach*. New York: Guilford.
- Thowfeek, M. H., & Jaafar, A. (2010). Integrating national culture into information and communication technology adoption model. *2010 International Symposium on Information Technology*, 3, 1601–1605. <https://doi.org/10.1109/ITSIM.2010.5561462>
- Tiwari, S. T. S., Chan, S. W., Ahmad, M. F., & Zaman, I. (2019). Application and implementation of e-procurement technologies in Malaysian manufacturing firm. *International Journal of Supply Chain Management*, 8(2).
- Tornatzky, L. G., & Fleischer, M. (1990). *Processes of technological innovation (Issues in organization and management series)*. New York, USA: Lexington Books.
- Tornatzky, L., & Klein, K. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, 29(1), 28–43. <https://doi.org/10.1109/TEM.1982.6447463>
- Trang, S. T.-N., Zander, S., de Visser, B., & Kolbe, L. M. (2016). Towards an importance–performance analysis of factors affecting e-business diffusion in the wood industry. *Journal of Cleaner Production*, 110, 121–131. <https://doi.org/10.1016/j.jclepro.2015.05.051>
- Tsai, M. C., Lee, W., & Wu, H. C. (2010). Determinants of RFID adoption intention: Evidence from Taiwanese retail chains. *Information and Management*, 47(5–6), 255–261. <https://doi.org/10.1016/j.im.2010.05.001>
- Tsiakis, T. (2012). Consumers' Issues and Concerns of Perceived Risk of Information Security in Online Framework. The Marketing Strategies. *Procedia - Social and Behavioral Sciences*, 62, 1265–1270. <https://doi.org/10.1016/j.sbspro.2012.09.216>
- Twati, J M. (2006). The impact of organisational culture innovation on the adoption of IS / IT: the case of Libya, 19(2), 175–191. <https://doi.org/10.1108/17410390610645076>
- Twati, Jamal M. (2008). The Influence of Societal Culture on the Adoption of Information Systems : The Case of Libya. *Communication IIMA*, 8(1), 1–12.
- Tweel, A. (2012). *Examining the Relationship between Technological , Organizational , and Environmental Factors and Cloud Computing Adoption*. Northcentral University.

- Untaru, E., Ispas, A., Candrea, A. N., & Luca, M. (2016). Predictors of individuals' intention to conserve water in a lodging context: the application of an extended Theory of Reasoned Action. *International Journal of Hospitality Management*, *59*, 50–59. <https://doi.org/10.1016/j.ijhm.2016.09.001>
- Valente, T. W., & Rogers, E. M. (1995). The Origins and Development of the Diffusion of Innovations Paradigm as an Example of Scientific Growth. *Science Communication*, *16*(3), 242–273. <https://doi.org/10.1177/1075547095016003002>
- Van Hulst, F. J., & Posthumus, H. (2016). Understanding (non-) adoption of Conservation Agriculture in Kenya using the Reasoned Action Approach. *Land Use Policy*, *56*, 303–314. <https://doi.org/10.1016/j.landusepol.2016.03.002>
- Vellam, I. (2012). *The adoption of IFRS in Poland: an institutional approach*. University of Greenwich.
- Venkatesh, V., & Davis, F. D. (1996). A Model of the Antecedents of Perceived Ease of Use: Development and Test. *Decision Sciences*, *27*(3), 451–481. <https://doi.org/10.1111/j.1540-5915.1996.tb00860.x>
- Venkatesh, V., & Davis, F. D. (2000). Theoretical Acceptance Extension Model: Field Four Studies of the Technology Longitudinal. *Management Science*, *46*(2), 186–204. <https://doi.org/10.1287/mnsc.46.2.186.11926>
- Vilaseca-requena, J., & Torrent-sellens, J. (2007). An Integrated Model of the Adoption and Extent of E-Commerce in Firms, 222–241. <https://doi.org/10.1007/s11294-006-9061-z>
- Vinzi, V. E., Chin, W. W., Henseler, J., & Wang, H. (2010). *The handbook of Partial Least Square: Concepts, Methods and Applications*. Springer Berlin Heidelberg.
- Wallace, L. G., & Sheetz, S. D. (2014). The adoption of software measures: A technology acceptance model (TAM) perspective. *Information & Management*, *51*(2), 249–259. <https://doi.org/10.1016/j.im.2013.12.003>
- Wang, Y.-S., Li, H. T., Li, C. R., & Zhang, D. Z. (2016). Factors affecting hotels' adoption of mobile reservation systems: A technology-organization-environment framework. *Tourism Management*, *53*, 163–172. <https://doi.org/10.1016/j.tourman.2015.09.021>
- Wang, Y., & K.Ahmed, P. (2009). The moderating effect of the business strategic orientation on eCommerce adoption: Evidence from UK family run SMEs. *Journal of Strategic Information Systems*, *18*(1), 16–30. <https://doi.org/10.1016/j.jsis.2008.11.001>

