


Legal & Contractual Requirements for Construction 4.0 in Malaysian Construction Industry

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Legal & Contractual Requirements for Digital Transformation in Malaysian Construction Industry
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EDITORIAL TEAM

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DISCLAIMER

1. This document is expected to be a reference for projects that involves Building Information Modelling (BIM).
2. Every project that uses BIM has different requirements. Therefore, the users should clearly identify the BIM requirements in that particular project prior to adopting any clause(s) in this document.
3. This document should be read in conjunction with the current Condition of Contract.
4. This document does not cover all issues that can occur during BIM implementation in projects. Users should obtain appropriate professional/legal advice before making any addendum in the existing Conditions of Contract to comply with BIM requirements.
5. This document does not change any existing contractual relationships or shift any risk of the parties in a Project, which has been agreed.



PREAMBLE

This document highlights the Legal & Contractual implications of BIM encountered by the Malaysian construction industry. Therefore, suggestions for improvement to accommodate Construction 4.0 are proposed.

This document will aid the stakeholders to embrace Construction 4.0 by addressing the challenges and proposing strategic outcomes. It should be read as the motivation to reform our industry, thrusting the industry into Construction 4.0.

This document provides the framework by categorising the case for change, where we are, where do we want to be and how do we get there?

Leveraging on the legal and contractual issues of BIM implementation, this document suggests appropriate and specific action plans to drive the Malaysia Construction Industry productivity and efficiency towards Construction 4.0.

Kindly forward your comments and suggestions to it.pembinaan@cidb.gov.my for further improvement on this guide.



