



The 4th INDUSTRIAL REVOLUTION (IR 4.0)

Presented by:

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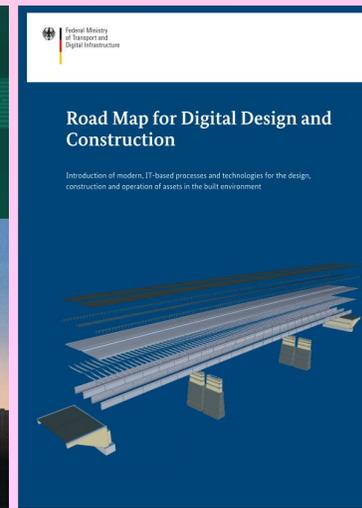
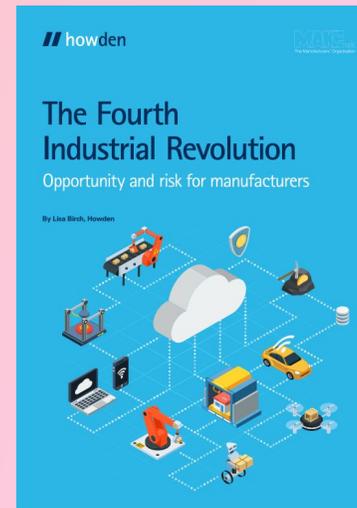
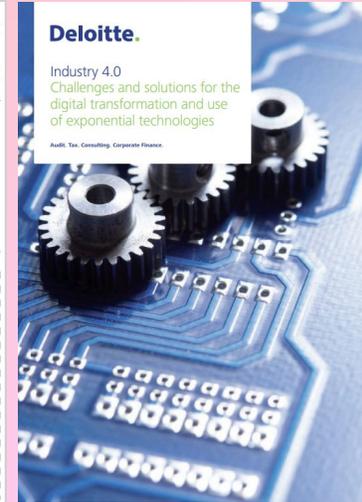
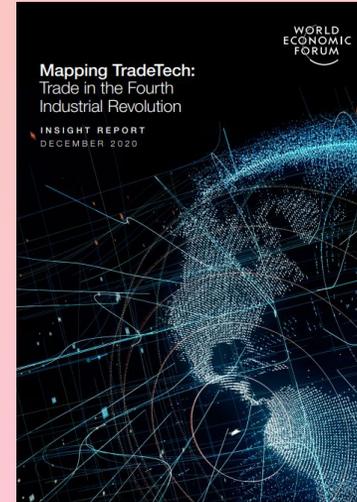
Outline of Presentation

The Fourth Industrial Revolution

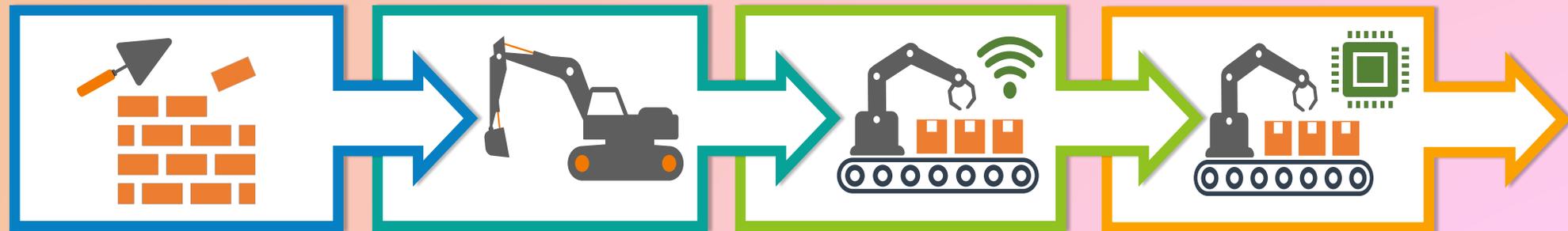
Construction 4.0

Malaysian Alignment Toward Construction 4.0

The Fourth Industrial Revolution (4IR)



