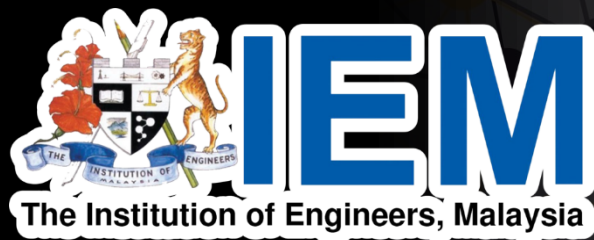


AQSA International Congress 2023

ENGINEERING FOR A MORE RESILIENT CONSTRUCTION INDUSTRY

Ir. Prof Dr Norlida Buniyamin
President





*Engineering has
been the building
block of civilisation
since the beginning
of time.*

*Today, it is a field that propels a
NATION to MODERNITY.*



Engineering combines knowledge of mathematical & natural sciences gained by study, experience & practice in applying judgement to develop ways to utilise, economically, the materials and forces of nature for the benefit of mankind.



Science

is defined as:

**A body of certain kind of
organised, well-founded
and repeatable knowledge.**

Technology



is defined as:

**A field that requires the application
of scientific & engineering
knowledge & methods combined
with technical skills in support of
engineering activities.**



ENGINEERING

is therefore defined as

an ART,

a Science

and

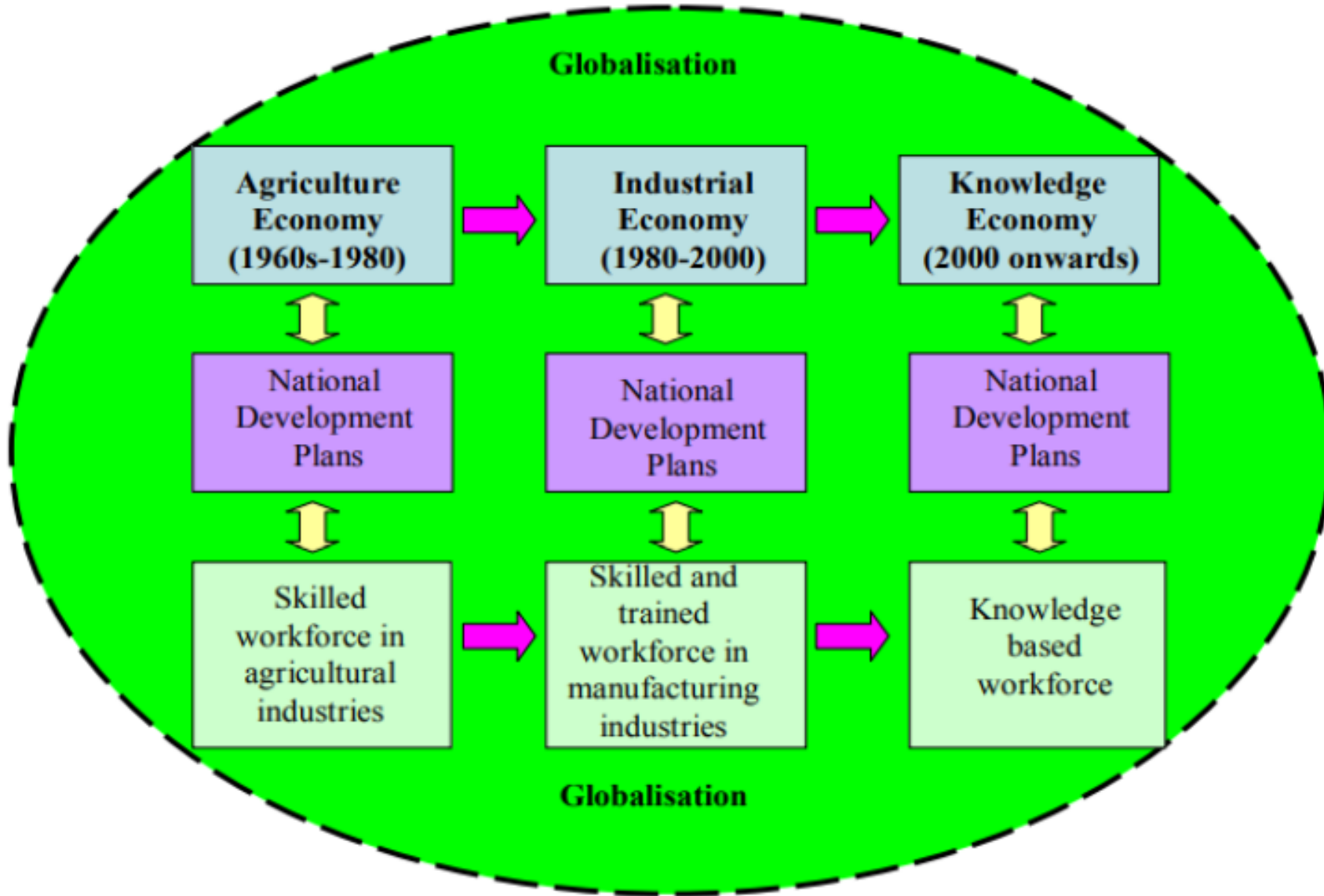
Technology



Let's ponder a bit and have a look at how engineering has contributed over the centuries to the world and the Malaysia that we are living in today!

Early Malaya was dependent on agriculture





Relationship framework as Malaysia moves from agricultural-based economy to knowledge-based economy (Singh 2010)

The Evolution of E&E in Malaysia

1970s

Simple components, semiconductor parts assembly and semi-knocked-down electrical products



1980s

Consumer electronics parts to full assembly



1990s

Fully automated manufacturing facilities
Design & development



2000s-2010s

- R&D centres
- IC & System Design
- Wafer fab
- Ingot growing
- Digital consumer goods
- Low volume, high complexity & high mixed products



Now

Produces 8% of global back-end semiconductor output.

Seeing more investments inflows due to trade war.

Companies set to benefit from themes such as 5G, sensors, autonomous cars and IoT.



Future



Labour Intensive
Low Technology Products
Low value added

Source: MIDA