- Wang, Y. M., Wang, Y. S., & Yang, Y. F. (2010). Understanding the determinants of RFID adoption in the manufacturing industry. *Technological Forecasting and Social Change*, 77(5), 803–815. <https://doi.org/10.1016/j.techfore.2010.03.006>
- Weber, D. M., & Kauffman, R. J. (2011). What drives global ICT adoption? Analysis and research directions. *Electronic Commerce Research and Applications*, 10(6), 683–701. <https://doi.org/10.1016/j.elerap.2011.01.001>
- Wei, J., & Liu, Y. (2015). Government support and firm innovation performance: Empirical analysis of 343 innovative enterprises in China. *Chinese Management Studies*, 9(1), 38–55. <https://doi.org/http://dx.doi.org/10.1108/JEIM-07-2014-0077>
- Wei, T. T., Marthandan, G., Chong, A. Y.-L., Ooi, K.-B., & Arumugam, S. (2009). What drives Malaysian m-commerce adoption? An empirical analysis. *Industrial Management & Data Systems*, 109(3), 370–388. <https://doi.org/10.1108/02635570910939399>
- Wetzels, M., Odekerken-Schröder, G., & Oppen, C. van. (2009). Using PLS Path Modelling for Assessing Hierarchical Construct Models: Guidelines and Empirical Illustration. *MIS Quarterly*, 33(1), 177–195.
- Wilden, R., Gudergan, S. P., & Nielsen, B. B. (2013). Dynamic Capabilities and Performance: Strategy, Structure and Environment. *Long Range Planning*, 46(1–2), 72–96. <https://doi.org/10.1016/j.lrp.2012.12.001>
- William, E. Y. K. (2015). Institutional Isomorphism and the Adoption of Mobile Application in Malaysian Tourism Small and Medium Enterprise. *Research Journal of Management Sciences*, 4(11), 1–9.
- Wisdom, J. P., Chor, K. H. B., Hoagwood, K. E., & Horwitz, S. M. (2014). Innovation adoption: A review of theories and constructs. *Administration and Policy in Mental Health and Mental Health Services Research*, 41(4), 480–502. <https://doi.org/10.1007/s10488-013-0486-4>
- Wong, K. K. (2013). Partial Least Squares Structural Equation Modeling (PLS-SEM) Techniques Using SmartPLS. *Marketing Bulletin*, 24(1), 1–32. <https://doi.org/10.1108/EBR-10-2013-0128>
- Wong, S. L., & Teo, T. (2009). Determinants of the Intention to Use Technology: Comparison between Malaysian and Singaporean Female Student Teachers. *Proceedings of the 17th International Conference on Computers in Education*, 784–791.

- Woon, K. C., Shafaghi, M., & Tan, B. L. (2011). Development of a business-to-business critical success factors (B2B CSFs) framework for Chinese SMEs. *Marketing Intelligence & Planning*, 29(5), 517–533. <https://doi.org/10.1108/02634501111153700>
- Wu, F., Mahajan, V., & Balasubramanian, S. (2003). An Analysis of E-Business Adoption and its Impact on Business Performance. *Journal of the Academy of Marketing Science*, 31(4), 425–447. <https://doi.org/10.1177/0092070303255379>
- Wymer, S. a., & Regan, E. a. (2005). Factors Influencing ecommerce Adoption and Use by Small and Medium Businesses Factors Influencing e-commerce Adoption and Use by Small and Medium Businesses. *Electronic Markets*, 15(4), 37–41.
- Xu, M., Rohatgi, R., & Duan, Y. (2007). E-Business Adoption in SMEs: Some Preliminary Findings from Electronic Components Industry. *International Journal of E-Business Research*, 3(1), 74-79,81-90. <https://doi.org/10.4018/978-1-60566-086-8.ch016>
- Yang, C. S. (2018). An analysis of institutional pressures, green supply chain management, and green performance in the container shipping context. *Transportation Research Part D: Transport and Environment*, 61, 246–260. <https://doi.org/10.1016/j.trd.2017.07.005>
- Yasmin, N. (2015, September 8). ICT, PKS disaran manfaat teknologi. *Utusan Malaysia*. Retrieved from <http://www.utusan.com.my/bisnes/usahawan/pks-disaran-manfaat-teknologi-ict-1.133434>
- Yayla, A. A., & Hu, Q. (2012). The impact of IT-business strategic alignment on firm performance in a developing country setting: exploring moderating roles of environmental uncertainty and strategic orientation. *European Journal of Information Systems*, 21(4), 373–387. <https://doi.org/10.1057/ejis.2011.52>
- Yeung, J. H. Y., Shim, J. P., & Lai, A. Y. K. (2003). Current Progress of E-Commerce Adoption: Small and Medium Enterprises in Hong Kong. *Communications of the Acm*, 46(9), 226–232.
- Yoon, T. E., & George, J. F. (2013). Why aren't organizations adopting virtual worlds? *Computers in Human Behavior*, 29(3), 772–790. <https://doi.org/10.1016/j.chb.2012.12.003>
- Yousafzai, S. Y., Foxall, G. R., & Pallister, J. G. (2007). Technology acceptance: a meta-analysis of the TAM: Part 1. *Journal of Modelling in Management*, 2(3), 251–280. <https://doi.org/10.1108/17465660710834453>

