UNIVERSITI TEKNOLOGI MARA
Cawangan Perak

e-Proceedings v-GOGREEN2021 29-30 SEPT

VIRTUAL GO GREEN: CONFERENCE AND PUBLICATION

"Rethinking Built Environment: Towards a Sustainable Future"

Organiser:
Research, Industrial Linkages, Community & Alumni Network (PJIM&A)

Co-organiser:
Department of Built Environment Studies & Technology (JABT), Faculty of Architecture, Planning & Surveying (FSPU)

PUBLICATION DATE: 1st JUNE 2022

e-Proceedings
v-GOGREEN2021 29-30 SEPT

VIRTUAL GO GREEN: CONFERENCE AND PUBLICATION

"Rethinking Built Environment: Towards a Sustainable Future"

Organiser:
Research, Industrial Linkages, Community & Alumni Network (PJIM&A)

Co-organiser:
Department of Built Environment Studies & Technology (JABT), Faculty of Architecture, Planning & Surveying (FSPU)

Key Elements of Building Information Modeling (BIM) for BIM-Based Projects

Wan Nur Syazwani Wan Mohammad[1], Mohd Rofdzi Abdullah[2], Sallehan Ismail [3] and Roshana Takim[4]

[1,2,3] Centre of Studies for Construction, Department of Built Environment Studies and Technology, Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA (UiTM), Perak Branch, 32610, Seri Iskandar, Perak, Malaysia.

wannur956@uitm.edu.com

Abstract

BIM is introduced to support the fourth Industrial Revolution 4.0 (IR4.0) in the construction industry. Through BIM, the construction information is stored, supplied, and received in one single respiratory system which enables the BIM-based project team to interact and collaborate in real-time throughout the project life cycle. Nevertheless, the BIM adoption performance among contractors is relatively low for their projects. One of the reasons is that there is a lack of overarching key elements identified from the previous study of BIM assessment models. The objective of this study is *to identify the key elements of BIM used for BIM-based projects adopted from various BIM assessment models*. A systematic literature review from various BIM assessment models in the United States, United Kingdom, Netherland, Australia, China, South Korea, and Malaysia was conducted. The findings revealed that four (4) key elements to be considered. These are *BIM objectives, BIM uses, BIM adoption components, and project performance criteria*. The deliberated key elements cover the assessment of BIM-based projects' performance (i.e., time, cost, quality, and safety) across construction project phases. Hence, the outcomes of this paper could help BIM stakeholders in particular contractors to comprehend various key elements for BIM-based projects in Malaysia.

Keywords: *Building Information Modeling (BIM); Key elements*; *Contractor*; BIM *Models.*

1.0 Introduction

The construction industry has been moving towards Industrial Revolution 4.0 which has transformed the construction industry into a competitive digital ecosystem. Better relevant information, improved collaboration among construction stakeholders (i.e., consultants, contractors, and subcontractors), and enhanced project delivery are key elements in the digitization of the industry (Merschbrock & Munkvold, 2015). As such, Building Information Modelling (BIM) is a vital solution for the construction industry to approach the Fourth Industrial Revolution (4.0) agenda. BIM is defined as the development and use of a computer software model to simulate the construction and operation of a facility. As a result, BIM is rich in information, object-oriented, intelligent, and parametric digital representation and able to help users to make fast decisions (Erntrom et al., 2006). BIM also facilitates contractors in performing their daily works, improving visualisation, increasing transparency in the construction process, reducing change orders and rework; and improving coordination with contractors and manufacturers at the early stage in BIM-based projects.

Likewise, BIM is a parametric tool to achieve better integration among project stakeholders to reduce conflicts (Azhar et al., 2012; Shapiai, 2015). Furthermore, BIM with the processing and integrated tools of the project data can reshape the way of the construction team to work together to achieve the ultimate project outcome (i.e., time, cost, quality, and safety) (Hadzaman et al., 2015: John, 2018). Despite the numerous benefits of BIM, the adoption of BIM among contractors has been reported to be low compared to other stakeholders (CIDB, 2016). It was reported that the adoption rate for BIM is 13% by contractors, 42% by architects, and 21% by engineers (Idrus & Bahar, 2018). Numerous studies on BIM Maturity/ BIM Capabilities/BIM performance evaluation models were carried out to assess the team's performance and yet overarching BIM assessment models are still continuously debated. Lack of key elements from existing studies of BIM assessment models revealed that contractors were unable to meet projects' performance criteria (i.e., time, cost, quality, and safety). As a result, contractors obtained less benefit from the BIM-based projects. Hence, this paper attempts to review the existing BIM Assessment models from various countries (i.e., the United States, United Kingdom, Netherland, Australia, China, South Korea, and Malaysia) to capture the key elements for BIM-based projects.

