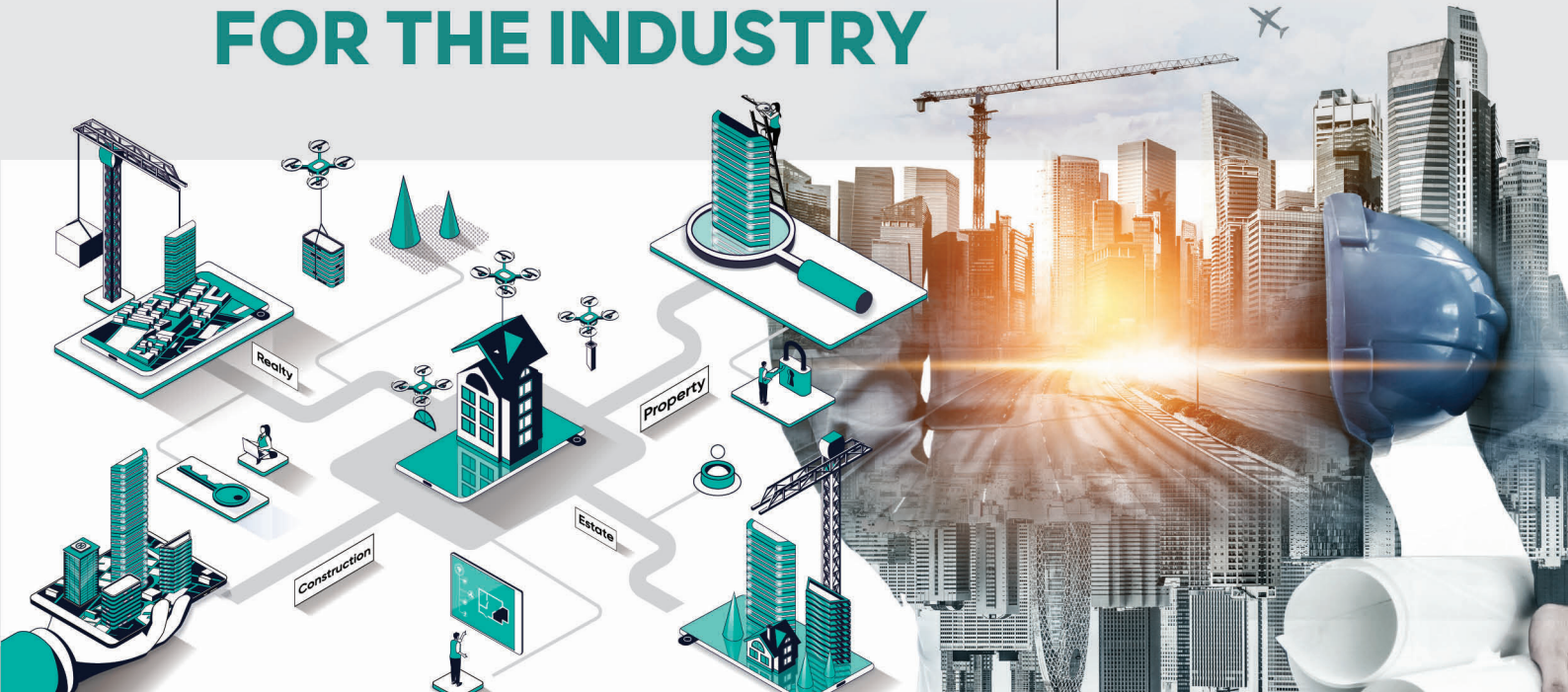
IBS AND QLASSIC MAKING IT WORK FOR THE INDUSTRY

CIDB MALAYSIA



Research collaboration:

REHDA INSTITUTE

CREAM
CONSTRUCTION RESEARCH INSTITUTE OF MALAYSIA

The Definition of Conventional and IBS

For the purpose of this report, the various construction methods are defined as follows:

a) Conventional Method

Based on current industry practice, the conventional method refers to **combining the adoption of IBS components** and **conventional in-situ methods.** It often involves the use of a formwork system and/or other IBS components at a **lower percentage** together with the use of conventional construction methods for other components of the construction and **not necessarily 100% conventionally** constructed. In short, it is a hybrid between conventional and IBS technology, albeit at a lesser percentage of the latter.

b) Industrialised Building System (IBS)

The construction method of this type involves an industrial process in which **building components are designed, transported to the construction site and erected** according to plans. In this research, the IBS method includes Precast Concrete Framing and Box System, Steel Framing System, Formwork System, Prefabricated Timber Framing System, Blockwork system and Hybrid/ Innovative System.