- Yusliza, M.-Y., Yong, J. Y., Tanveer, M.I., Ramayah, T., Juhari, N. F., & Muhammad, Z. (2019). A structural model of the impact of green intellectual capital on sustainable performance. *Journal of Cleaner Production*, 1–39. <https://doi.org/10.1016/j.jclepro.2019.119334>
- Yusof, Y. (2018, February 28). MDEC believes digital technology would drive economy. *New Straits Times*. Retrieved from <https://www.nst.com.my/business/2018/02/339869/mdec-believes-digital-technology-would-drive-economy>
- Yusoff, M. N. H. Bin, & Yaacob, M. R. Bin. (2010). The Government Business Support Services in Malaysia: The Evolution and Challenges in the New Economic Model. *International Journal of Business and Management*, 5(9), 60–72. <https://doi.org/10.5539/ijbm.v5n9p60>
- Zailani, S., Iranmanesh, M., Nikbin, D., & Beng, J. K. C. (2015). Determinants of RFID Adoption in Malaysia's Healthcare Industry: Occupational Level as a Moderator. *Journal of Medical Systems*, 39(1), 172. <https://doi.org/10.1007/s10916-014-0172-4>
- Zailani, S., Iranmanesh, M., Nikbin, D., & Jumadi, H. B. (2014). Determinants and environmental outcome of green technology innovation adoption in the transportation industry in Malaysia. *Asian Journal of Technology Innovation*, 22(2), 286–301. <https://doi.org/10.1080/19761597.2014.973167>
- Zhang, C., & Dhaliwal, J. (2009). An investigation of resource-based and institutional theoretic factors in technology adoption for operations and supply chain management. *International Journal of Production Economics*, 120(1), 252–269. <https://doi.org/10.1016/j.ijpe.2008.07.023>
- Zhu, K., Dong, S., Xu, S. X., & Hally, M. (2006). Innovation diffusion in global contexts: determinants of post-adoption digital transformation of European companies. *European Journal of Information Systems*, 15(6), 601–616. <https://doi.org/10.1057/palgrave.ejis.3000650>
- Zhu, K., & Kraemer, K. L. (2005). Post-Adoption Variations in Usage and Value of E-Business by Organizations: Cross-Country Evidence from the Retail Industry. *Information Systems Research*, 16(1), 61–84. <https://doi.org/10.1287/isre.1050.0045>
- Zhu, K., Kraemer, K. L., & Xu, S. (2006). The Process of Innovation Assimilation by Firms in Different Countries: A Technology Diffusion Perspective on E-Business. *Management Science*, 52(10), 1557–1576. <https://doi.org/10.1287/mnsc.1050.0487>

- Zhu, K., Xu, S., & Dedrick, J. (2003). Assessing drivers of e-business value: results of a cross-country study. *Twenty-Fourth International Conference on Information Systems*, 1–13.
- Zhu, Q., & Sarkis, J. (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. *International Journal of Production Research*, 45(18–19), 4333–4355. <https://doi.org/10.1080/00207540701440345>
- Zikmund, W., Babin, B. J., Carr, J. C., & Mitch Griffin. (2010). *Business research methods* (8th ed.). Mason, OH : South-Western Cengage Learning.
- Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). *Business Research Methods. Business Research Methods*. <https://doi.org/10.1.1.131.2694>
- Zorn, T. E., Flanagan, A. J., & Shoham, M. D. (2011). Institutional and noninstitutional influences on information and communication technology adoption and use among nonprofit organizations. *Human Communication Research*, 37(1), 1–33. <https://doi.org/10.1111/j.1468-2958.2010.01387.x>
- Zsidisin, G. A., Melnyk, S. A., & Ragatz, G. L. (2005). An institutional theory perspective of business continuity planning for purchasing and supply management. *International Journal of Production Research*, 43(16), 3401–3420.

APPENDIX A



Information and Communication Technology Adoption Among Small and Medium Enterprises in the Northern Region of Malaysia

Dear respondent,

I am conducting a research on “**INFORMATION AND COMMUNICATION TECHNOLOGY ADOPTION AMONG SMALL AND MEDIUM ENTERPRISES IN THE NORTHERN REGION OF MALAYSIA**”. The ultimate purpose of this study to explore the influencing factors of SMEs to adopt Information and communication technologies in Malaysia.

I have identified your organization as having the characteristics necessary to participate in this research study. I would very much appreciate your contribution and cooperation to complete the enclosed questionnaires within your valuable time. Your answers are very important to ensure accuracy to this research. All information obtained would be treated **STRICTLY CONFIDENTIAL** and use for **ACADEMIC PURPOSES ONLY**.

If you have any questions about the survey, I shall be contacted at 012-5353589. A summary report will be provided to the participants upon request.

Thank you for your assistance and cooperation. I hope this study will provide a significant contribution for the betterment of SMEs in Malaysia.

