



MANAGERIAL DECISION MAKING CAPABILITIES
FRAMEWORK IN ADOPTING TECHNOLOGY
INNOVATION WITHIN QUANTITY SURVEYING
ORGANISATIONS

BY

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ABSTRACT

The emergence of technology innovation has been acknowledged as one of the strategic decisions to solve the fragmented practices. Technology innovation is employed by various organisations to assist them in different ways. Despite the benefits it offers, both Western and non-Western researchers have reported numerous innovation problems, in which slow decision-making process to adopt new technologies remains to be the primary concern. The small professional services organisation (SCPS) or the so-called knowledge-intensive professional service organisation are also facing the same problem. From the perspective of small medium enterprises (SME's) researchers, the problem arose due to the incapability of managers to make technology adoption decisions. Realising the need of technology innovation within the Malaysian construction SMEs, this research aims at developing a managerial decision-making capability framework (MDMCF), which would be able to assist SME's managers to understand their level of adoption capability. This research adopted a qualitative method to collect data from the respondents. These include conducting pilot interviews on two qualitative researchers and one quantity surveying (QS) manager selected randomly to ensure the validity and reliability of the questions. The exploration of research has been continued by gathering the data from ten number of case studies and using three main research techniques: (i) semi-structured interview, (ii) direct observation, and (iii) documentation. The scope of the research tried to focus on identifying the motivational factors and examining the managerial decision making capability (MDMC) within Malaysian construction specifically from top managerial level, small size of QS organisations and using BIM software as an exemplar. Then, the developed framework was validated by eight domain experts from various QS organisations. Their selection were based on their position, experience and their involvement in the decision making process with regard to IT adoption. Using cross-case analysis, the results from the case studies showed that the managers' motivation to adopt new technologies were influenced by two primary reasons: (i) the significance of new technology and (ii) the advantages of new technology towards organisations. Whereas, managerial decision to adopt new technology was influenced by their capability that can be classified into two broad categories: (i) non-behavioural capability and (ii) behavioural capability. These broad factors were further categorised into five main factors: (i) demographic characteristics, (ii) cognition, (iii) social capital, (iv) human capital and (v) behaviour. Based on the empirical results, this research seems to be a meaningful contribution to the body of knowledge of construction innovation in Malaysia as the data related to CPS organisations were gathered. The MDMCF can also be a 'blueprint' or guideline to assist managers in planning any technology adoption strategy within their organisation.

خلاصة البحث

قد تم الاعتراف بظهور الابتكار التكنولوجي كواحد من القرارات الاستراتيجية لحل الممارسات المجزأة. ويتم استخدام الابتكار التكنولوجي من قبل المنظمات المختلفة لمساعدتها بطرق مختلفة. على الرغم من الفوائد التي يوفرها، فقد أفاد الباحثون الغربيون وغير الغربيين عن العديد من مشكلات الابتكار، حيث لا تزال عملية اتخاذ القرار بطيئة لاعتماد تقنيات جديدة هي الشاغل الرئيسي. كما تواجه المشكلة نفسها منظمة الخدمات المهنية الصغرى (SCPS) أو ما يسمى بمنظمة الخدمات المهنية المكثفة للمعرفة. ومن منظور الباحثين من الشركات المتوسطة والصغيرة (SME)، نشأت المشكلة هذه بسبب عدم قدرة المديرين على اتخاذ قرارات اعتماد التكنولوجيا. وإذ يدرك هذا البحث الحاجة إلى الابتكار التكنولوجي داخل المشاريع الصغيرة والمتوسطة الحجم في ماليزيا، فيهدف هذا البحث إلى تطوير إطار القدرة على اتخاذ القرارات الإدارية MDMCF، والذي سيكون قادراً على مساعدة مديري المؤسسات الصغيرة والمتوسطة في فهم مستوى قدراتهم على التبني. واعتمد هذا البحث على طريقة نوعية لجمع البيانات من المستجيبين. وتشمل هذه إجراءات المقابلات التجريبية على اثنين من الباحثين الكميين ومدير واحد في مسح الكمية (QS) الذين تم اختياره عشوائياً لضمان صحة وموثوقية الأسئلة. وقد استمر استكشاف البحث عن طريق جمع البيانات من عشر دراسات حالة واستخدام ثلاثة أساليب بحثية رئيسية: (1) مقابلة شبه منظمة، (2) الملاحظة المباشرة، (3) الوثائق. لقد حاول نطاق البحث التركيز على تحديد العوامل التحفيزية وفحص القدرة على اتخاذ القرارات الإدارية (MDMC) داخل البناء الماليزي على وجه التحديد من المستوى الإداري الأعلى، وصغر حجم منظمات QS واستخدام برمجيات BIM كفكرة. بعد ذلك، تم التحقق من صحة الإطار المطور من قبل ثمانية خبراء المجال من مختلف منظمات QS. واستند اختيارهم على موقعهم وخبرتهم ومشاركتهم في عملية صنع القرار فيما يتعلق بتبني تكنولوجيا المعلومات. باستخدام التحليل المتقاطع، لقد أظهرت نتائج دراسات الحالة أن حافز المديرين على تبني تقنيات جديدة تأثروا بدورين أساسيتين الأسباب: (1) أهمية التكنولوجيا الجديدة و(2) مزايا التكنولوجيا الجديدة تجاه المنظمات. إضافة إلى أن القرار الإداري بتطبيق التكنولوجيا الجديدة قد تأثر بقدرتهم التي يمكن تصنيفها إلى فئتين عريضتين: (1) القدرة غير السلوكية و(2) القدرة السلوكية. وتم تصنيف هذه العوامل العامة إلى خمسة عوامل رئيسية: (1) الخصائص الديموغرافية، (2) الإدراك، (3) رأس المال الاجتماعي، (4) رأس المال البشري، و(5) السلوك. بالرجوع إلى النتائج التجريبية، يبدو أن هذا البحث يشكل مساهمة ذات معنى في مجموعة المعارف المتعلقة بالابتكار في مجال البناء في ماليزيا حيث تم جمع البيانات المتعلقة بمنظمات CPS. ويمكن أيضاً أن يكون MDMCF "مخططاً" أو مبدأ توجيهياً لمساعدة المديرين في التخطيط لأي إستراتيجية لتبني التكنولوجيا داخل مؤسستهم.