**Notes: The definition of the Conventional Method and IBS method used in this report are for the purpose of this report only. It may vary from other reports.*

Conventional Method Includes Elements of IBS

Comparison of Conventional vs IBS (in IBS Score)

Type	Project	Conventional : IBS Score (%)	IBS: IBS Score)%)
High Rise	Project 1	**62** *Aluminium formwork*	**92** *BIM coordinated & automated robotic precast manufacturing system*
	Project 2	**51.5** *RC shear walls, beams, slab and infill with brickwork/plaster*	**77.6** *Full precast wall & RC slab*
	Project 3	**52.5** *Roof truss, modular system and formwork system*	**73** *Precast concrete slab, precast wall panel, toilet pod/PBU*
	Project 4	**38** *Aluminium formwork, interlocking block, slab (cast in-situ, wall (cast in-situ) using formwork system*	**60** *Precast column, beam and slab (half slab), external wall (cast in-situ),internal wall (concrete wall panel)*
	Project 5	**51** *Formwork system (cast in situ for rc wall)*	**75** *Precast panel wall*
Landed	Project 6	**50** *Hybrid (modular system and drywall)*	**90** *Precast concrete framing, panel & box system*

Findings:
1. The score was obtained from the calculation of IBS items that have been used for the projects.
2. From the scoring stated above, there is NO 100% conventional (fully wet work) for conventional construction projects in this case studies.
2. All projects stated above has utilised IBS components in their conventional IBS method (based on the calculated scoring).
3. The conventional method projects recorded a minimum 38% and above score for every project.

Major Findings

01
Inefficient
IBS Ecosystem

02
High Cost

03
Insufficient
Incentive

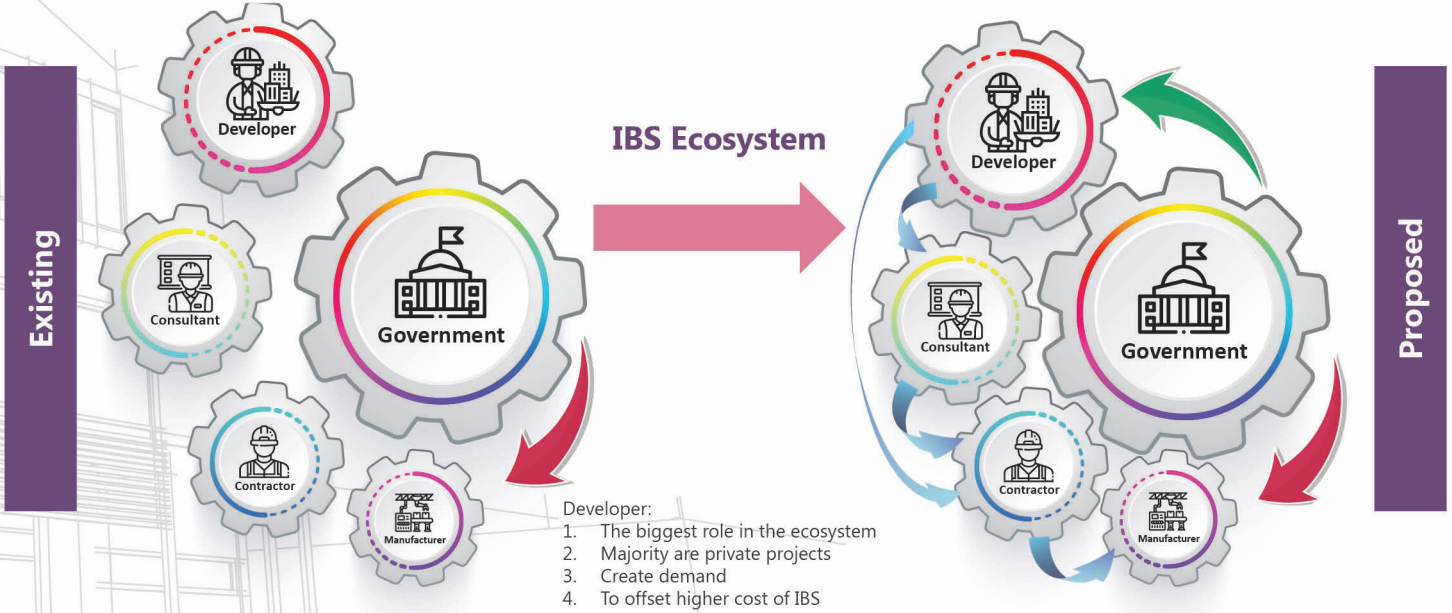
04
Lack of
Expertise

Structural Issue 1:

Inefficient IBS Ecosystem

Issues:

1. Despite various efforts over the years, up to 2019, **only 40%** of private projects adopted IBS in their project.
2. **Policy** (i.e., private project more than RM50mil must achieved 50 IBS Score) are imposed on **developers** yet **no incentives** are provided to counter higher costs.
3. **Lack of pull factors** to attract developers to utilise IBS costs of which are higher than conventional method of construction.
4. **Focus/incentives** are given mainly to **manufacturers** which will not be able to move industry towards IBS.



Developer:
1. The biggest role in the ecosystem
2. Majority are private projects
3. Create demand
4. To offset higher cost of IBS

Structural Issue 2:
High Cost

Issues:

1. Costs of adopting IBS is generally higher

Cost Comparison Between Conventional & IBS

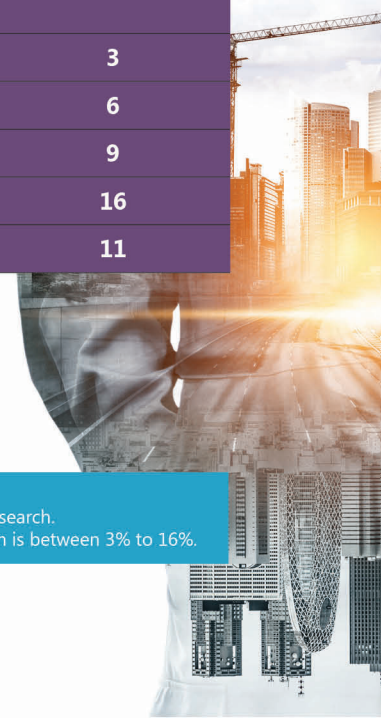
Type	Project	Units	Conventional (RM/ sq. ft) Building cost	IBS (RM per sq. ft) Building cost	Difference (%)
High Rise	1	864	123	123	3
	2	562	87	87	6
	3	240	137	137	9
	4	600	79	79	16
Landed	5	250	108	108	11

Notes:

1. *Actual data costs from actual projects are only for this research purpose.*
2. ***The cost per square foot (psf)** is the costs **quoted by main contractor** as a **contract sum** and would have **already incorporated any savings** in terms of **reduced materials wastage, timeline and other costs.***
3. *The calculation is based on **building cost** as it **contributes the most significant percentage (>60%) in total development cost.***

Findings:

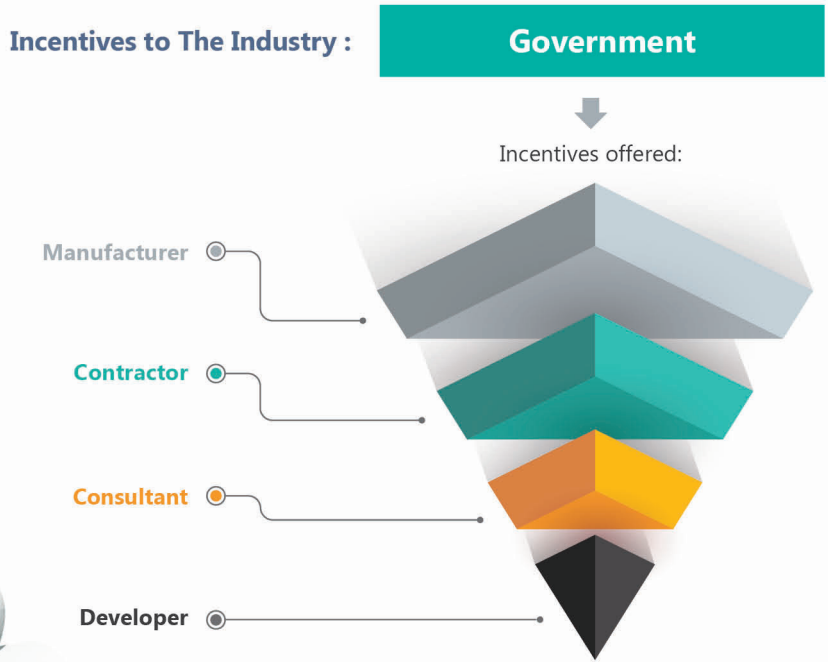
i. The results above illustrate the actual cost comparison between conventional and IBS based on the case studies for this research.
ii. As shown in the results, all five projects show the cost of IBS is higher than conventional. The difference in cost comparison is between 3% to 16%.