Yours sincerely,

School of Business Management
Universiti Utara Malaysia
E-mail: mathivannan@uum.edu.my
mathijl@gmail.com

(Dr. Khairol Anuar Ishak)
School of Business Management
Universiti Utara Malaysia

Penerimaan Teknologi Maklumat Dan Komunikasi di kalangan Perusahaan Kecil dan Sederhana di Kawasan Utara Malaysia

Responden yang dihormati,

Saya sedang menjalankan kajian penyelidikan mengenai "**Penerimaan Teknologi Maklumat Dan Komunikasi di kalangan Perusahaan Kecil dan Sederhana Di kawasan Utara Malaysia**". Tujuan utama kajian ini untuk meneroka faktor-faktor yang mempengaruhi PKS untuk menerima pakai teknologi maklumat dan komunikasi di Malaysia.

Saya telah mengenal pasti organisasi anda kerana mempunyai ciri-ciri yang diperlukan untuk menyertai kajian penyelidikan ini. Saya amat menghargai sumbangan dan kerjasama anda untuk menyiapkan soal selidik yang disertakan dalam masa yang anda hargai. Jawapan anda adalah sangat penting untuk memastikan ketepatan kajian penyelidikan. Semua maklumat yang diperolehi akan dianggap **SULIT** dan hanya akan digunakan untuk **TUJUAN AKADEMIK SAHAJA** .

Sekiranya anda mempunyai sebarang soalan mengenai soal selidik ini, saya boleh dihubungi melalui 012-5353589 . Laporan ringkasan akan diberikan kepada para peserta atas permintaan.

Terima kasih atas bantuan dan kerjasama anda. Saya harap kajian ini akan memberi sumbangan penting demi penambahbaikan PKS di Malaysia.

Yang ikhlas,

Mathivannan Jaganathan
Pusat Pengajian Pengurusan Perniagaan
Universiti Utara Malaysia
E-mel: mathivannan@uum.edu.my
mathijl@gmail.com

(Dr. Khairol Anuar Ishak)
Pusat Pengajian Pengurusan Perniagaan
Universiti Utara Malaysia

SECTION A / SEKSYEN A

Please **CIRCLE** the degree to which you agree with the following statements about **INFORMATION AND COMMUNICATION TECHNOLOGY ADOPTION**.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut tentang **Penerimaan Teknologi Maklumat Dan Komunikasi**.

*ICT = Information and Communication Technology / *Teknologi maklumat dan komunikasi*

Never used <i>Tidak pernah digunakan</i> 1	Once a month <i>Sekali sebulan</i> 2	Once a week <i>Sekali seminggu</i> 3	Once a day <i>Sekali sehari</i> 4	More than once a day <i>Lebih daripada sekali sehari</i> 5
--	--	--	---	--

1	Our firm uses e-mail to communicate with employees. <i>Firma kami menggunakan e-mel untuk berkomunikasi dengan pekerja.</i>	1	2	3	4	5
2	Our firm uses email to communicate with our customers. <i>Firma kami menggunakan e-mel untuk berkomunikasi dengan pelanggan kami.</i>	1	2	3	4	5
3	Our firm uses e-mail to communicate with our suppliers. <i>Firma kami menggunakan e-mel untuk berkomunikasi dengan pembekal kami.</i>	1	2	3	4	5
4	Our firm uses e-mail to communicate with the government institutions. <i>Firma kami menggunakan e-mel untuk berkomunikasi dengan institusi kerajaan.</i>	1	2	3	4	5
5	Our firm uses e-mail to communicate with trade associations. <i>Firma kami menggunakan e-mel untuk berkomunikasi dengan persatuan perdagangan.</i>	1	2	3	4	5
6	Our firm uses e-mail to send orders/e-tickets to our customers. <i>Firma kami menggunakan e-mel untuk menghantar pesanan / e-tiket kepada pelanggan kami.</i>	1	2	3	4	5
7	Our firm uses e-mail to receive orders from our customers. <i>Firma kami menggunakan e-mel untuk menerima pesanan daripada pelanggan kami.</i>	1	2	3	4	5
8	Our firm uses e-mail to update customers on their orders. <i>Firma kami menggunakan e-mel untuk mengemas kini pelanggan atas pesanan mereka.</i>	1	2	3	4	5
9	Our firm uses internet websites to find information relevant to our firm businesses. <i>Firma kami menggunakan laman web berinternet untuk mencari maklumat yang berkaitan dengan perniagaan firma kami.</i>	1	2	3	4	5
10	Our firm uses internet websites to find information about other business stakeholders. <i>Firma kami menggunakan laman web berinternet untuk mencari maklumat mengenai pemegang kepentingan perniagaan yang lain.</i>	1	2	3	4	5
11	Our firm uses firm's website for presenting firm's profile, product and service information. <i>Firma kami menggunakan laman web firma untuk menyampaikan profil firma, maklumat produk dan perkhidmatan.</i>	1	2	3	4	5
12	Our firm uses the firm's website for exchanging information with customers online e.g. discussion forums. <i>Firma kami menggunakan laman web firma untuk berkongsi maklumat dengan pelanggan, contohnya forum perbincangan.</i>	1	2	3	4	5