Industrial Revolutions difference



1.0

1st Industrial Revolution

Powered by the steam engine, dramatically spurred production and urbanisation

2.0

2nd Industrial Revolution

Mass production and new forms of energy such as electricity

3.0

3rd Industrial Revolution

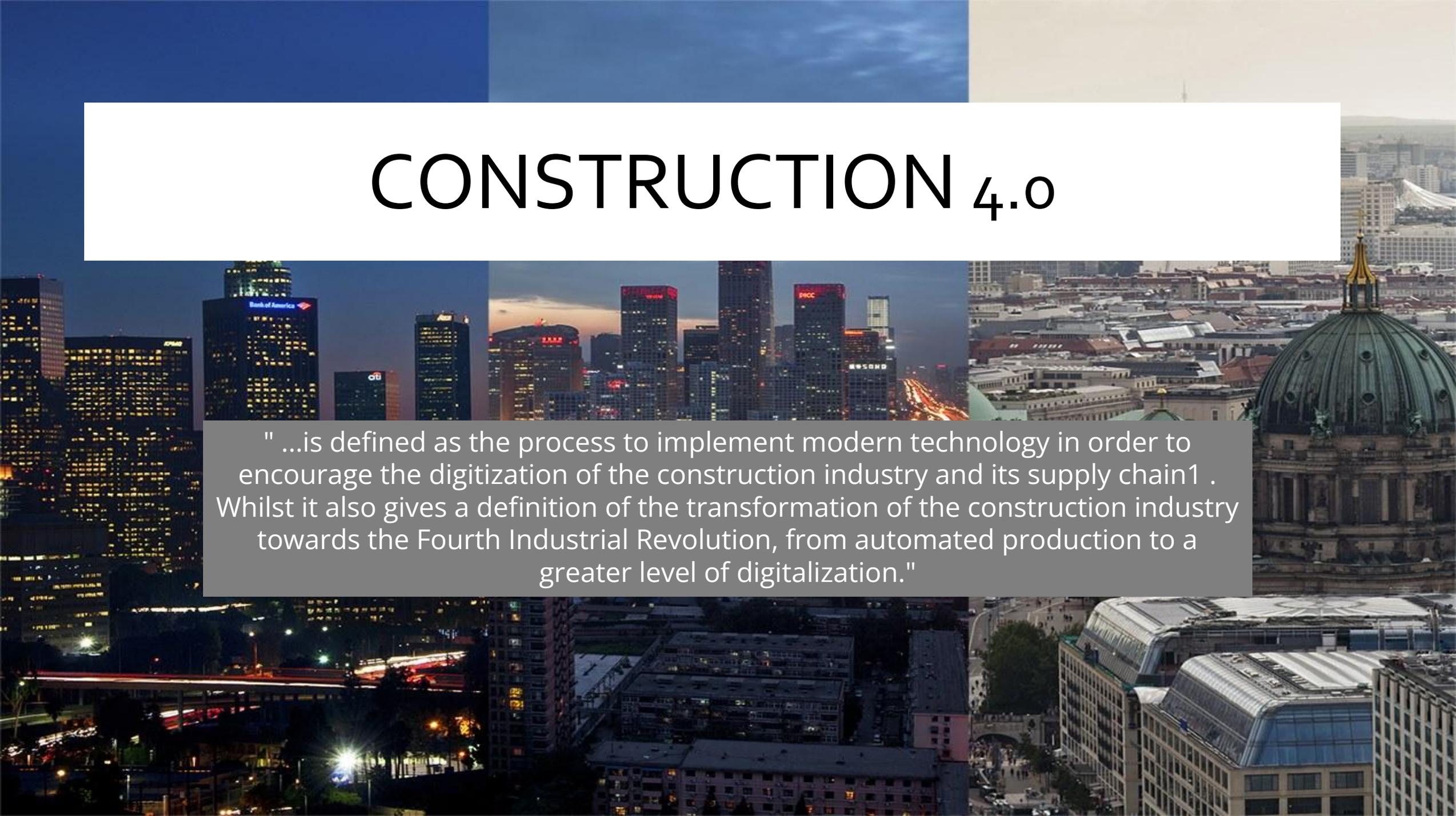
Introduction of digital technologies such as computers, cell phones, and the internet

4.0

4th Industrial Revolution

Next generation of cyber-physical systems (CPS) through technologies such as artificial intelligence, robotics, and nanotechnology

CONSTRUCTION 4.0

The background of the slide is a collage of three cityscapes. On the left, a modern skyline at night with illuminated skyscrapers, including one with a 'Bank of America' sign. In the center, a dense urban area with various buildings and a prominent green dome. On the right, a large, ornate building with a prominent green dome and a golden spire, likely a historical or institutional building.

"...is defined as the process to implement modern technology in order to encourage the digitization of the construction industry and its supply chain¹. Whilst it also gives a definition of the transformation of the construction industry towards the Fourth Industrial Revolution, from automated production to a greater level of digitalization."