Historical moment. Launching of HP in Malaysia in 1972



One of the earliest electronics manufacturers in Malaysia was Texas Instruments which was set up in 1972

©2007 Robert J. Steiner

Malaysia Institute of Microelectronic Systems



The creation of MIMOS can be traced to the realization within government and university circles that microelectronics is imposing a pervasive influence upon human activities and is going to have an even more profound effect on future societies. Having identified the fundamental principles of microelectronics industry, the establishment of MIMOS was a logical consequence of the vision of the government.

Research and development activities in microelectronics are essential for the growth of the industry. In order to be competitive in the global market, MIMOS has been established to carry out research and development activities in microelectronics.

Necessary Infrastructures
For this to occur, four necessary infrastructures must be established:

- a pool of talented and creative designers who are capable of finding effective solutions to the problems faced in innovative product design;
- a sound infrastructure to initiate and sustain indigenous R & D activities;
- an efficient and established information gathering and dissemination centre to ensure that engineers, scientists and entrepreneurs are made aware of our capabilities and products.

SAPURA S2000



Its main objectives are:

- to undertake and conduct research and development activities in the field of microelectronic systems and related areas;
- to provide product research and development services to industry;
- to contribute towards the creation of an indigenous pool of experts in microelectronic systems by organising courses, seminars and other relevant activities;
- to encourage and support the creation of new industries based on high technology and modern microelectronics;
- to disseminate information and research findings in the field of microelectronics to interested parties; and