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DECLARATION

I hereby declare that this thesis is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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This thesis is dedicated to my father, Mahdzir b Mustafa, my mother, Maznah bt Megat Abdul Hamid, my siblings: Mazlinda bt Mahdzir, Mazrul b Mahdzir, Muzafar b Mahdzir, My nieces: Ameerul Fadhli, Aisyah Ameera, Naseem Fadhli and Maya Ameera

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LIST OF ABBREVIATIONS

APP.	Appendix
A/E/C	Architecture, Engineering and Construction
appendix	app.
BI	Behavioural intention to use
BIM	Building Information Modelling
BQs	Bills of Quantities
BQSM	Board of Quantity Surveyors Malaysia
Buildsoft	Global Estimating System
C&S	Civil and Structural
C-TPB-TAM	Combination of Theory of Planned Behaviour/Technology Acceptance Model
CD	Compact disc
CAD	Computer Aided Design/Drafting
CATO software	Estimating and Cost Planning software for Construction Professionals
CEO	chief executive officer
CI	Construction Industry
CPS	construction professional services organisation
CIDB	construction industry development board
CIMP	Construction Industry Master Plan
Cost-X	Estimating and Cost Planning software for Construction Professionals.
CRM	Customer relationship Management
DMC	decision making capability
DMCF	decision making capabilities framework
DOI	Diffusion of Innnovation
DPMMWP	Dewan Perniagaan Melayu Malaysia Bandaraya Kuala Lumpur
ed./eds.	Edition/editions; editor,
e. g	<i>(exempligratia)</i> for Example
et al	and others
Etc	and so forth
EDI	information and communication technology
EMRs	electronic medical records
EPS	electronic-procurement systems
ERP	Enterprise resource planning
et al.	<i>(et alia)</i> : and others
etc	<i>(et cetera)</i> : and so forth pages that follow
FAMA	Federal Agricultural Marketing Authority
fi g./figs.	Figure/figures
G1 to G7	Contractor category and class under PKK
GDP	gross domestic product
GLCs	government-linked companies
Glodon	Estimating and Cost Planning software for Construction Professionals.
HQ	Headquarters

Ibid	<i>(ibidem)</i> : in the same place
ICU JPM	Unit Penyelarasan Pelaksanaan Jabatan Perdana Menteri
ICECA	Internal Civil Engineering Cost Association
IDT	Innovation Diffusion Theory
i.e	that is
IFC	Industry Foundation Class
IIUM	International Islamic University Malaysia
ISO	International Organization for Standardization
ISM	Institution of Surveyors, Malaysia
IT	Information Technology
JKR	Jabatan Kerja Raya
KL	Klang Valley
KLCC	Kuala Lumpur City Centre
KLIA	Kuala Lumpur International Airport
LCCT	Low Cost Carrier Terminal
M&E	Mechanical and Electrical
MARA	Majlis Amanah Rakyat
MCI	Malaysian construction industry
MDMC	managerial decision making capability
MDMCF	managerial decision making capabilities framework
Mindef	Kementerian Pertahanan Malaysia
MISM	Member of the Royal Institution of Surveyors
MM	Motivational Model
MPCU	Model of PC Utilization
MRISM	Member of Royal Institution of Surveyors Malaysia
MRT	Mass Rapid Transit
MS	Microsoft
no./no.s	number/numbers
NSDC	National SME Development Council
PBC	Perceived behavioural control
PDCCQS	Property Development Cost Consultant Quantity Surveyor
PEOU	Perceived Ease of Use of technology
PETRONAS	Petroleum Nasional Berhad
Pknpk	Perbadanan Kemajuan Negeri Perak
PKB	Polytechnic Kota Bharu
POLIMAS	Politeknik Sultan Abdul Halim Mu'adzam Shah
PU	Perceived Usefulness
PWTC	Putra World Trade Centre
QS	Quantity Surveying/Quantity Surveyor
QSBCC	Quantity Surveying and Building Cost Consultant
QSBEC	Quantity Surveyor, Building Economist, Construction Cost
QSCCA	Quantity Surveying and Construction Cost Advice
QSCCC	Quantity Surveying and Construction Cost Consultants
QSCF	Quantity Surveying Consultancy Firm
QSM	Quality Service Management System
RBV	Resource-based View
Revit	Revit MEP software for Construction Professionals
RFID	radio frequency identification