2.0 Worldwide BIM Overview

The United States General Serviced Administration (GSA) initiated BIM for US public projects by utilising visualisation, coordination, and simulation of the 3D model up to 4D model since 2007 (Harun et al., 2016). In the United Kingdom, BIM is introduced to reduce the cost of public sector assets cost, carbon footprint and improve construction information management (Hamma-adama & Kouider, 2019). Since then, various initiatives from The UK Government's Construction Strategy, the British Standards Institute (BSI), and The Architectural, Engineering, and Construction (AEC) (UK) Standards committee have been established to support the development of BIM in the UK. Apart from that, The Scandinavian Region countries (i.e., Norway, Denmark, and Finland) implement BIM for both public and private projects and strengthen research and development with regards to BIM. In Australia, the Australian government under NATSPEC Construction Information has been implementing various strategies to support the adoption of BIM (i.e., document to project implementation, choice of tools, object properties, and standard, and National Building Guide, 2011) (Mcauley et al., 2017).

Following thereon, Asian countries (i.e., Singapore, Hong Kong, and Malaysia) began formulating various strategies in BIM adoption. For instance, The Construction and Real Estate Network (CORENET) in Singapore have provided the necessary BIM tool for the exchange of information among all parties in BIM-based projects (Teo & Fatt, 2006). One of the strategies adopted is the e-Plan Check System based on Industry Foundation Classes (IFC). Other strategies are pilot projects, seminars, training grants, and collaboration with government agencies and developers. According to Fung (2013), in Hong Kong, the Committee on Environment and Technology of the Construction Industry Council (CIC) highlighted several strategic BIM implementation initiatives. These are collaboration, incentive and proven benefit, standard and common practice, legal and insurance, information sharing and hard over, promotion and education, risks assessment, and globally competitive. In Malaysia, the adoption of BIM was initiated by The Malaysian Public Work and Department (PWD) in 2007 and successfully adopted BIM in their first project (i.e., National Cancer Institute). Since then, various bodies (i.e., the Public Works Department (PWD), the Construction Industry Development Board (CIDB), the Royal Institute of Surveyors Malaysia (RICS), the Multimedia Super Corridor (MSC), the Prima Corporation Malaysia (PRIMA), and the Construction Institute of Malaysia (CREAM) involved in the development of BIM for their current project (Brahim, 2018). The roles of these agencies are to provide a BIM roadmap, establish a BIM committee, Research and Development (R&D), and BIM seminars and conferences. These indicated that those agencies accepted BIM as the new technology and now developed it as a main agenda in the construction industry which is in line with Fourth Industrial Revolution 4.0 (IR4.0) through Construction 4.0 (2021-2025).

3.0 Methodology

In this study, a systematic literature review was comprehensively conducted. It reviewed BIM Assessment models at different levels (i.e., individual, organisation, and projects) from various countries such as the United States, United Kingdom, Netherland, Australia, China, South Korea, and Malaysia. The variables extracted from the models were recorded and, analysed using the content analysis method. For this study, thematic content analysis is one of the most common forms of analysis within qualitative research that could reveal the findings.

4.0 Synthesis of BIM Assessment Models

Table 1 shows the twelve (12) BIM assessments models from three main databases: Web of Science; Scopus and Science Direct. There are four (4) models from the United States, followed by two (2) models from the United Kingdom and Netherland respectively. Whilst, Australia, South Korea, China, and Malaysia have developed one (1) model each**.** Various key elements, strengths, and limitations for each model are presented.