Structural Issue 3:
Insufficient Incentive

Issues:

1. The **incentives** are given to other industry players who are **not the project owner/decision maker** in the ecosystem
2. **Existing incentives not significant to drive migration** to IBS (for example: construction levy exemption)



Structural Issue 4:

Lack of Expertise

Lack of Local Skilled Workers

- 3D issues (dirty, difficult & dangerous) + 1D (demanding)
- Demand for higher salary & better working environment
- Lack of competence

Foreign Workers

- Fewer younger generation enter construction industry- local workers are not interested- need to rely on foreign workers

Training

- Training focuses on theory rather than practical
- In the next 3-5 years, the industry require an additional 61%-80% of IBS expertise to run the whole IBS ecosystem (based on survey)

Technology

- BIM expertise & BIM adoption rate is low
- Project delayed due to insufficient technical knowledge

Proposal and Recomendations

Strategy 1: Policy to Incentivise

IBS Incentive Policy

- Increased Gross Floor Area (GFA) via increase in plot ratio/density
- Double tax deduction for IBS components in development projects
- Reduce Corporate Taxes
- Defer tax deduction for project at Certificate of Practical Completion (CPC) for better cash flow
- Tax deduction for materials used in production of precast components
- Tax incentives for relevant software

Strategy 2: Coordinating Agency

Establishment of a Coordinating Agency

- Proper interagency co-ordination to ensure seamless implementation of IBS incentives spearheaded by *Kementerian Perumahan dan Kerajaan Tempatan* (KPKT). This is very important to the successful implementation of IBS as such incentives may be beyond the jurisdiction of single party as land is a state matter.
- The government through KPKT and *Kementerian Kerja Raya* (KKR) to mandate public housing projects delivery as catalyst projects for IBS through a consortium of developers, contractors, consultants and manufacturers. This will create economies of scale for IBS and attract greater interests/ demand for the systems.

Ministry	Descriptions
KPKT *(the main agency)*	• policy on incentivizing IBS projects • implementation of incentives • monitoring and coordinating of incentives
KKR and CIDB	• Enhancing collaboration between ecosystem • Optimizing fund allocations • Knowledge empowerment through relevant IBS training and courses
KPKT and KKR	• Deliver mandate for construction of public housing • Works closely with CIDB and REHDA to identify catalyst projects to be awarded to IBS consortium • To provide lever and demand for IBS

Strategy 3: Supportive Ecosystem

IBS TVET Training

- improve relevant workforce skills and providing industry-relevant training for youth

IBS Scholarship

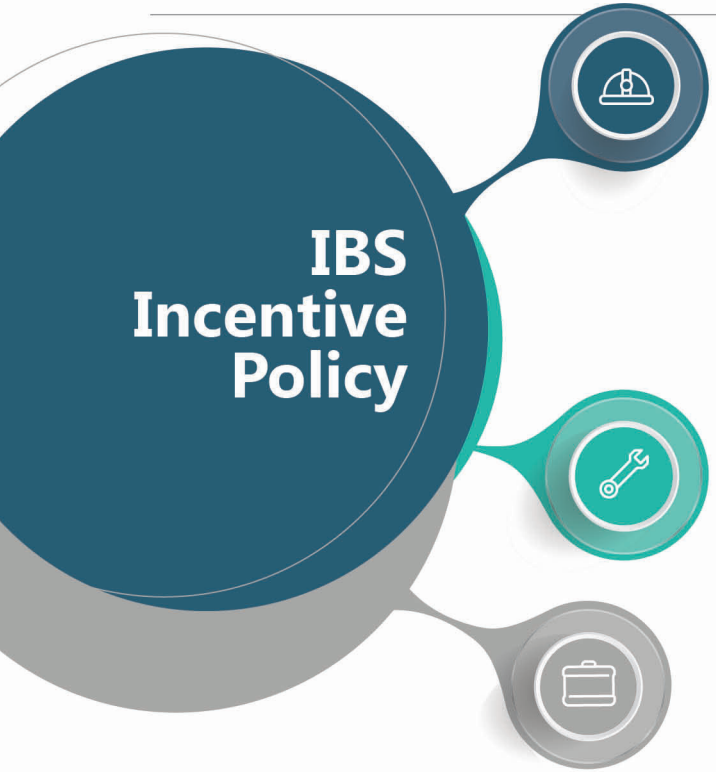
- initiative for the Malaysian youth to pursue their studies in higher learning institution at university level and to produce more IBS professional in the industry