To be the leading country in the implementation of Construction 4.0 in the Southeast Asian region



Transform the Malaysian construction industry by empowering smart construction for future society



CONSTRUCTION 4.0

VISION & MISSION





Prefabrication
& Modular
Construction

Building
Information
Modeling (BIM)

Autonomous
Construction

Augmented
Reality &
Virtualisation

Cloud and
Realtime
Collaboration

3D Scanning &
Photogrammetry

Construction 4.0

12 Emerging Technologies

Big Data and
Predictive
Analytic

Internet of
Things

3D Printing &
Additive
Manufacturing

Advanced
Building
Materials

Blockchain

Artificial
Intelligence



Level of Adoption among Contractors towards Construction 4.0 Technologies

Level of Adoption	Adopted	Don't and won't adopt
1. Internet of Things	20%	56%
2. Cloud and Realtime Collaboration	17%	63%
3. Prefabrication and Modular Construction	16%	65%
4. Advanced Building Materials	15%	61%
5. Building Information Modelling (BIM)	14%	67%
6. Big Data and Predictive Analytic	12%	70%
7. Blockchain	11%	71%
8. Artificial Intelligence	10%	71%
8. 3D Scanning and Photogrammetry	10%	75%
9. 3D Printing and Additive Manufacturing	8%	77%
9. Autonomous Construction	8%	77%
10. Augmented Reality and Virtualisation	7%	78%

Areas of Adoption among Professionals towards Construction 4.0 Technologies

Areas of Adoption	BEM	MIP	PAM	BQSM
1. Internet of Things			/	/
2. Cloud and Realtime Collaboration	/	/	/	/
3. Prefabrication and Modular Construction				
4. Advanced Building Materials				
5. Building Information Modelling (BIM)	/		/	
6. Big Data and Predictive Analytic	/			/
7. Blockchain				
8. Artificial Intelligence			/	
8. 3D Scanning and Photogrammetry	/			
9. 3D Printing and Additive Manufacturing				
9. Autonomous Construction	/	/		
10. Augmented Reality and Virtualisation		/	/	/

