

THE EFFECT OF INTANGIBLE FACTORS ON
INNOVATION CAPABILITIES IN HIGHER
EDUCATION INSTITUTIONS

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DOCTOR OF PHILOSOPHY

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SUPERVISOR'S DECLARATION

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

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Thesis submitted in fulfillment of the requirements
for the award of the degree of
Doctor of Philosophy

Centre for Mathematical Sciences
UNIVERSITI MALAYSIA PAHANG

AUGUST 2020

ACKNOWLEDGEMENTS

First I would like to express my deepest thanks to ALLAH, the Most Gracious and Most Merciful for the blessing, wisdom, health, strength and passion that He has given to me throughout this challenging and adventurous doctoral journey.

From the bottom of my heart, I would like to express my appreciation to my main supervisor, Associate Professor Dr. Mohd Rashid Bin Ab Hamid, for his insights, words of encouragements for believing me and guiding me. He has advised me efficiently from the beginning through the end of this research. My deepest appreciation also goes to my late co-supervisor, Professor Dr. Razman Mat Tahar for supervising me for only a short period of time.

This appreciation is also extended to all my friends Humaira Binti Abdul Latif and Hassan Rahnaward Ghulami for helping me with many things over the years. Thank you for your support, encouragement and advice to me. To Dr Mazuri Binti Abd Ghani from Universiti Sultan Zainal Abidin (UniSZA), thank you so much for guiding me in writing the thesis and teaching me statistics. My sincere gratitude also goes to the Mybrain15 from Malaysian Ministry of Higher Education for giving me this opportunity to complete this research and providing me with the financial support.

Lastly, most importantly of all, I am deeply indebted to my family especially to my parents, Zainal Abidin Bin Md Hussein and Nor Fadzillah Binti Abdul Majid and also to my parents-in-law Mohammad Baharuddin Bin Mohd Amin and Jamilah Binti Othman for their prayers, care, sacrifice, and support for me. Saving the best for last is this heartfelt gratitude and appreciation are dedicated to my dearest husband, Ahmad Khairi Bin Mohammad Baharuddin. Thank you for being with me throughout these years. Your loves and supports have helped me overcome all the challenges. Thanks for believing in me to give the space for achieving my 'selfish' dreams. Finally, to my kids, Ahmad Qaiser Bin Ahmad Khairi and Dini Qasrina Binti Ahmad Khairi, you have given me strength and spirit to continue when I hesitate, and to keep soaring high when I falter. You teach me how to appreciate the time and love and you are my big gift granted by ALLAH.

ABSTRAK

Inovasi memainkan peranan penting dalam pembangunan mana-mana organisasi termasuk institusi pengajian tinggi (IPT) yang menggesa ramai penyelidik untuk memulakan isu ini. IPT perlu dijadikan contoh dalam mempraktikkan inovasi bagi menggalakkan dan memperkasa keupayaan inovasi untuk menjadikan sesebuah institusi penyelidikan menjadi terus maju. Oleh itu, objektif kajian ini bertujuan untuk mengkaji hubungan struktur dalam model hipotesis yang terdiri daripada faktor-faktor kritikal iaitu objektif dan strategi, pengurusan perubahan, pengurusan sumber, amalan terbaik dan keupayaan inovasi. Sebanyak sembilan hipotesis telah dikemukakan dalam model untuk menguji hubungan antara kelima-lima faktor kritikal keupayaan inovasi. Kerangka teori yang menyepadukan semua lima faktor juga telah diperkenalkan. Pemodelan kuasa dua terkecil separa telah digunakan untuk menilai model secara empirikal. Data primer telah dikumpulkan melalui pameran-pameran inovasi dengan menggunakan soal selidik yang diterima pakai dan disesuaikan daripada kajian terdahulu, di mana teknik persampelan-mudah telah digunakan terhadap universiti tempatan awam dan swasta dan telah menghasilkan 213 maklumbalas yang sah. Dapatan kajian menunjukkan bahawa semua hubungan hipotesis adalah signifikan pada t -nilai > 2.58 , ujian dua-hujung dengan menggunakan 5000 bootstrap sampel kecuali hubungan diantara pengurusan sumber terhadap inovasi yang memberikan keputusan hubungan tidak signifikan. Hasil keputusan hubungan yang signifikan, mengesahkan proksi di dalam model ini. Implikasi penyelidikan ini akan menyediakan garis panduan-garis panduan atau idea-idea kepada pengurusan dan pentadbiran di universiti untuk mencapai prestasi yang lebih baik dengan mengamalkan nilai-nilai teras yang dikategorikan sebagai petunjuk tidak ketara. Tambahan pula, melalui model yang dibina ini boleh menjadi asas untuk IPT terutamanya di Malaysia bagi mempercepat keupayaan inovasi mereka dengan meraih segala usaha dan berusaha untuk mencapai kecemerlangan serta diiktiraf institusi di seluruh dunia.