Table 1. Key elements for BIM-based projects adopted from various BIM assessment models

No	BIM Assessment models/tools (Years/Countries)	Stakeholders	Key Elements	Strengths	Limitations
1	NBIMS-CMM (2007/ United States)	Individuals & organisations	***Information Management***	● Simpler and easier to understand	● Inconsistency of the maturity scores ● Limited to a single scope ● Lack of user descriptions
2	Virtual, Design & Construction (VDC) Scoreboard (2009/ United States)	Projects	Planning (BIM objective), ***Technology, Organisation & Project Performance***	● Test for 108 pilot studies ● Applicable for all the project phases	● Complicated evaluation ● Lack of user descriptions, BIM Uses, and information management
3	The Organisational BIM Assessment Profile (2010/ United States)	Organisations	Technology, Organisation, Information Management & ***BIM objective, BIM Uses***	● Covered multiple aspects of assessment ● A clear description of measured items	● Costly and time constraint ● Limited explanation of Rubric Matrix ● Lack on items of project performances
4	BIM Maturity Model (2016/ United States)	Projects	Technology, Organisation & Information Management	● Extensive quantitative data and analysis ● Establish the relationship among the factors	● Lack on items of project performance criteria ● Theoretical studies ● Lack of user guideline
5	BIM Maturity Level (2008/ United Kingdom)	Industries & Organisations	Information Management	● Extensive data management	● Limited to a single scope ● Lack of user descriptions ● Specified in the UK only
6	BIM Maturity Measures (2016/ United Kingdom)	Projects	Technology, Organisation & Information Management	● Extensive validation with 213 case study projects	● Oriented to a single organisation.
7	BIM Quick Scan Model (2010/Netherland)	Organisations	Technology, Organisation & Information Management	● Two methods of assessment: self & certified scan ● Test for 130 organisations	● Insufficient documents & rough questions ● Lack of user guideline ● Costly
8	BIM Maturity Model (2018/ Netherland)	Organisations	Technology, Organisation & Information Management	● Provides a testing tool from various sector	● Lack on items of project performance criteria ● Lack of user guideline
9	BIM Maturity Matrix (BIM^3) (2010/Australia)	Individuals & Organisations	Technology, Organisation & ***Environment***	● Multiple aspect of assessment. ● Various stages of assessment ● Clear steps in operating the model	● Unrecognized ● Complicated evaluation ● Lack of user guideline ● Costly and time constraint
10	SLAM-BIM (2014/South Korea)	Projects	BIM objective, BIM uses & Project Performance	● KPI as the project goal ● Using a quantitative measurement performance	● Limited data of ROI, change orders & projects schedule

11	Multifunctional BIM Maturity Model (2016/ China)	Projects, Organisations &Industries	Technology, Organisation & Information Management	● Easy-to-use presentation ● A clear view of domains and sub-domain of the study	● Lack of user guideline Lack on items of project performance criteria
12	BIM Maturity Level for Design Stage (2015/Malaysia)	Projects	Organisation	● Provides strategies to move one level to another level	● Limited of assessment details ● Focus on the project design team

4.1 Key Elements for BIM-Based Projects

Four (4) key elements for BIM-based projects were identified from various BIM assessment models. These are BIM objective, BIM uses, BIM adoption components (i.e., technology, organisation, environment, and information management), and project performance criteria. In the United States, four (4) BIM Models were reviewed. The first model is the National Building Information Modeling Standard Capability Maturity Model (NBIMS-CMM) (2007), followed by the Virtual, Design & Construction (VDC) Scoreboard (2009), The Organisational BIM Assessment Profile (2010), and BIM Maturity Model (2016). NBIMS-CMM focuses on *BIM information management* solely and neglects other important variables. Whilst, Virtual, Design & Construction (VDC) Scoreboard (2009) and The Organisational BIM Assessment Profile (2010) highlighted four BIM adoption key elements in terms of *planning, technology, organisation, and project performance*. One extra element was added by The Organisational BIM Assessment Profile (2010) is the *BIM Uses* which is vital. The strength of NBIMS-CMM is simpler and easier to understand but the limitation of the model is the inconsistency of the maturity scores and lack of user's description. The Virtual, Design & Construction (VDC) Scoreboard (2009) on the other hand, is applicable for all BIM project phases despite the model being regarded as complicated to use. For BIM Maturity Model by Chen (2013), the application of Structural Equation Modelling (SEM) was realised and had highlighted (3) main key elements *technology, organisational (process), and information management* for BIM-based projects. The strength of the model is specifying the relationship between the indicators and the factors through an extensive quantitative data collection for 925 respondents. One of the limitations of the model is that it is lacking user guidelines.