CIDB Construction Strategy Plan

4.0

Malaysia Alignment towards Construction Strategy Plan 4.0



Building Information Modeling



Autonomous Construction



Internet of Things



Advanced Building Material



Augmented Reality & Visualization



Big Data & Predictive



3D Printing



3D Scanning & Photogrammetry



Cloud & Realtime Collaboration



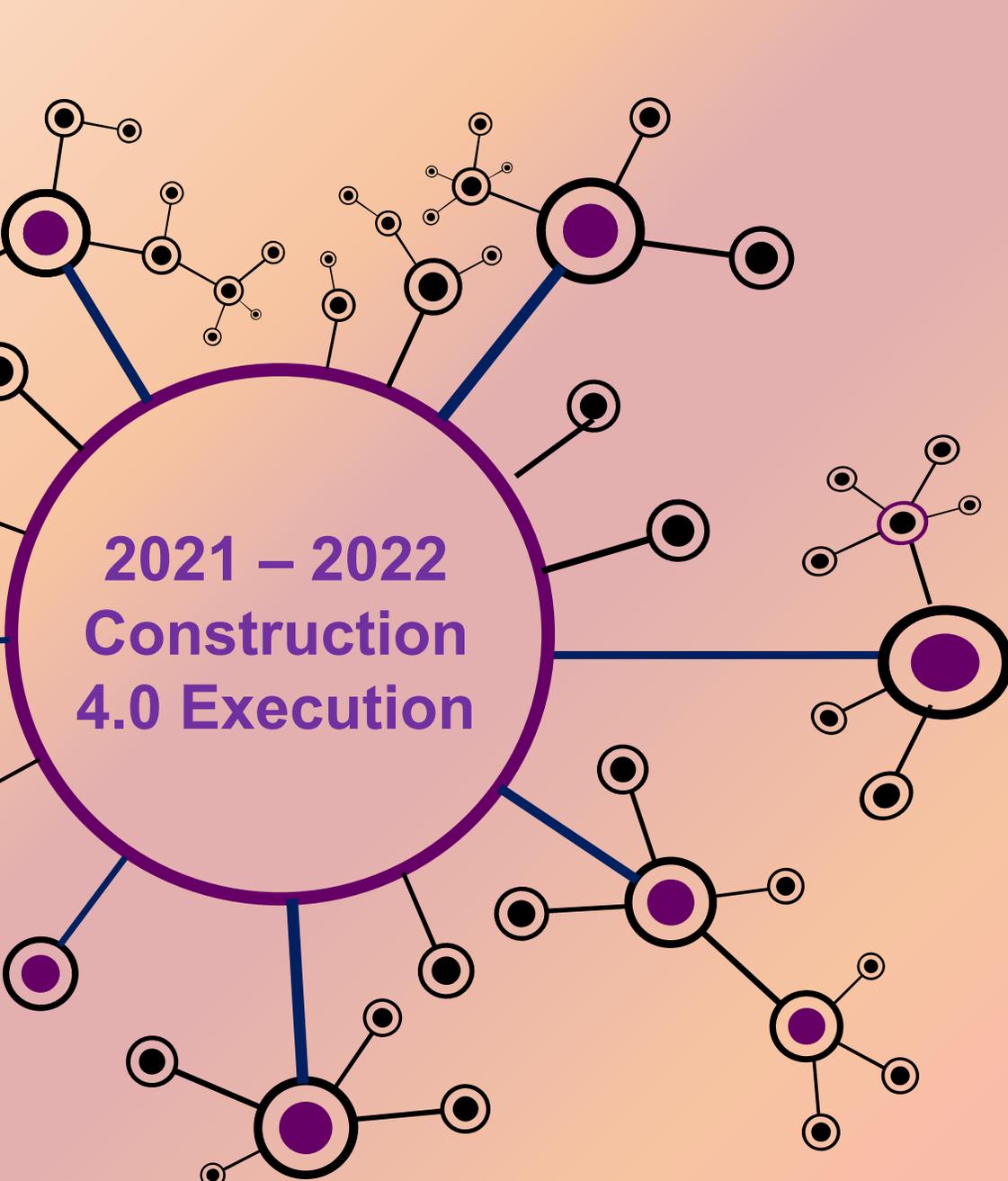
Prefabrication & Modular Construction



Artificial Intelligence

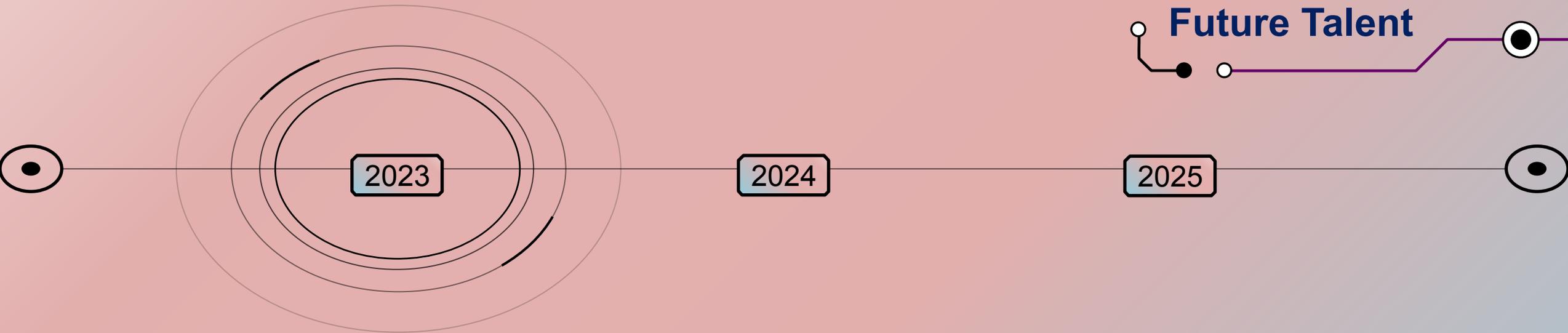


Blockchain



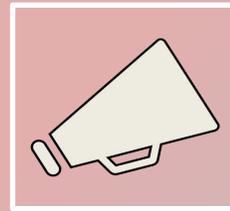
2021 – 2022 Construction 4.0 Execution

1. Strengthening QCLASSIC/ SHASSIC assessment with the use of mobile Apps technology software for seamless assessment.
2. Development of Emerging Augmented Reality (AR) Technology for industry reference
3. NATIONAL BIM e-SUBMISSION (NBeS)
4. Technology Transfer (Benchmarking) related to IBS and BIM
5. Technology-based Reference Centre for Empowerment program
6. Technology Integrated Portal - Phase 2 (Integrated portal development)
7. Big Data Analytics Framework Development



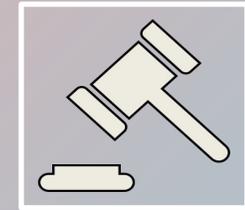
Construction 4.0 Capability Enhancement

Process on how individual organisations learn from experiences and approach future tasks.