ABSTRACT

Innovation plays an important role in the development of any organization including higher education institutions (HEIs) that forced many researchers to embark on this issue. HEIs should be the role model in the practice of innovation so as to encourage and empower innovation for the survival of research institution. Therefore, the aim of this study is to examine the structural relationships in the hypothesized model that comprised of critical factors, namely, objectives and strategy, change management, resource management, best practices and innovation. A total of nine hypotheses have been put forward to test the relationships amongst these five critical factors of innovation capabilities model. Theoretical framework that integrates all five factors is also introduced. Partial least squares structural equation modeling technique was used to empirically assess the model. The primary data was collected through innovation exhibitions using questionnaire that was adopted and adapted from previous study, in which convenience-sampling technique was employed on local public and private universities that generated 213 valid responses. The findings revealed that all the hypothesized relationships are significant at t -value > 2.58 of two-tailed test by using 5000 bootstrapped samples, except for the relationship between resource management towards innovation that resulted in a non-significant relationship. The result of these significant relationships, verified the proxies in the model. The implications of this research would provide the guidelines or ideas towards management and administration in the university in order to achieve better performance by practicing the core values that categorized as intangible indicators. Moreover, throughout this developed model could be the basis for HEIs, especially in Malaysia, to accelerate their innovative capability by garnering all the efforts and endeavor for achieving excellence and be recognized worldwide.

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LIST OF SYMBOLS

$\%$	Percentage
H_o	Null hypothesis
H_1	Alternative hypothesis
R^2	Coefficient of determination
f^2	The effect size.
p	Significance level
Q^2	Blindfolding and predictive relevance for constructs
q^2	Predictive relevance effect size
\sum	Summation
t	t-test statistic

LIST OF ABBREVIATIONS

NSI	National survey of innovation
UNIK	Unit Inovasi Khas
AIM	Agensi Inovasi Malaysia
HEIs	Higher education institutions
PRIs	Public Research Institutes
IP	Intellectual Properties
R&D	Research and development
ROI	Return on investment
GRI	Government Research Institute
GDP	Gross Domestic Product
R&D&C	Research, development and commercialization
GTP	Government Transformation Program
GNI	Gross national income
NKEA	National Key Economic Areas
NEM	New Economic Model
GCI	Global Competitiveness Index
ASEAN	Association of Southeast Asian Nations
GII	Global Innovation Index
PCT	Patent Cooperation Treaty
WIPO	World Intellectual Property Organization
IHL	Institutions of higher learning
MBNQA	Malcolm Baldrige National Quality Awards
EFQM	European Foundation of Quality Management
AQA	Australia Quality Awards
TQM	Total Quality Management
ISO	International Standard Organization
MBWA	Management by Wandering Around
VBTPM	Value-based Total Performance Excellence Measurement
KPI	Key Performance Index
HRM	Human resource management

MyTIC	Technological Innovation Capabilities of Malaysian-Owned Companies
MyIPO	Intellectual Property Corporation of Malaysia
QA	Quality Assurance
VBOC	Value-based organizational capability
CSFs	Critical success factors
UGGI	University Good Governance Index
IE	Innovation excellence
IC	Innovation capability
IR	Innovation result
P & L	Profit and loss statement
RBV	Resource-based view
VBOF	Value-based organizational focus
VBPR	Value-based performance results
CFA	Confirmatory factor analysis
TPEM	Total Performance Excellence Model
P&P	Teaching and learning activities
ICT	Information and communication technology
MOHE	Ministry of Higher Education
MTE	Malaysian Technology Expo
ITEX	International, Invention and Technology Expo
EDA	Exploratory data analysis
MCAR	Missing completely at random
EM	Expectation maximization
VIF	Variance inflation factor
CMB	Common method bias
PLS-SEM	Partial least squares - structural equation model
PLS	Partial Least Squares
SEM	Structural equation modeling
MAR	Missing at random
SRS	Simple random sampling
AVE	Average variance extracted
HTMT	Heterotrait-monotrait

CR	Composite reliability
IPTA	Public higher learning institution
IPTS	Private higher learning institution
IPMA	Importance and performance matrix analysis
MQA	Malaysian Quality Assurance
IF	Impact Factor
IPA	Importance-Performance Analysis
KPM	Kolej Profesional MARA
UIAM	Universiti Islam Antarabangsa Malaysia
UKM	Universiti Kebangsaan Malaysia
UM	Universiti Malaya
UMK	Universiti Malaysia Kelantan
UMP	Universiti Malaysia Pahang
UMS	Universiti Malaysia Sabah
UniMAP	Universiti Malaysia Perlis
UNIMAS	Universiti Malaysia Sarawak
UniSZA	Universiti Sultan Zainal Abidin
UPM	Universiti Putra Malaysia
UPNM	Universiti Pertahanan Nasional Malaysia
UPSI	Universiti Pendidikan Sultan Idris
USIM	Universiti Sains Islam Malaysia
UTeM	Universiti Teknikal Melaka
UTHM	Universiti Tun Hussein Onn Malaysia
UTM	Universiti Teknologi Malaysia
GMI	German-Malaysian Institute
TATIUC	Institut Teknikal Tinggi Terengganu University College
ICAM	International College of Automotive
IUKL	Infrastructure University Kuala Lumpur
KKTM	Kolej Kemahiran Tinggi MARA
MMU	Multimedia University
UniKL	Universiti Kuala Lumpur
UNITEN	Universiti Tenaga Nasional
UTP	Universiti Teknologi Petronas

KPTM	Kolej Poly-Tech MARA
UiTM	Universiti Teknologi MARA
JPbSM	Human Resources Development Department
ILQaM	Institute of Leadership and Quality Management
AKEPT	Higher Education Leadership Academy
MRUN	Malaysia Research University Network
RDCE	Research activity, development, commercialization and entrepreneurship
PSPTN	National Higher Education Strategic Plan

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