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01

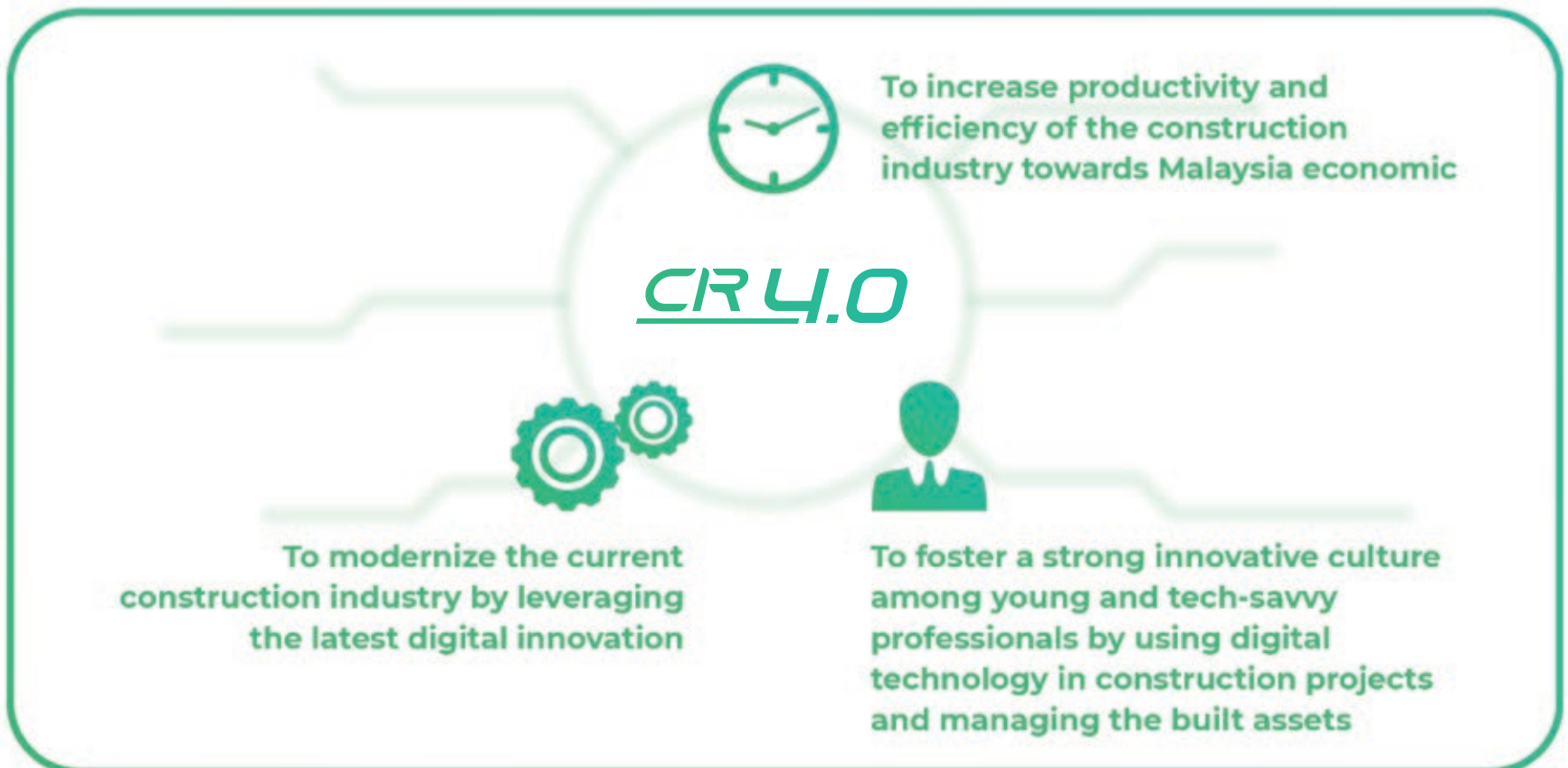
*BIM & CONSTRUCTION 4.0 IN
MALAYSIAN CONSTRUCTION INDUSTRY*

INTRODUCTION

Construction Industry Transformation Plan (CITP) 2016 – 2020 recognises BIM as a driver to increase Industry productivity and efficiency.

BIM is initially incorporated to digitalise construction information, data and drawing. It enables the stakeholders to communicate, collaborate and coordinate the construction process effectively, anywhere, and in real time. Evolving advent digital technology and innovation, creates synergy for Malaysian Construction Industry towards Construction 4.0.

Construction 4.0 transformation processes aim :



The Construction 4.0 transformation involves these measures:



1 To recruit young and highly skilled manpower in the construction industry to meet future economic demand



2 To establish and promote the digital process, workflows and procedures to support innovative construction process



4 Improving digital security measures that protect construction information and National data security from cybercrime threats.



3 To increase competitiveness among the local organisation in domestic and international markets



SECTION
02

BIM & Construction 4.0

CASE FOR CHANGE

The global Industrial Revolution 4.0 (IR4.0) calls for Malaysian Construction Industry to transform their current approaches and practices in order to contribute significantly to the nation's economic prosperity.

IR4.0 will transform the Malaysian Construction Industry from intensive labour force-based industry to the use of automation and mechanisation to improve productivity and efficiency. The process involves optimising the conventional construction process towards Construction 4.0 through the application of advanced technologies.

The introduction of BIM has helped transform the conventional construction process into an innovative delivery model.

BIM requires specific legal and contractual requirements. In Malaysia, despite increasing number of projects have started to use BIM at various levels since early 2000, however, contractual arrangements still remain conventional. To meet BIM requirement, the legal and contract terms should consider to be extended to digital construction production processes (model, data and information).

STUDY METHODOLOGY

This report is to present the major findings of contract requirements for the implementation of Industrial Revolution and Digital Construction in Malaysia.

A series of workshops were held to bring together BIM stakeholders from a range of agencies and sectors, as well as representatives from the construction law community to discuss future opportunities to reform the current contractual practice to accommodate the Construction 4.0 requirement.

One-on-one interviews were recently held with top industry leaders, attempted to verify the outcomes from previous workshops and sought to refine them further.



SECTION
03

*Construction 4.0 in
Malaysian Construction Industry*

*WHERE
ARE WE?*

*CIR
4.0*

*HOW DO
WE GET
THERE?*

*WHERE DO
WE WANT TO BE?*

WHERE ARE WE?

There is no BIM provision in the current Condition of Contract

The existing Condition of Contract only covers delivery of the physically constructed product (such as building and infrastructure). However, for BIM implementation, it requires the construction output to be both in physical and digital information form.

Based on current practice, the legal and contractual requirement for BIM implementation is only stated in the Employer Information Requirement (EIR), client's brief or BIM Execution Plan (BEP), a working translation of EIR by the appointed party, where these documents are not contractually binding and do not have any legal implication. There are also cases where BIM requirements are included only as an addendum to the existing contracts, which may jeopardise existing contract delivery.