13	Our firm uses website for customers to place order online. <i>Firma kami menggunakan laman web untuk pelanggan membuat tempahan dalam talian.</i>	1	2	3	4	5
14	Our firm uses website for supplier to view suppliers' stock quantity in firm. <i>Firma kami menggunakan laman web untuk pembekal melihat kuantiti stok pembekal dalam firma</i>	1	2	3	4	5
15	Our firm places orders online to suppliers. <i>Firma kami membuat pesanan secara atas talian kepada pembekal.</i>	1	2	3	4	5
16	Our firm fully getting orders online from customers. <i>Firma kami mendapat pesanan secara atas talian daripada pelanggan.</i>	1	2	3	4	5
17	Our firm fully getting orders online from suppliers. <i>Firma kami sepenuhnya mendapat pesanan atas talian daripada pembekal.</i>	1	2	3	4	5
18	Our firm uses the firm's website for receiving customers complaints about the firm products and services offered. <i>Firma kami menggunakan laman web firma untuk menerima aduan pelanggan tentang produk dan perkhidmatan yang ditawarkan oleh firma.</i>	1	2	3	4	5
19	Our firm uses the firm's website for updating customers on the new products and services offered. <i>Firma kami menggunakan laman web firma untuk mengemaskini pelanggan tentang produk baru dan perkhidmatan yang ditawarkan.</i>	1	2	3	4	5

Please **CIRCLE** the degree to which you agree with the following statements about **RELATIVE ADVANTAGE** of ICT.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut tentang **KELEBIHAN RELATIF ICT**.

Strongly Disagree Sangat Tidak Setuju 1	Disagree Tidak Setuju 2	Neutral Berkecuali 3	Agree Setuju 4	Strongly Agree Sangat Setuju 5
---	---	--	------------------------------------	--

1	ICT allow better communication with our customers. <i>ICT membolehkan komunikasi yang lebih baik dengan pelanggan kami.</i>	1	2	3	4	5
2	ICT increase the profitability of our firm. <i>ICT meningkatkan keuntungan firma kami.</i>	1	2	3	4	5
3	ICT create an electronic presence for our brands. <i>ICT mewujudkan kewujudan elektronik untuk jenama kami.</i>	1	2	3	4	5
4	ICT reduce costs (e.g., communication, advertising, marketing, travel, and research & development). <i>ICT mengurangkan kos (misalnya, komunikasi, pengiklanan, pemasaran, perjalanan, dan penyelidikan & pembangunan).</i>	1	2	3	4	5
5	ICT allow us to enter new businesses or markets. <i>ICT membolehkan kita untuk memasuki perniagaan atau pasaran baru.</i>	1	2	3	4	5
6	ICT improve our web presence. <i>ICT memperbaiki kewujudan laman web kami.</i>	1	2	3	4	5

Please **CIRCLE** the degree to which you agree with the following statements about **SECURITY** of ICT.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut tentang **KESELAMATAN** ICT.

Strongly Disagree Sangat Tidak Setuju 1	Disagree Tidak Setuju 2	Neutral Berkecuali 3	Agree Setuju 4	Strongly Agree Sangat Setuju 5
---	-------------------------------	----------------------------	----------------------	--------------------------------------

1	Our firm does not have confidence in the online payment system. <i>Firma kami tidak mempunyai keyakinan terhadap sistem pembayaran dalam talian.</i>	1	2	3	4	5
2	Our firm is concerned that information involved in a transaction over the internet is not secured. <i>Firma kami bimbang akan maklumat yang terlibat dalam urusan niaga melalui internet tidak dijamin.</i>	1	2	3	4	5
3	Our firm lacks confidence on the security of internet transactions. <i>Firma kami tidak mempunyai keyakinan terhadap keselamatan transaksi melalui internet.</i>	1	2	3	4	5
4	Our firm lacks confidence in using a credit card to make payment through Internet. <i>Firma kami tidak percaya dengan penggunaan kad kredit untuk membuat pembayaran melalui internet.</i>	1	2	3	4	5
5	Our firm worried that our business transactions on the Internet can be read and seen by others. <i>Firma kami bimbang akan transaksi perniagaan kami melalui Internet boleh dibaca dan dilihat oleh orang lain.</i>	1	2	3	4	5
6	Our firm concerned about the security of data and transactions over the Internet. <i>Firma kami mengambil berat tentang keselamatan data dan transaksi melalui internet.</i>	1	2	3	4	5
7	Our customers are concerned about the security of data over the Internet. <i>Pelanggan kami mengambil berat tentang keselamatan data melalui Internet.</i>	1	2	3	4	5

Please **CIRCLE** the degree to which you agree with the following statements about **COMPATIBILITY** of ICT.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut tentang **KESESUAIAN** ICT.

Strongly Disagree Sangat Tidak Setuju 1	Disagree Tidak Setuju 2	Neutral Berkecuali 3	Agree Setuju 4	Strongly Agree Sangat Setuju 5
---	-------------------------------	----------------------------	----------------------	--------------------------------------

1	The use of ICT fits the work style of the firm. <i>Penggunaan ICT sesuai dengan gaya kerja firma .</i>	1	2	3	4	5
2	The use of ICT is fully compatible with current business operations. <i>Penggunaan ICT sepenuhnya bersesuaian dengan operasi perniagaan semasa.</i>	1	2	3	4	5
3	Using ICT is compatible with your firm's corporate culture and value system. <i>Penggunaan ICT bersesuaian dengan budaya korporat firma dan sistem nilai.</i>	1	2	3	4	5
4	The use of ICT compatible with existing hardware and software in the firm. <i>Penggunaan ICT sesuai dengan perkakasan dan perisian sedia ada di firma.</i>	1	2	3	4	5

Please **CIRCLE** the degree to which you agree with the following statements about **COMPLEXITY** of ICT.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut tentang **KERUMITAN** ICT.