Catalyst Project

- Existing/new planned public projects to drive IBS innovation and implementation by private contractors/developers

Strategy 1:

Policy To Incentivise



DEVELOPER

1. Increased Gross Floor Area (GFA) via increase in plot ratio/density (based on certain threshold of scoring):

IBS Score	Incentive
70-90	20%
>90	>20%

2. Double Tax Deduction for IBS components in development projects
   - For expenditure using IBS items/components
   - Project based basis

3. Reduce Corporate Taxes from 24% to 21%

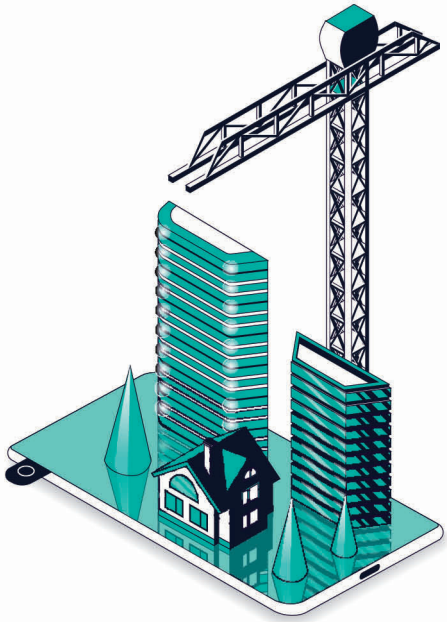
CONTRACTOR/SUB CONTRACTOR

4. Defer tax deductions for project at Certificate of Practical Completion (CPC) for better cash flow
5. Tax deductions for materials used in production of precast components
6. Reduce Corporate Taxes from 24% to 21%

CONSULTANT

7. Tax incentives for relevant software

Strategy 2:
Coordinating Agency



Establishment of a Coordinating Agency

KPKT

a. **Policy on incentivising** IBS projects
- Eligibility
- Interagency coordination

b. to **deliver adequate** incentives for IBS ecosystem to ensure cost recovery and motivation to adopt IBS.

c. **monitoring and coordinating** of incentives
- Policy & implementation

State & Local Government
- Increased GFA

KPKT & KKR

Catalyst Projects for Affordable Housing

- To **deliver mandate** for construction if Public Housing
- To work closely with CIDB and REHDA to identify catalyst projects to be awarded to IBS developer/contractors to provide the lever and demand for IBS

KKR & CIDB

a. **Enhancing collaboration** between ecosystem
b. **Optimising fund allocations** by reviewing and improving the existing programmes

Knowledge empowerment through relevant IBS training and courses.

Ministry of Finance
allocate, manage and control the Malaysian budget

Strategy 3:
Supportive Ecosystem

1. The TVET programme shall be at earlier stage (during secondary schooling) and continues into higher learning institutions
2. TVET Programme: To train IBS tradesman/skilled workers utilising the CIDB's existing facilities at *Akademi Binaan Malaysia* (ABM) and etc
3. Training programmes for:
   - Organisational skills
   - Technical skills
4. CIDB, MBAM, and REHDA to collaborate on TVET Training initiatives to train local workers/tradesman and make them employable
5. The proper training fees for TVET should be affordable to attract more younger generation to join the training

1. This programme is a financial assistance to undertake undergraduate studies in IBS related courses
2. Employers who understand the competitive nature of the scholarship will recognize it as an accomplishment that demonstrates excellent academic capabilities and applied skills
3. Government offering a scholarship through CIDB for undergraduates to pursue studies in IBS through soft skills (IoT part) and hard skills (system part).