Promotion and awareness

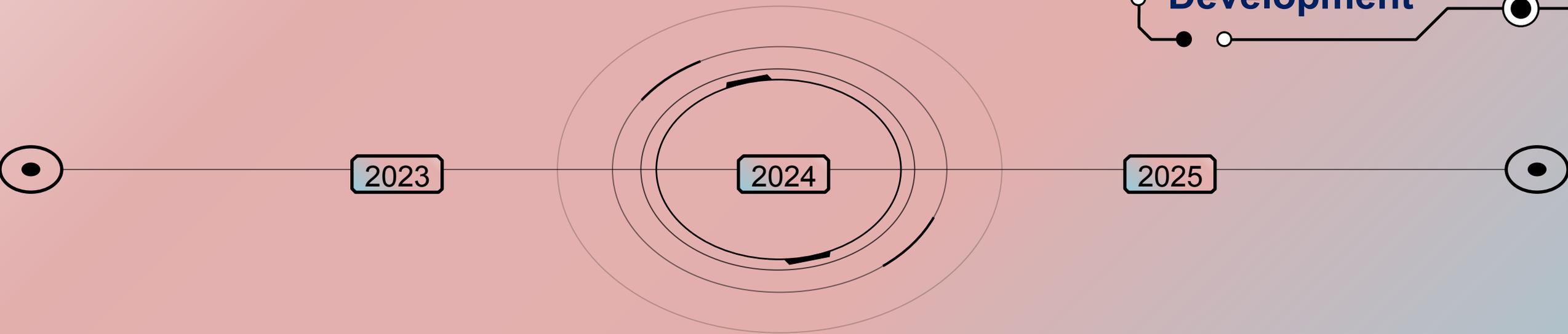
Latest solutions and trends through interactive demos, seminars, and workshops



Standard, Guidelines, Policy, and Regulations

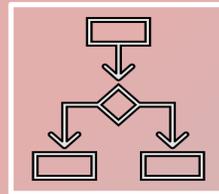
Synthesize and document the current state of industry standards and regulations associated with emerging construction technologies

Research and Development



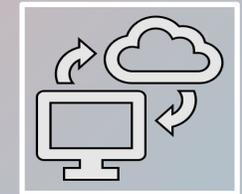
Technical education reforms

Unlock attitudes and participation



Information Management Framework (IMF) Network

Enable the seamless sharing of data ecosystem of connected digital construction.



Digital Construction Hub

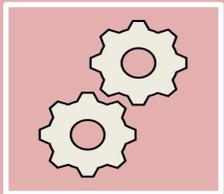
A centralized platform data information

Integration

2023

2024

2025



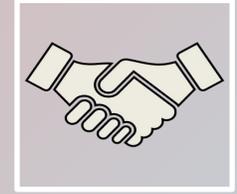
Construction 4.0 Expertise and Professionalism