Strongly Disagree <i>Sangat Tidak Setuju</i> 1	Disagree <i>Tidak Setuju</i> 2	Neutral <i>Berkecuali</i> 3	Agree <i>Setuju</i> 4	Strongly Agree <i>Sangat Setuju</i> 5
---	---	--	------------------------------------	--

1	The use of ICT requires a lot of mental effort. <i>Penggunaan ICT memerlukan banyak usaha mental.</i>	1	2	3	4	5
2	The use of ICT is frustrating. <i>Penggunaan ICT mengecewakan.</i>	1	2	3	4	5
3	The use of ICT is too complex for business operations. <i>Penggunaan ICT terlalu kompleks untuk operasi perniagaan.</i>	1	2	3	4	5
4	The skills needed to adopt ICT are too complex for employees of the firm. <i>Kemahiran yang diperlukan untuk menerima pakai ICT terlalu kompleks untuk pekerja firma.</i>	1	2	3	4	5

Please **CIRCLE** the degree to which you agree with the following statements about **COST** of ICT.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut tentang **KOS** ICT.

Strongly Disagree <i>Sangat Tidak Setuju</i> 1	Disagree <i>Tidak Setuju</i> 2	Neutral <i>Berkecuali</i> 3	Agree <i>Setuju</i> 4	Strongly Agree <i>Sangat Setuju</i> 5
---	---	--	------------------------------------	--

1	The costs involved in the adoption of ICT would be far greater than the expected benefits. <i>Kos yang terlibat dalam penerimaan ICT akan jauh lebih besar daripada faedah yang diharapkan.</i>	1	2	3	4	5
2	The cost of maintaining ICT tool would be very high for our firm. <i>Kos mengekalkan alatan ICT akan sangat tinggi untuk firma kami.</i>	1	2	3	4	5
3	The cost involved in providing support systems for ICT would be too high. <i>Kos yang terlibat dalam menyediakan sistem sokongan untuk ICT terlalu tinggi.</i>	1	2	3	4	5
4	The amount of money invested in training employees for ICT would be very high. <i>Jumlah wang yang dilaburkan dalam latihan pekerja kepada ICT sangat tinggi.</i>	1	2	3	4	5

Please rate the degree to which you agree with the following statements about **NORMATIVE PRESSURE** of ICT.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut tentang **TEKANAN NORMATIF** ICT.

Strongly Disagree <i>Sangat Tidak Setuju</i> 1	Disagree <i>Tidak Setuju</i> 2	Neutral <i>Berkecuali</i> 3	Agree <i>Setuju</i> 4	Strongly Agree <i>Sangat Setuju</i> 5
--	--------------------------------------	-----------------------------------	-----------------------------	---

1	Industry sources (for example: industry or trade associations) are pressuring our firm to adopt ICT. <i>Sumber industri (contohnya: persatuan industri atau perdagangan) memberi tekanan kepada firma kami untuk menerima pakai ICT.</i>	1	2	3	4	5
2	We participate actively in industry, trade, or professional associations that promote ICT. <i>Kami mengambil bahagian secara aktif dalam industri, perdagangan, atau persatuan profesional yang mempromosikan ICT.</i>	1	2	3	4	5
3	We often receive information regarding ICT from sources outside our firm. <i>Kami sering menerima maklumat mengenai ICT dari sumber luar firma kami.</i>	1	2	3	4	5
4	Many of our customers are currently adopting ICT. <i>Kebanyakan pelanggan kami telah menerima pakai ICT.</i>	1	2	3	4	5
5	Many of our customers will be adopting ICT. <i>Ramai pelanggan kami akan menerima pakai ICT.</i>	1	2	3	4	5
6	Many of our suppliers are currently adopting ICT. <i>Ramai pembekal kami kini menerima pakai ICT.</i>	1	2	3	4	5
7	Many of our suppliers will be adopting ICT. <i>Ramai pembekal kami akan menerima pakai ICT.</i>	1	2	3	4	5

Please **CIRCLE** the degree to which you agree with the following statements about **MIMETIC PRESSURE** of ICT.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut tentang **TEKANAN MIMETIC** ICT.