Some of the roles and responsibility in BIM projects (such as the BIM Manager) are also not clearly defined and elaborated in the provision of contracts, which could increase the risk of professional negligence.

Therefore, to accommodate BIM requirements, additional amendments to reform the Condition of Contract is needed to cover the legal and contractual issues that may become crucial in future.



Additional Liability

When BIM is implemented, designers and contractor will be responsible to produce and manage both - the physical constructed product and the digital information model. Hence, more responsibility and liability will be enforced to ensure the workability of BIM model and its accuracy for both, the physical and BIM Model. This imposes additional responsibility and liability to the designer and contractors' commitment and increases the risks towards the existing contract as compared to the conventional construction process.

Thus, the new fee structure based on additional responsibility and liability should be considered due to this added professional liability and indemnity.



Common Data Environment

Common Data Environment (CDE) is file repositories or electronic document management systems that are essential in BIM implementation for collaborative, secure and digital environment. The CDE provides access to the team to collect, manage and disseminate the data and information in a managed process.

It is known that establishing and managing CDE is costly and involves complex process. The current usage of CDE is not systematically established and standardised among the BIM projects in Malaysia. This is due to lack of standard guidelines in developing CDE.

Furthermore, the requirement of CDE is not clearly defined and secure. Lack of controlled access may trigger another issue concerning data governance and security. The responsibility to ensure the confidentiality and security of the information in the CDE is also not clearly stated in contract documents.



Data Security

The main challenge to implement BIM is when all the retrieved data is in digital format.

The BIM process would make the model be accessible by various parties. The data in the model could be tampered with due to security breaches, uncontrolled access and actions by unauthorised users.

Until to date, there are no guidelines, process and regulation to protect retrieved data against unauthorized use.



Data Ownership and Intellectual Properties (IP)

The provision of data contained within the BIM model is wide-ranging and have contributions from a variety of participants.

The deliverables generated from the BIM process may impact the data and Intellectual Property (IP) rights that derive from:



*Whole federated
BIM model;*



*BIM object library
(e.g. door, window etc)*

The Designer and Contractor are required to transfer more intellectual property on a BIM project. In order to protect their intellectual property, the designers and contractor may need to withhold the data and information. This raises issues of data ownership and IP rights licensing.

To avoid liability of infringement of third-party intellectual property rights, the provision needs to be established to ensure that all contributors warrant their intellectual property rights.

Upon project completion, issues of data rights ownership and responsibility as well as the reliability of as-build BIM model may rise.



Cloud Computing Security

When a BIM project stores data or hosts the model, data and information on the public cloud, it loses the control and authority over the uploaded model, data and information. With more data moving to the cloud, maintaining the sanctity, sustainability and integrity of this data becomes of paramount importance.



WHERE DO WE WANT TO BE?

Once the contractual framework has been established, it is hoped that all stakeholders will be informed and aware of their roles, responsibility and liability that will be affected by Construction 4.0.

The overarching philosophy behind the Construction 4.0. is the introduction of Contractual Requirements aimed to ***Attract, Create and Transform (ACT)***.



Awareness, readiness, competency from stakeholders to embrace with digital transformation journey.



Creation of safe and secure Digital Environments, Comprehensive Guidelines, policy and standards for Construction 4.0. This will ease adoption and to nurture innovations.



Transform capabilities of the construction industry to be digitally ready by incorporating advanced innovation and technology, and enhanced security features.

HOW DO WE GET THERE?

The journey to embrace Construction 4.0 in the Malaysian Construction Industry will be anchored by three main factors: People, Process and Technology.

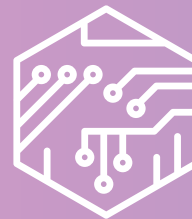
These three factors and their relationships will be informed through a variety of legal and contractual agreements.