1. To award public project to a consortium of IBS role player (developers, consultants, contractors, and manufacturers)
2. To create the adequate economies of scale and impactful IBS adoption.

Matrix of Proposed Incentives & The Implementation Agencies

Agency/Ministry/ Stakeholders	Double Tax Deduction for IBS components in development projects	Reduce Corporate Taxes (24% to 21%)	Increased GFA via increase in plot ratio/ density	Defer tax deductions for a project to pay at CPC for better cash flow	Tax deductions for materials used in production of precast components	Tax Incentives for relevant software	IBS TVET Training	IBS Scholarship	Catalyst Project
State Government			√						
Federal Government	√	√		√	√	√	√	√	√
Ministry of Finance			√						√
KPKT							√	√	√
KKR							√	√	
Ministry of Human Resources							√		
Ministry of Higher Education							√		
Ministry of International Trade and Industry							√		
Ministry of Science, Technology and Innovation							√		
CIDB							√	√	
Developer	√	√	√				√	√	√
Contractor		√		√	√		√	√	√
Consultant						√	√	√	√
Manufacturer							√	√	√

Impact of Recommendations

Structural Issue 1:
Inefficient IBS Ecosystem

A more efficient IBS ecosystem

Incentives to developers will trigger interest and mindset shift towards IBS

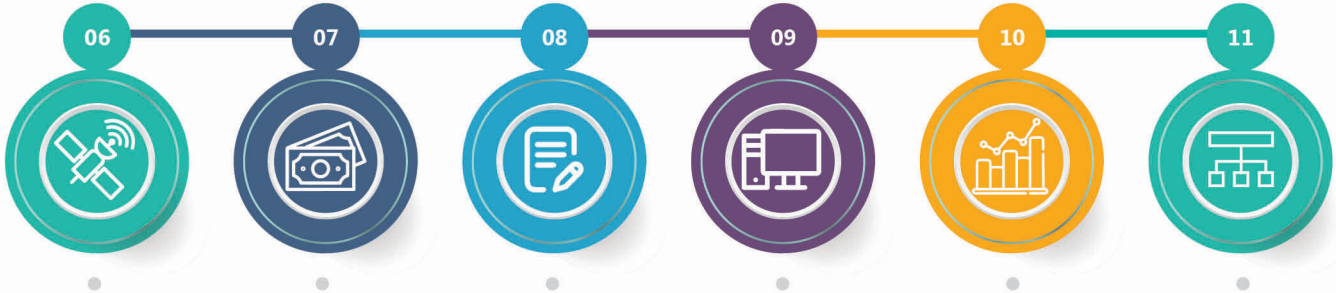
Decision to adopt IBS by the developer will pull the whole supply chain contractors, manufacturers, professionals to full gear in moving towards IBS

More efficient and productive construction industry

Transformation of the construction industry towards prefabrication

Structural Issue 2:
High Cost &

Structural Issue 3:
Insufficient Incentive



06 Specific policies to optimize the usage of IBS in the construction industry and provide financial and non-financial assistance to the stakeholders (developer, contractor, and consultant) to apply this construction method

07 The company can offset the higher cost in IBS with the incentives scheme offered and at the same time motivated to implement the IBS due to no additional cost incurred in the construction project. Incentives will encourage more IBS project in Malaysia

08 Meaningful incentives to cover the gap in higher costs between conventional vs IBS

09 Proper coordination between agencies will ensure the successful of IBS adoption

10 Higher adoption of IBS by private project with attractive scheme

11 Economies of scale for IBS as more developers choose the system

Structural Issue 4:

Lack of Expertise

IBS ADOPTION

UPSKILL LOCAL WORKFORCE

12 Increase in number of IBS projects in Malaysia

13 Enhanced industry readiness to move towards PPVC as the next step.

14 Enhancement and upskill of local workforce

15 Job opportunities for the younger generation in an improved construction environment

16 Reduce unemployment with increase in local spending and increase in local economic multiplier effect from construction activity