Technology leadership
to drive Construction
4.0



Internationalization Business growth

Start-up business
support

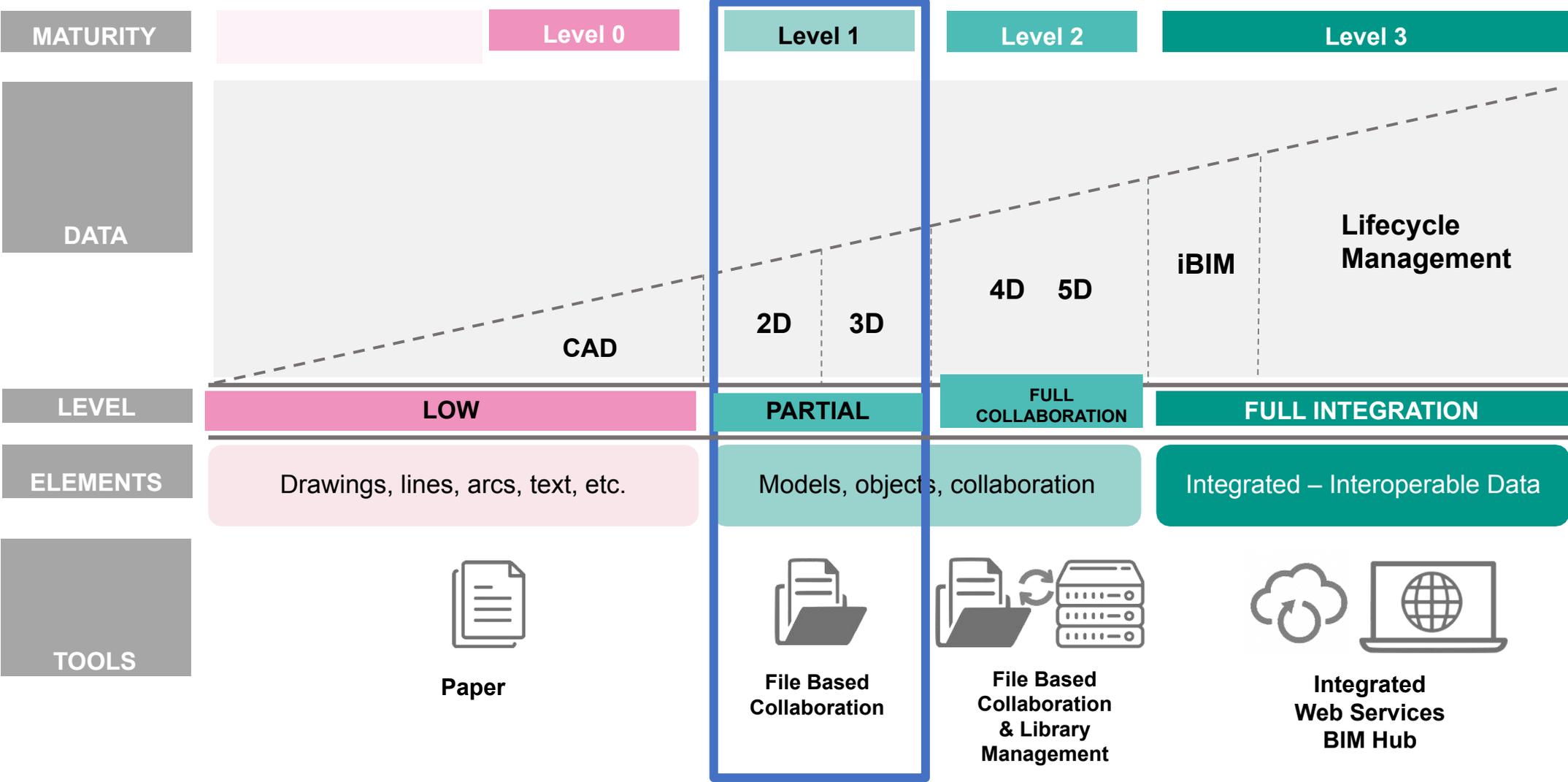


Benchmarking International Business Map

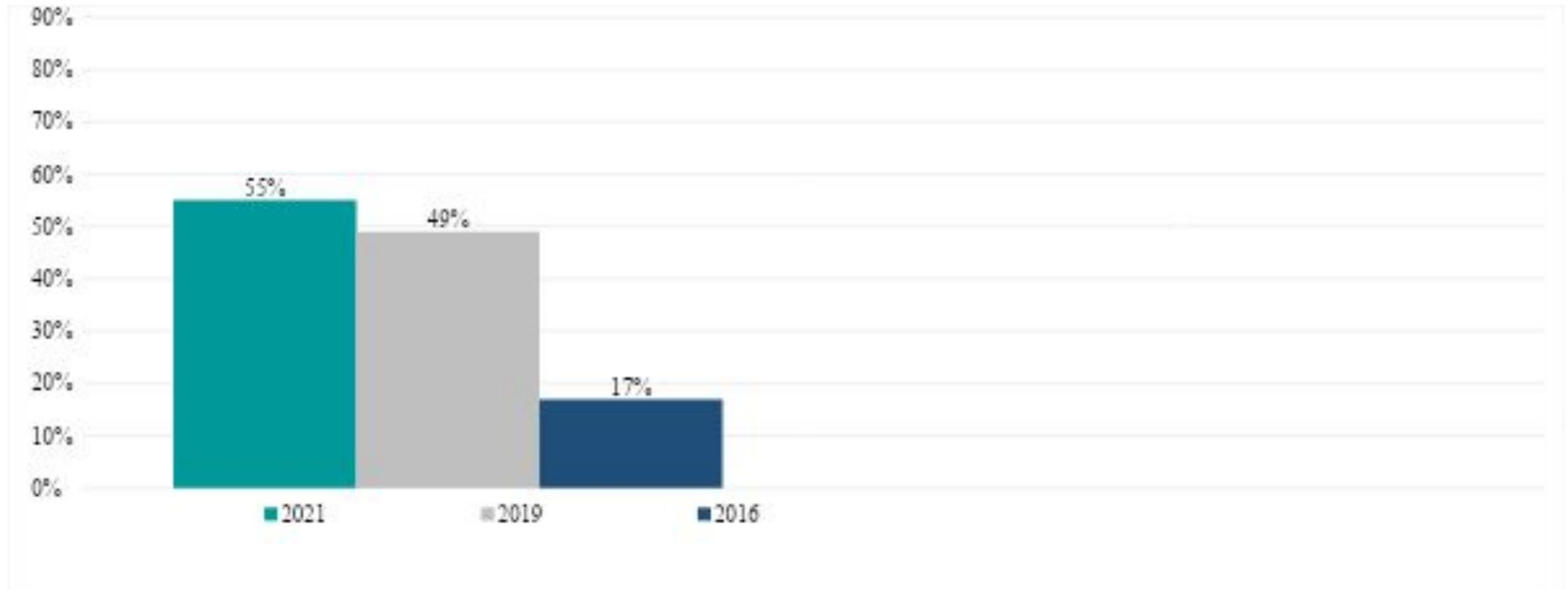
A business proposal to
offer a solution for
problem faced by client