Fitness :

Accelerating digital workforce transformation in digital construction

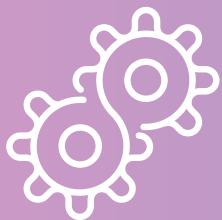
PEOPLE



Enablers :

The platform for change

TECHNOLOGY



Adaptiveness :

Driving digital transformation

PROCESS

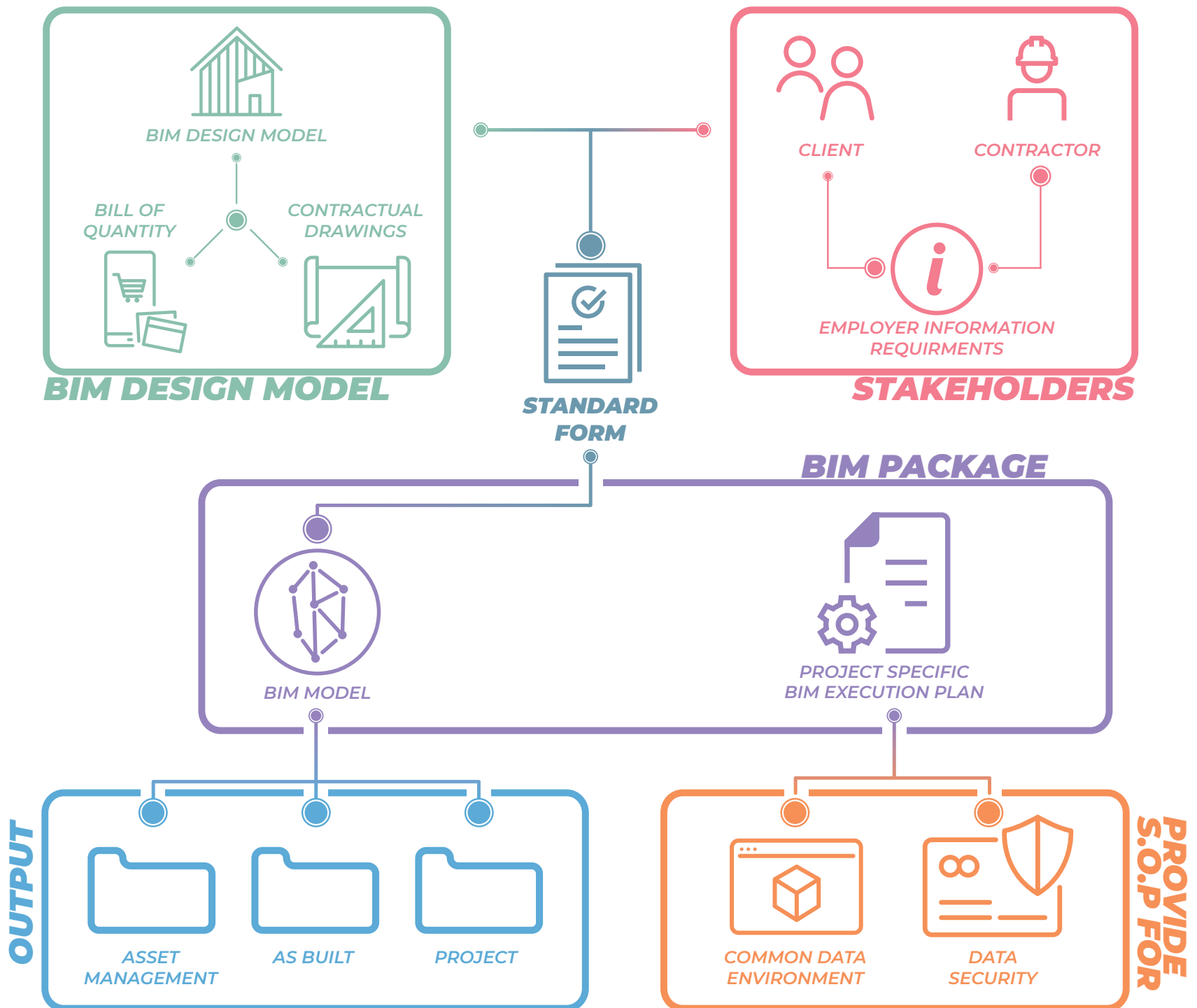


Support :

A flexible, forward-looking and integrated policies and regulation responses to the digital transformation

POLICY

The diagram below lays out the different stages and relationships of the construction process that incorporates digital technology. The legal and contract plays a central role in binding the different parties and their deliverables in the project ecosystem.





PEOPLE

Mission : FITNESS

To introduce legal and contractual requirements to the construction players at large.