17 Adequate talent pool to enable industry to embrace technology extensively moving forward

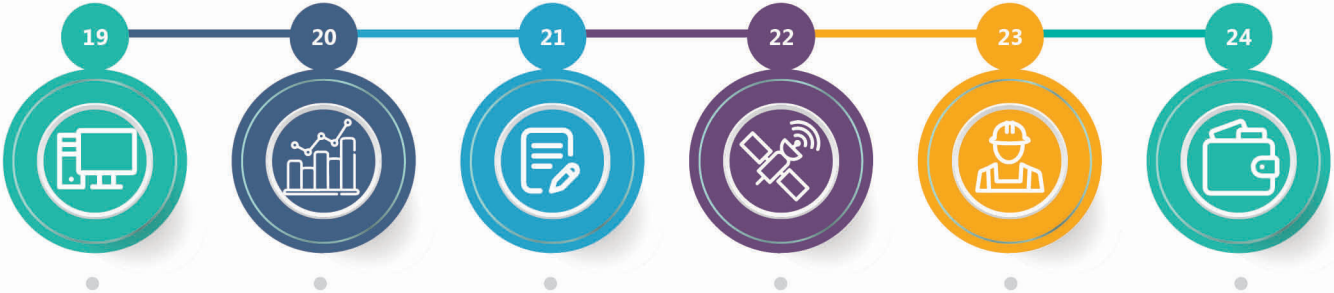
18 The IBS Scholarship will produce more professional workers in the construction industry

Structural Issue 4:

Lack of Expertise (Cont.)

TECHNOLOGY IMPROVEMENT

BENEFIT TO THE *RAKYAT*



19 — A conducive environment at working place because all the works are pre-fabricated in the factory within controlled environment

20 — Improve in technology, productivity and efficiency of the construction project

21 — Improve performance in the project deliverables

22 — Increase and speed up delivery of affordable housing, school, hospital and etc

23 — Support the government in realising IBS target and homeownership agenda in providing quality and adequate housing, employment, talent pool, high income skilled workforce

24 — Better-quality home to the rakyat purchasers

Conclusion

01 This study identifies **higher costs** of IBS construction and the **lack of incentives** to the main role players to offset such costs as the key factors hampering IBS growth

02 It is time to implement **game changing transformation** to make IBS work for the industry. Malaysia can **replicate** what **Singapore** is doing; a proven success in motivating and supporting industry towards higher prefabrication through **financial and non-financial incentives** and capacity building

03

04 The proposals are to be implemented in **total** to be fully **effective** and to ensure an **efficient** ecosystem that is supportive of IBS in the years to come

05 **Transformation is urgent** and will help shift industry mindset towards IBS - benefitting all parties including the government, the industry players, the buyers and the general public at large

Towards this purpose, the following actions must be taken to make IBS workable and feasible for the industry:

- **An overhaul to the existing IBS ecosystem** to provide a policy that incentivise role players in the IBS supply chain, mainly developers as key decision maker and investor and to include all such as contractors, consultants and IBS manufacturers. Such incentives must be meaningful to the players and able to bridge the gaps of higher IBS costs for each player
- To **establish a coordinating agency** that will be responsible for inter-agency coordination in implementing such policies. This is very important to the successful implementation of IBS as such incentives may be beyond jurisdiction of a single party as land is a state matter; and
- **Capacity building / empowerment of supporting ecosystem** by way of TVET and other training schemes, scholarships and implementing public housing projects as the catalyst to kickstart IBS adoption in a bigger way through public private partnerships

QLASSIC Assessment - An Industry Insight

Summary of Findings on QLASSIC Assessment

1 Contribution of QLASSIC assessment to sales of residential

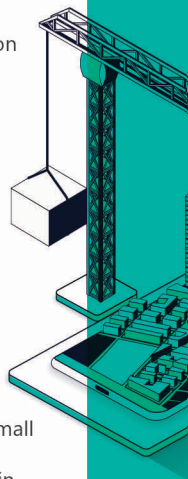
- Majority (65%) of respondents opined that QLASSIC does not contribute to higher sales of residentials.
- QLASSIC is done at tail end of project whereas sales take place prior to commencement of construction

2 Optimum QLASSIC score for residential project

- Affordable housing: 60 and below
- Medium and High cost: 70 and above

3 Minimum score for QLASSIC applied project

- Affordable housing: 51-70
- Medium & High cost: 71-90



4 Correlation between construction method and QLASSIC Score

- IBS is more on structural and QLASSIC is more on architectural/finishes - it has NO IMPACT/small impact but not significant
- Some projects record lower QLASSIC Score possibly due to the lower scores obtained in certain components
- In private projects, it is all about development's commitment to quality and irrelative to whether IBS score is low or otherwise
- In summary, there is no specific relation or no correlation between IBS Score and QLASSIC Score

5 Correlation between defect rectification cost and QLASSIC score

- Generally, projects that are QLASSIC certified have lesser workmanship defects in comparison with non-certified projects. Thus, this may translate into reduced defect rectification works. Besides this, housing developers of QLASSIC certified projects may also gain reputation in delivering quality houses.