BIM Maturity Level

2021



BIM Adoption in Local Industry in Malaysia



Problem Statements

Lack of streamline collaboration between Contractors and Consultants

Unavailability of online, real-time analytical model

Cost impact analysis cannot be done in real-time to accommodate changes in design and materials

Lack of consolidated drawings identifying clashes prior construction

Non-centralized repository for drawings and information

Solutions?

Solution through BIM

Increase Efficiency in Malaysian Industry

Assist in making informed decisions at design and planning stage

Avoid design clashes

Increase quality of projects

Reduce variation order (VO) and error during construction stage

Standardise design and overall development process flow of information

BIM

BIM

Roles & Responsibilities

BIM Process Integration	Business Process SOP & Documentation	BIM R&DI	Knowledge Sharing
<p>Integrate BIM Processes and Requirements into project implementation for better design quality and cost control by minimising Variation Orders and RFI during construction.</p>	<p>Strategise, develop, and manage a comprehensive business process for design and construction value chain by using BIM. Establish, enforce, and update BIM Integrated Standard Operating Procedure (“ISOP”) and incorporated BIM documents into construction projects, in line with BIM Level 2 British Standard protocol</p>	<p>Strategise, conduct and manage research and development to enhance BIM processes and BIM Level in Malaysia. Identifying trends of technologies which relevant to digital building construction for future adoption in industry.</p>	<p>Educate project stakeholders on the BIM usage and its advantages to foster better collaboration in the project. Collaborate with industry players for knowledge sharing and lesson learned of BIM implementation best practice.</p>

Database for IBS Adoption from 2013 to 2021.

The IBS adoption in year 2021 in government projects is higher than private projects, about 62.0% and 60.0%, respectively.