Strongly Disagree <i>Sangat Tidak Setuju</i> 1	Disagree <i>Tidak Setuju</i> 2	Neutral <i>Berkecuali</i> 3	Agree <i>Setuju</i> 4	Strongly Agree <i>Sangat Setuju</i> 5
--	--------------------------------------	-----------------------------------	-----------------------------	---

1	Many of our competitors are currently adopting ICT. <i>Ramai pesaing kami kini menerima pakai ICT.</i>	1	2	3	4	5
2	Many of our competitors will be adopting ICT in the near future. <i>Ramai pesaing kami akan menerima pakai ICT dalam masa terdekat.</i>	1	2	3	4	5
3	Our key competitors are currently adopting ICT. <i>Pesaing utama kami kini menerima pakai ICT.</i>	1	2	3	4	5
4	Our competitors that have adopted ICT are benefiting greatly. <i>Para pesaing kami yang telah menerima pakai ICT sangat bermanfaat.</i>	1	2	3	4	5
5	Our competitors that have adopted ICT are perceived favourably by others in our industry. <i>Pesaing kami yang menerima pakai ICT dilihat lebih baik oleh pihak lain dalam industri kami.</i>	1	2	3	4	5
6	Our competitors that have adopted ICT are perceived favourably by their customers. <i>Para pesaing kami yang menerima pakai ICT dilihat lebih baik oleh pelanggan mereka.</i>	1	2	3	4	5

Please **CIRCLE** the degree to which you agree with the following statements about **COERCIVE PRESSURE** of ICT.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut, tentang **TEKANAN PAKSAAN ICT**.

Strongly Disagree <i>Sangat Tidak Setuju</i> 1	Disagree <i>Tidak Setuju</i> 2	Neutral <i>Berkecuali</i> 3	Agree <i>Setuju</i> 4	Strongly Agree <i>Sangat Setuju</i> 5
---	---	--	------------------------------------	--

1	Customers that matter to us expect us to use ICT. <i>Pelanggan yang penting kepada kami mengharapkan kami menggunakan ICT.</i>	1	2	3	4	5
2	We may not retain our important customers without adopting ICT. <i>Kami tidak boleh mengekalkan pelanggan penting kami tanpa menerima pakai ICT.</i>	1	2	3	4	5
3	Customers that are crucial to us encourage us to use ICT. <i>Pelanggan yang penting kepada kami mendorong kami menggunakan ICT.</i>	1	2	3	4	5

Please **CIRCLE** the degree to which you agree with the following statements about **GOVERNMENT SUPPORT** of ICT.

Sila **BULATKAN** sejauh mana anda bersetuju dengan kenyataan berikut tentang **SOKONGAN KERAJAAN** terhadap ICT.

Strongly Disagree <i>Sangat Tidak Setuju</i> 1	Disagree <i>Tidak Setuju</i> 2	Neutral <i>Berkecuali</i> 3	Agree <i>Setuju</i> 4	Strongly Agree <i>Sangat Setuju</i> 5
---	---	--	------------------------------------	--

1	The government provides guidance in overcoming risks associated with implementation of ICT. <i>Kerajaan menyediakan panduan dalam mengatasi risiko yang berkaitan dengan pelaksanaan ICT.</i>	1	2	3	4	5
2	The government provides awareness building and education programs for ICT. <i>Kerajaan menyediakan program pembangunan kesedaran dan pendidikan untuk ICT.</i>	1	2	3	4	5
3	The government provides financial assistance to SMEs for ICT. <i>Kerajaan menyediakan bantuan kewangan kepada PKS untuk ICT.</i>	1	2	3	4	5
4	The government provide improvements for national ICT infrastructure. <i>Kerajaan menyediakan penambahbaikan bagi infrastruktur ICT negara.</i>	1	2	3	4	5
5	The government provides tax incentives towards the purchase and use of ICT. <i>Kerajaan menyediakan insentif cukai ke atas pembelian dan penggunaan ICT.</i>	1	2	3	4	5
6	The government regulation related to ICT favour ICT adoption. <i>Peraturan kerajaan yang berkaitan dengan ICT memihak kepada penerimaan ICT.</i>	1	2	3	4	5
7	The government promotes the ICT adoption among SMEs. <i>Kerajaan menggalakkan penerimaan ICT dalam kalangan PKS.</i>	1	2	3	4	5

SECTION B / SEKSYEN B

The following questions ask for information concerning yourself and your firm's background. Please answer each question by ticking the appropriate box and fill-up the required information.

Soalan-soalan berikut meminta maklumat mengenai diri anda dan latar belakang firma anda. Sila jawab setiap soalan dengan menandakan kotak yang sesuai dan isi maklumat yang diperlukan.

Please tick (/) in the appropriate box / Sila tandakan (/) dalam kotak yang sesuai.

1. **Gender/Jantina**

Male/Lelaki Female/Perempuan

2. **Age/Umur**

Below 30/Bawah30 41-50 61 and above/61 dan atas
 31- 40 51-60

3. **Race/Bangsa**

Malay/Melayu Indian/India
 Chinese/Cina **Others**, please specify/Lain-lain, sila nyatakan: _____

4. **Highest education level / Tahap Pengajian Tinggi**

PhD/ PhD Master/Sarjana Degree/Sarjana Muda
 Diploma/Diploma Certificate/Sijil Secondary school/Sekolah Menengah
 Primary School/Sekolah Rendah

Others, please specify:/Lain-lain, sila nyatakan: _____

5. **If you are a business owner or business partner, how long has your firm been established?**

Jika anda adalah pemilik perniagaan atau rakan niaga, berapa lama firma anda telah ditubuhkan?