In the United Kingdom, two (2) BIM models were reviewed. These are BIM Maturity Level (2008) and BIM Maturity Measures (2016). The BIM Maturity Level was developed by Bew and Richards and it describes the impact of *information management* as the BIM key element (Brahim 2018). The model was used to evaluate the BIM maturity at the industry and organisational levels. Nevertheless, the model also has limitations in which it focuses on the single scope, lacks user descriptions which make it difficult for BIM users to comprehend (Succar, 2015; Brahim, 2018). The development of The BIM Maturity Measure (2016) (BIM_MM) is to improve the BIM capabilities of design and engineering disciplines. With its emphasis on *technology, organisational (people & process), and information management* of BIM key elements. The model was tested on 213 case study projects at the ARUP organisation in the UK and applied to various projects handled by the ARUP organisation.

In Netherland, once again two (2) BIM models were reviewed to obtain the key elements for BIM-based projects. The BIM Quickscan model provides an insight into the current BIM performance in organisations by two (2) methods of assessment, self and certified scan (Sebastian & Van Berlo, 2010; Van Berlo & Hendriks, 2012; Alaghbandrad & Forgues, 2013). The model emphasised three BIM key elements *(i.e., technology (tools and applications), Organisation (organisation culture & management), and information management (information structure).* In addition, the model applied the quantitative and qualitative approaches to assessment in over 130 organisations to obtain an extensive overview of BIM. The model is conducted through field tests (interviews) with the construction players, qualitative judgments from BIM Consultants, verification through expert panels, and validation by two (2) pilot studies (Wu *et al*., 2017). Nevertheless, the model has insufficient documentation of the measurement items, rough questions, a lack of guidelines for users to operate the tool, and is costly (Wu *et al*., 2017). Whilst, the BIM maturity by Siebelink et al., (2018) emphasised on *technology, organisation and information management* as the key elements of BIM. The BIM model is applicable for various disciplines in the construction supply chain (i.e., clients organisations, architectural firms, engineering firms, commercial and industrial building contractors, civil contractors, MEP contractors, and suppliers). However, the model does not consider the specific project performance criteria as the goal.

In Australia, Building Information Modelling Maturity Matrix (BIM^3) by Succar (2010) was reviewed. The model is used to assist individuals and organisations in planning, assessing, and achieving BIM performances. Three (3) main key elements were captured *(i.e., technology; organisation (process & people), and environment).* The model clearly explains the steps in operating points to obtain a high score for BIM-based projects. However, there are several drawbacks. The model has been regarded as unrecognised, little-known in the construction industry, and lacks authoritative endorsements (Succar, 2013; Kam *et al*., 2016). Besides, the model is complex, time-consuming, and costly and could require BIM experts to access the model (Alaghbandrad & Forgues, 2013). The SLAM-BIM model in South Korea is known as a goal-driven model for project evaluation. The model emphasises assessment for the maturity level of BIM projects and highlighted 4 key elements for BIM measurements *(i.e., technology, organisations, environment, and information management).* The model can comprehend the data collection techniques and the assessments methods to the users. Nevertheless, the lacking part of the model is that it is not incorporating business efficacy such as Return on Investment (ROI), change orders, and schedule delays.

Following thereon, one model termed as Multifunctional BIM maturity Model from China was reviewed. The model was developed by Liang *et al*., (2016) that functions to evaluate the BIM maturity level of individuals in projects, organisations, industries and to integrate into a single, easy-to-use presentation. It provides a clear view of the *relationship* between the domains and subdomains of the BIM maturity level at the project and organisation levels. The key elements captured *are BIM objectives, BIM uses, and project performance.* Despite the advantages of the model, it is difficult to operate the tool, the rubrics for the assessments are highly subjective and limited on the items of project performance criteria. In Malaysia, the BIM Maturity Level for Design Stage by Mohd (2015) is a potential model to be pondered. The model aims to help the design team to implement BIM in BIM-based projects. The model emphasises the key elements of BIM implementation by a project team to obtain the highest level (5). A five-dimensional building information modelling is the real-time extraction or development of fully valued parametric building components within a virtual model. The main key element focused by the model *is the organisation.* The strength of the model is that it provides strategies to move from one level to another Nevertheless, the model is limited in its explanation of the assessment details and guidelines for its use.

Given the above, various key elements *(i.e., BIM objectives, BIM uses, BIM adoption components (i.e., technology, organisation, and environment),* and performance criteria *(i.e., time, cost, quality, and safety)* were identified and captured from previous assessment models. Besides, the strengths and the limitations disclosed, the models identify various options in terms of BIM key elements to be adopted for further development of a BIM framework. Among others, 3 BIM assessment models from the United States (i.e., NBIMS-CMM (2007); the VDC Scoreboard and The Organisational Building Information Modelling (BIM) Assessment Profile) and one (1) model from Australia (i.e., the Building Information Modelling Maturity Matrix (BIM^3) are referred in terms of the comprehensive BIM key elements listed for BIM-based projects.