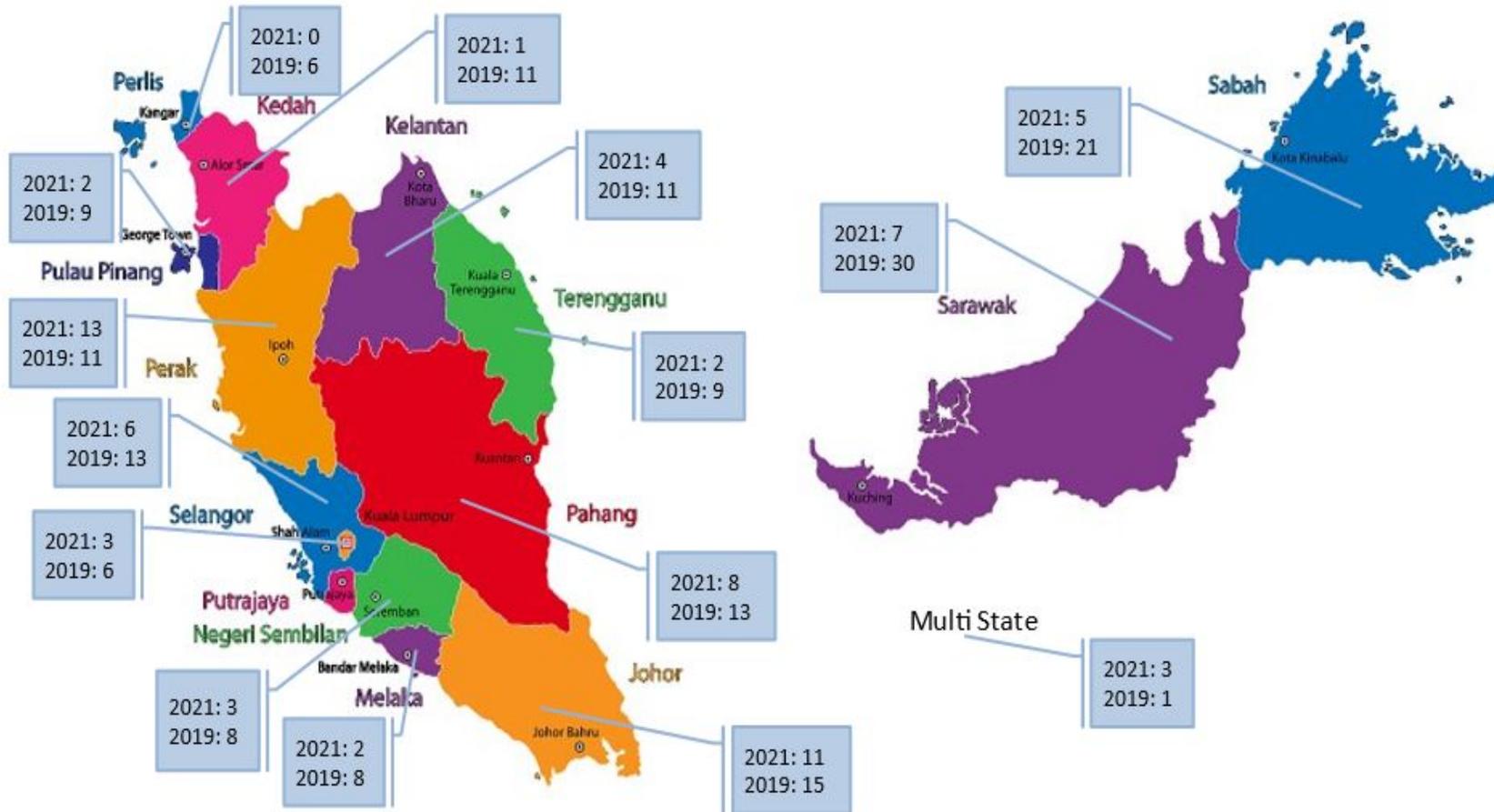


Year	Government Project	Private Project
2013	61.0%	14.0%
2017	10.7%	21.0%
2019	36.1%	33.1%
2021	62.0%	60.0%

*Data was solely taken from contractors' responses collected via a survey form.

* The percentage of projects displayed consists of projects that have been completed and are ongoing in the said year.

IBS Adoption for Completed Government Project by State – All Project Value



Distribution of Completed Government Project Using IBS

Completed IBS Project According to State and IBS Score for All Project Value

State	2019		2021	
	≥70 IBS Score	<70 IBS Score	≥70 IBS Score	<70 IBS Score
Johor	11 (73%)	4 (27%)	6 (55%)	5 (45%)
Kedah	9 (82%)	2 (18%)	-	1 (100%)
Kelantan	9 (64%)	5 (36%)	3 (75%)	1 (25%)
Melaka	8 (100%)	-	2 (100%)	-
Negeri Sembilan	7 (88%)	1 (13%)	1 (33%)	2 (67%)
Pahang	12 (92%)	1 (8%)	4 (50%)	4 (50%)
Perak	10 (91%)	1 (9%)	5 (38%)	8 (62%)
Perlis	5 (83%)	1 (17%)	-	-
Pulau Pinang	7 (23%)	2 (22%)	2 (100%)	-
Sabah	11 (52%)	10 (48%)	1 (20%)	4 (80%)
Sarawak	7 (23%)	23 (77%)	2 (29%)	5 (71%)
Selangor	10 (77%)	3 (23%)	4 (67%)	2 (%)
Terengganu	7 (78%)	2 (22%)	1 (50%)	1 (33%)
Wilayah Persekutuan	5 (83%)	1 (17%)	3 (100%)	-
Multi-state	1 (100%)	-	2 (67%)	1 (33%)
Total Project	175		70	

Problem Statements & Solutions

**High cost of IBS components
(purchasing/
manufacturing)**

**Additional of cost in
the purchase/ rental of
special equipment and
machinery in
implementing IBS
projects**

**Low level of knowledge
in IBS**

Solutions?

**Provide comprehensive
IBS training to the
construction workforce**

**Gov Plan Strategy:
Provide exemption of
levy to contractors that
using IBS**

RECOMMENDATION

- 1) Provide guidelines for digital endorsements and digital signatures
- 2) Revise SOF to include additional fees for the use of BIM
- 3) Provide financial support for the adoption of digitization in the form of grants and tax incentives
- 4) Provide additional training to BIM outside the sound valley and road shows, to highlight the benefits of digitization and approaches to digitization
- 5) Establish a resource center to guide and facilitate ECPs for effective digitization adoption, consisting of BEM, CREAM, and local government/technical agencies.

CONCLUSION

The cost of digitization, lack of expertise and other factors are seen as the main obstacle for industry players to adopt Construction 4.0 and digitization.

We believe that there will be a significant adoption of digitalization among industry players if these recommendations are adopted fully.



THANK YOU



Committed to Engineering Excellence

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