Less than 5 years / Bawah 5 tahun 16 – 20 years / 16 – 20 tahun
 5 - 10 years / 5-10 tahun More than 20 years / lebih 20 tahun
 11 – 15 years / 11-15 tahun

6. **My firm location/Lokasi firma saya**

Penang / Pulau Pinang Perak / Perak
 Kedah / Kedah Perlis / Perlis

7. **How many employees does your firm hire?**

Berapa ramai pekerja yang diupah oleh firma anda?

Less than 5 employees / Bawah 5 pekerja 31 – 75 employees / 31 – 75 pekerja
 6 - 30 employees / 6-30 pekerja 76 – 200 employees / 76- 200 pekerja

8. **What is the Legal Status of Your Firm? (Select only one)**

Apakah status perundangan firma anda?

Sole Proprietorship / *Milikan tunggal* Private Limited/ *Sendirian Berhad*

Partnership / *Perkongsian* Limited Liability Partnership / *Perkongsian Liabiliti Terhad*

9. **Firm's Sector: / Sektor Firma**

Manufacturing / *Pembuatan* Services / *Perkhidmatan*

10. **Please state the type of INDUSTRY or MAIN BUSINESS ACTIVITY which most closely represents your firm.**

Sila nyatakan jenis INDUSTRI atau PERNIAGAAN UTAMA yang paling rapat mewakili firma anda.

(for example: electrical & electronics, food & beverages, healthcare, tourism services)
(contohnya: elektrik & elektronik, makanan & minuman, penjagaan kesihatan, perkhidmatan pelancongan)

**THANK YOU VERY MUCH FOR YOUR KIND COOPERATION.
TERIMA KASIH ATAS KERJASAMA ANDA.**

Appendix B

Factor	Total Variance Explained					
	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.738	23.490	23.490	15.100	22.537	22.537
2	6.701	10.001	33.491			
3	6.017	8.981	42.472			
4	4.212	6.286	48.759			
5	3.459	5.162	53.921			
6	2.982	4.450	58.371			
7	2.276	3.398	61.768			
8	1.969	2.938	64.707			
9	1.681	2.510	67.216			
10	1.656	2.472	69.688			
11	1.481	2.210	71.898			
12	1.360	2.030	73.928			
13	1.240	1.850	75.778			
14	1.067	1.592	77.371			
15	.947	1.414	78.784			
16	.914	1.364	80.148			
17	.863	1.288	81.436			
18	.832	1.241	82.678			
19	.805	1.201	83.879			
20	.798	1.192	85.071			
21	.690	1.030	86.101			
22	.622	.928	87.029			
23	.579	.864	87.894			
24	.536	.800	88.694			
25	.500	.747	89.441			
26	.471	.703	90.144			
27	.450	.672	90.816			
28	.448	.669	91.485			
29	.428	.639	92.124			
30	.405	.605	92.729			
31	.352	.526	93.255			
32	.339	.505	93.760			
33	.324	.483	94.243			
34	.302	.450	94.693			
35	.286	.427	95.120			
36	.258	.386	95.506			
37	.249	.372	95.878			
38	.226	.337	96.215			
39	.211	.315	96.530			
40	.184	.275	96.805			
41	.174	.260	97.065			
42	.172	.256	97.321			
43	.160	.238	97.559			
44	.151	.226	97.785			
45	.138	.206	97.991			
46	.130	.194	98.185			
47	.110	.165	98.349			
48	.108	.161	98.511			
49	.098	.146	98.656			
50	.095	.143	98.799			
51	.087	.130	98.928			
52	.074	.111	99.039			
53	.071	.107	99.146			
54	.069	.103	99.248			
55	.062	.092	99.340			
56	.060	.089	99.429			
57	.056	.083	99.512			
58	.052	.077	99.590			
59	.049	.073	99.662			
60	.044	.066	99.728			
61	.036	.054	99.782			
62	.030	.045	99.827			
63	.027	.040	99.868			
64	.026	.038	99.906			
65	.024	.036	99.942			
66	.022	.033	99.975			
67	.017	.025	100.000			

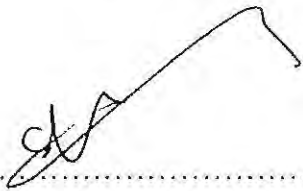
Extraction Method: Principal Axis Factoring.

Appendix C

To whom it may concern,

Subject: Translation of Questionnaire

I, SELVAM GURUSAMY, am competent to translate from Malay into English, and certify that the translation of research questionnaire is true and accurate to the best of my abilities as a language instructor and chief committee of English language.



.....
Signature of Translator

Selvam Gurusami

.....
Name of Translator



Appendix C

To whom it may concern,

Subject: Translation of Questionnaire

I, SUKUNA VATHI, am competent to translate from English into Malay, and certify that the translation of research questionnaire is true and accurate to the best of my abilities as a language instructor and chief committee of Malay language.



Signature of Translator

SUKUNA VATHI VELLASAMY VERAYA

Name of Translator

SUKUNA VATHI A/P VELLASAMY VERAYA
Penolong Kanan HEM
SJK (T) Ladang Paya Kemuning
06000 Jitra, Kedah Darul Aman.