5.0 Conclusion

This paper has identified various key elements for BIM-based projects from various BIM assessment models in Malaysia and across the globe. Unanimously, the BIM models have repeatedly highlighted *BIM objectives, BIM uses, BIM adoption components, and project performance criteria* as key elements for BIM-based projects. The BIM adoption components which consist of *technology, organisation, and information management* are regarded as the utmost variables of the key elements listed by the models. These components are inevitable in BIM-based projects in driving BIM adoption among contractors. For example, in technology, contractors could utilise BIM software to create models for buildings across project phases. In an organisation, the top management support is a key dynamic capacity for the architecture, engineering, and construction (AEC) industry, to influence the BIM adoption for their projects. In terms of environment (policy), the decision of BIM adoption is driven by corporate innovation strategy and government policy pressure. For information management, BIM serves as a data-sharing platform with effective data management for various stakeholders involved in BIM-based projects. All these elements are to be implemented in achieving the project performance criteria (i.e., time, cost, quality, and safety).

This paper is presented as part of an ongoing PhD research at the Faculty of Architecture, Planning, and Surveying, UiTM to develop a BIM adoption assessment framework for BIM-based projects. The results of the study could provide an insight into the BIM-based projects by providing a valuable guideline, especially related to the development of BIM in Malaysia.

References

Alaghbandrad, A., & Forgues, D. (2013). Development of a model to select BIM implementation strategy with respect to the BIM maturity level of an organization. *Proceedings, Annual Conference - Canadian Society for Civil Engineering*, *2*(January), 1149–1158.

Azhar, S., Khalfan, M., & Maqsood, T. (2012). Building information modelling (BIM): now and beyond. *Construction Economics and Building*, *12*(4), 15–28. https://doi.org/10.5130/ajceb.v12i4.3032

Bilal Succar. (2015). *BIM ThinkSpace: Episode 22: The Wedge and the S-Curve*. https://www.bimthinkspace.com/2015/02/episode-22-the-wedge-and-the-s-curve.html

Brahim, J. (2018). *Development of migration path model of BIM for construction professional*. Universiti Tun Hussein Onn Malaysia (UTHM).

Chen, Y. (2013). *Measurement Models of Building Information Modeling Maturity*. Purdue University.

Construction Industry Development Board Malaysia. (2016). Malaysia Building Information Modeling Report. In *Malaysia Building Information Modelling Report 2016, CIDB Technical Report Publication No 1217.* Construction Industry Development Board Malaysia. https://www.cidb.gov.my/sites/default/files/2020-12/14.BIM-Report-2016.pdf

Erntrom, B., Handson, D., Hill, D., Jarboe, J., Kenig, M., Nies, D., Russel, D., Snyder III, L., & Webster, T. (2006). The Contractors' Guide to BIM - Edition 1. *AGC of America*, 48. http://www.agcnebuilders.com/documents/BIMGuide.pdf

Fung, A. (2013). Final Draft Report of the Roadmap for BIM Strategic Implementation in Hong Kong's Construction Industry. *BIM-Roadmap*, 1–66.

Hadzaman, N. A. H., Takim, R., & Nawawi, A. H. (2015). *Building Information Modelling (BIM): the impact of project attributes towards clients' demand in BIM-based project*. *May 2016*, 59–69. https://doi.org/10.2495/BIM150061

Hamma-adama, M., & Kouider, T. (2019). Comparative Analysis of BIM Adoption Efforts by Developed Countries as Precedent for New Adopter Countries. *Current Journal of Applied Science and Technology*, *36*(2), 1–15. https://doi.org/10.9734/cjast/2019/v36i230224

Harun, A. N., Samad, S. A., Nawi, M. N. M., & Haron, N. A. (2016). Existing practices of building information modeling (BIM) implementation in the public sector. *International Journal of Supply Chain Management*, *5*(4), 166–177.

Idrus, A., & Bahar, N. (2018). *Level of Implementation of Building Information Modelling (Bim) Among Construction Contractors*. *Febuary*, 53–55.

John, D. D. (2018). *Building Information Modeling (BIM) Impact on Construction Performance*. Georgia Southern University.