Conclusion on QLASSIC Assessment

Based on available data, **all government projects** are **required** to undergo **QLASSIC Assessment** irrespective of construction method. Most government projects including social, public and affordable housing utilise IBS but achieve low QLASSIC score in the range of 45-80.

The **quality of the project** depends on the **project team's commitment and contribution.** For an example, if a project is **aiming** for a **higher QLASSIC,** they will **control and monitor** the Quality Assurance/Quality Control (**QAQC**) since the **commencement** of the project to ensure they can eventually achieve a higher QLASSIC Score.

There is **no correlation between construction method and QLASSIC Score** There is **no evidence** of a high IBS score translating to a high QLASSIC Score or vice versa.

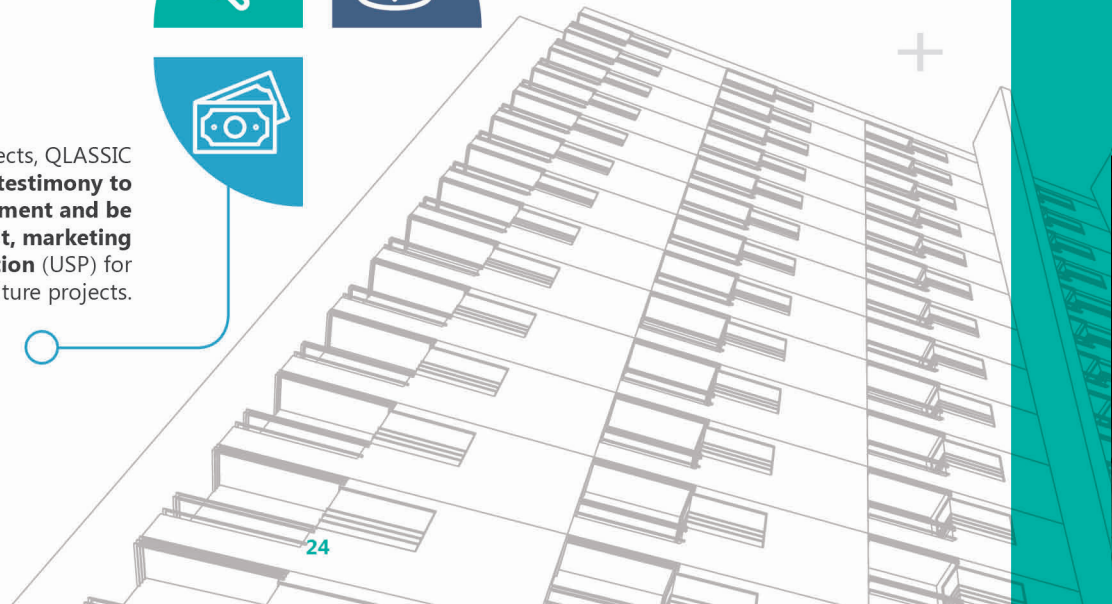
In **most private projects, QLASSIC application** is largely depending on **project value.** If the project is a **premium or high-end property,** the entire team will ensure the standard of high quality and the premium product is met right from the **commencement until completion** of the project.

Conclusion on QLASSIC Assessment (Cont.)

The higher QLASSIC Score in high-end projects will **add value** to the project indirectly.

The **optimum QLASSIC Scoring should not be a one size fits** all as **quality is closely related to materials and costs.** A **higher score** should be targeted for **higher costs projects** and similarly, a target for other pricing segments should correspond with **project categories.**

For private high-end projects, QLASSIC Assessment will become a **testimony to the high-quality commitment and be part of their advertisement, marketing and Unique Selling Proposition** (USP) for the upcoming future projects.



Notes

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