1. Training and Certification

1.1. General

- i. Digital Construction Concept and Theory
- ii. Model Coordination
- iii. Project Implementation Process
- iv. Digital Construction Quality Assurance

1.2. Module for Client

- i. Digital Construction Project Requirements
- ii. Digital Construction Quality Assurance

1.3. Module for Contractor

- i. Model Development
- ii. Contract Management
- iii. Model Submission
- iv. Model Coordination

1.4. Module for Consultants

- i. Fundamental modelling
- ii. Design process
- iii. Project Documentation

1.5. Facility Management

- i. Model Management and Development
- ii. Engineering Analysis

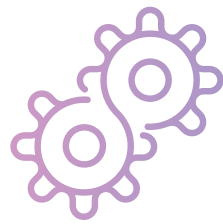
2. Awareness Programme

- i. Digital Construction Week
- ii. Digital Construction Roadshow

3. Digital tools showcase Center

Virtual Reality (VR), Augmented Reality (AR), Autonomous Systems, Smart Sensors, 3D Printer, LiDAR, Drone etc)

STRATEGY



PROCESS

Mission : ADAPTIVENESS

Driving the digital transformation by strengthening legal and contractual requirements. .

1. Industrial Guidelines

- 1.1. Awareness**
- 1.2. Readiness**
- 1.3. Adoption**
- 1.4. Project Execution**

2. Standard

2.1. Construction 4.0 Guidelines

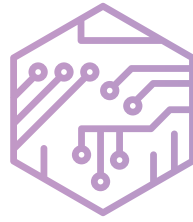
- i. EIR guideline
- ii. BEP guideline
- iii. PXP guideline
- iv. Modeling standards (based on level of development)

2.2. Common Data Environment (CDE)

3. Contract Reformation

4. Digital Construction Taxonomy

STRATEGY



TECHNOLOGY

Mission : ENABLERS

The platform for change

- 1. Digital connectivity initiatives through National Fiberisation and Connectivity Plan (NFCP).**
- 2. Digital Construction Pilot Project at National 5G Testbed area - Putrajaya and Cyberjaya.**
- 3. Establishment of National Construction Cloud Computing for Government Project.**
- 4. Establishment of Cyber Security Regulation for Construction Information.**

STRATEGY



POLICY

Mission : SUPPORT

A flexible, forward-looking and integrated policies and regulation responses to the digital transformation

- 1. Digital Transformation in Construction Strategic Plan**
 - 1.1. Roadmap**
 - 1.2. Key initiatives**
 - 1.3. Enabler**

- 2. Dasar Pembinaan Negara**
 - 2.1. Redefine key player roles and responsibilities**
 - 2.2. Promoting Integration Digital Design Delivery (IDDD) process**

STRATEGY

MOVING FORWARD: BIM AND DIGITAL TRANSFORMATION

Standard-form contracts in Malaysia commonly adopt the traditional approach of closely guarding copyright in designs created as part of the construction process, allied with the granting of a restricted license to use such designs only in the context of the construction of the asset itself. In Malaysia, copyright subsist by virtue of the Copyright Act 1987 ("Act") and copyright protection is accorded without any requirement of registration, deposit or otherwise.

At present none of the standard-form drafting bodies in Malaysia have incorporated any provisions that address the existence and potential implications of digital modelling.

The contractual issues raised by BIM include risk allocation, copyright and insurance in addition to more detailed matters such as: the ownership of a shared BIM design; the precise purposes for which the model will be used; the schedules of deliverables; interoperability issues; the management of the modelling process; the reliance to be placed on modelled information; and the use of the model after construction is completed.

BIM provisions have yet to be properly incorporated into Malaysian standard form contracts.

The industry faces a choice between continuing to guard the existing restrictive copyright and insurance positions, which will make the management and development of BIM increasingly difficult, or embracing a more collaborative process in which parties are able to agree that each other may, within defined parameters, use and rely upon the information provided by the other parties as contributing to the overall model within the context of the project itself.

It would seem clear that this latter approach would result in the most effective use of the BIM process but would require a relaxation of insurance and intellectual property rights that is currently unavailable in Malaysia.

Furthermore, the current economic climate may pose a threat to any serious attempts to move towards a truly integrated project delivery. There is a real possibility that BIM is a potential catalyst for these changes, a catalyst for Digital Transformation.



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