Kam, C., Senaratna, D., Mckinney, B., & Xiao, Y. (2016). The VDC Scorecard: Formulation and Validation. *CIFE Working Paper*, *WP 135*(January), 40.

Liang, C., Lu, W., Rowlinson, S., & Zhang, X. (2016). Development of a Multifunctional BIM Maturity Model. *Journal of Construction Engineering and Management*, *142*(11). https://doi.org/10.1061/(ASCE)CO.1943-7862.0001186

Mcauley, B., Hore, A., & West, R. (2017). *Building Information Modelling in Ireland 2017*. https://doi.org/10.21427/wy14-n123

Merschbrock, C., & Munkvold, B. E. (2015). Effective digital collaboration in the construction industry - A case study of BIM deployment in a hospital construction project. *Computers in Industry*, *73*, 1–7.

Mohd, S. (2015). *Building Information Modelling (Bim) Implementation Model for Construction Project Design Stage*. *September*.

Sebastian, R., & Van Berlo, L. (2010). Tool for benchmarking BIM performance of design, engineering and construction firms in the Netherlands. *Architectural Engineering and Design Management*, *6*(SPECIAL ISSUE), 254–263. https://doi.org/10.3763/aedm.2010.IDDS3

Shapiai, M. F. (2015). *Minimizing Conflicts During Construction Stage By Using Building Information Modeling*. Universiti Teknologi Malaysia.

Siebelink, S., Voordijk, J. T., & Adriaanse, A. (2018). Developing and Testing a Tool to Evaluate BIM Maturity: Sectoral Analysis in the Dutch Construction Industry. *Journal of Construction Engineering and Management*, *144*(8), 05018007.

Succar, B. (2010). Building Information Modelling Maturity Matrix. In *Handbook of Research on Building Information Modeling and Construction Informatics: Concepts and Technologies* (Issue January 2010, pp. 65–103). IGI Global. https://doi.org/10.4018/978-1-60566-928-1.ch004

Succar, B. (2013). Building Information Modelling : conceptual constructs and performance improvement tools. *PhD Thesis - University of Newcastle*, *December*, 202. https://doi.org/10.1016/j.autcon.2013.05.016

Teo, E. A.-L., & Fatt, C. T. (2006). *Section 5: Building Smart - A Strategy for Implementing BIM Solution in Singapore*.

Van Berlo, L., & Hendriks, H. (2012). Bim Quickscan: Benchmark of Bim Performance in the Netherlands. *CIB W78 2012: 29th International Conference*, 17–19.

Wu, C., Xu, B., Mao, C., & Li, X. (2017). Overview of bim maturity measurement tools. *Journal of Information Technology in Construction*, *22*(November 2016), 34–62.

Pejabat Perpustakaan
Librarian Office

Universiti Teknologi MARA
Cawangan Perak
Kampus Seri Iskandar
32610 Bandar Baru Seri Iskandar,
Perak Darul Ridzuan, MALAYSIA
Tel: (+605) 374 2093/2453 Faks: (+605) 374 2299

UNIVERSITI TEKNOLOGI MARA

Surat kami : 700-KPK (PRP.UP.1/20/1)
Tarikh : 20 Januari 2023

Prof. Madya Dr. Nur Hisham Ibrahim
Rektor
Universiti Teknologi MARA
Cawangan Perak

Tuan,

PERMOHONAN KELULUSAN MEMUAT NAIK PENERBITAN UiTM CAWANGAN PERAK MELALUI REPOSITORI INSTITUSI UiTM (IR)

Perkara di atas adalah dirujuk.

2. Adalah dimaklumkan bahawa pihak kami ingin memohon kelulusan tuan untuk mengimbas (*digitize*) dan memuat naik semua jenis penerbitan di bawah UiTM Cawangan Perak melalui Repositori Institusi UiTM, PTAR.

3. Tujuan permohonan ini adalah bagi membolehkan akses yang lebih meluas oleh pengguna perpustakaan terhadap semua maklumat yang terkandung di dalam penerbitan melalui laman Web PTAR UiTM Cawangan Perak.

Kelulusan daripada pihak tuan dalam perkara ini amat dihargai.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

Setuju.

27.1.2023

PROF. MADYA DR. NUR HISHAM IBRAHIM
REKTOR
UNIVERSITI TEKNOLOGI MARA
CAWANGAN PERAK
KAMPUS SERI ISKANDAR

SITI BASRIYAH SHAIK BAHARUDIN
Timbalan Ketua Pustakawan

nar