Jaring™

1990
Jaring, Malaysia's first ISP connected Malaysia to the world wide web

TM

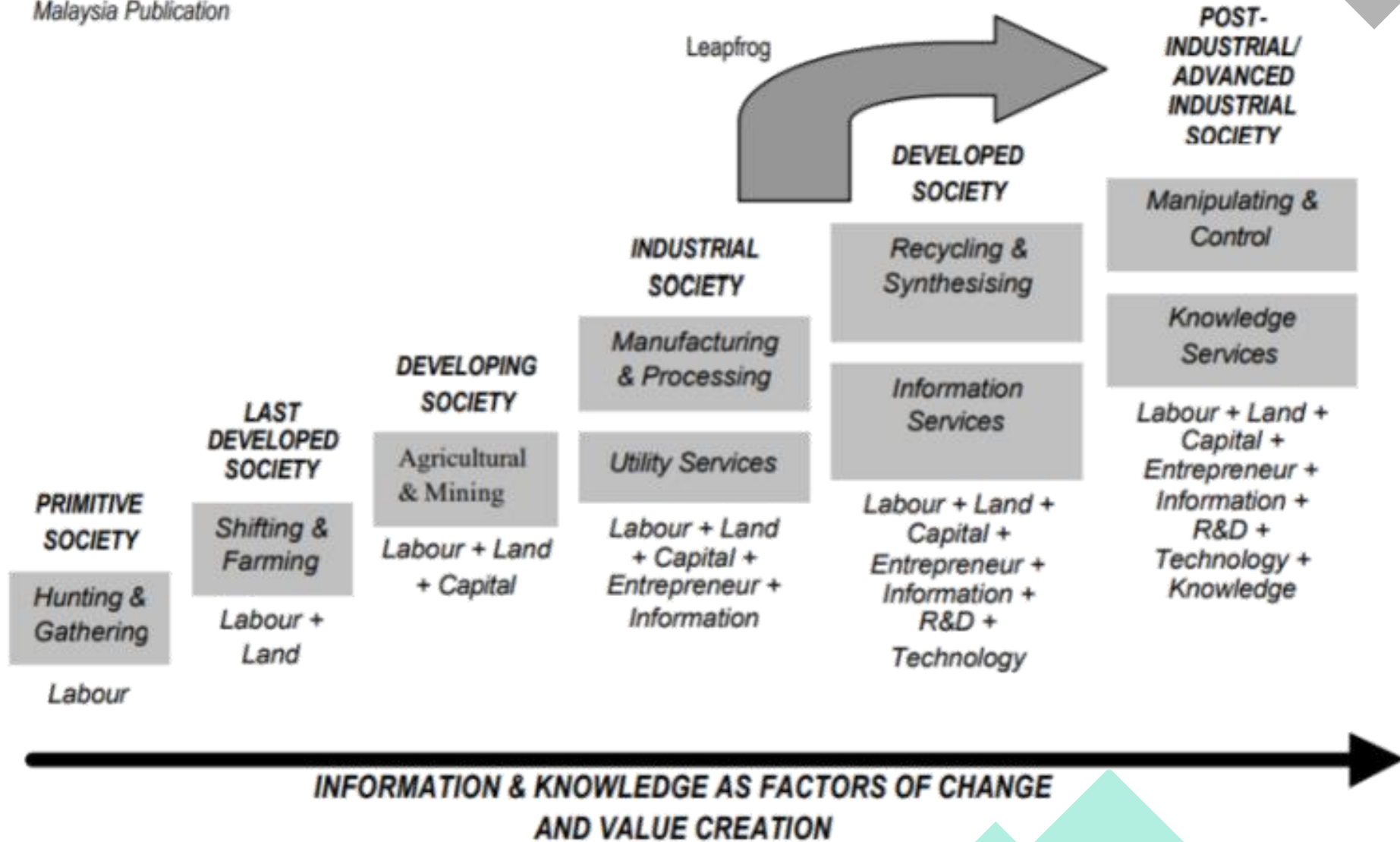
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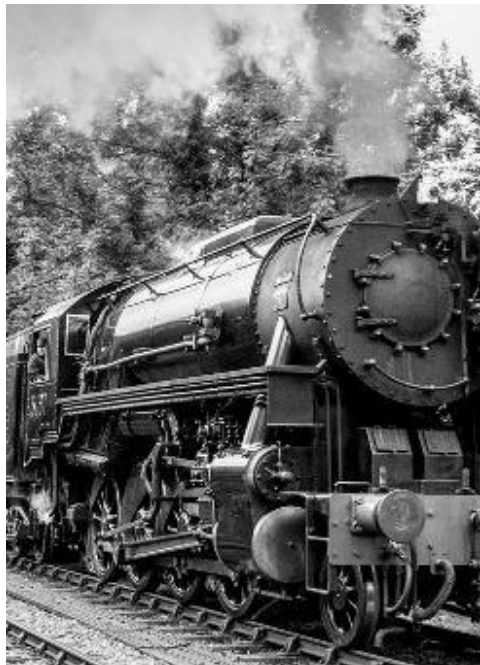
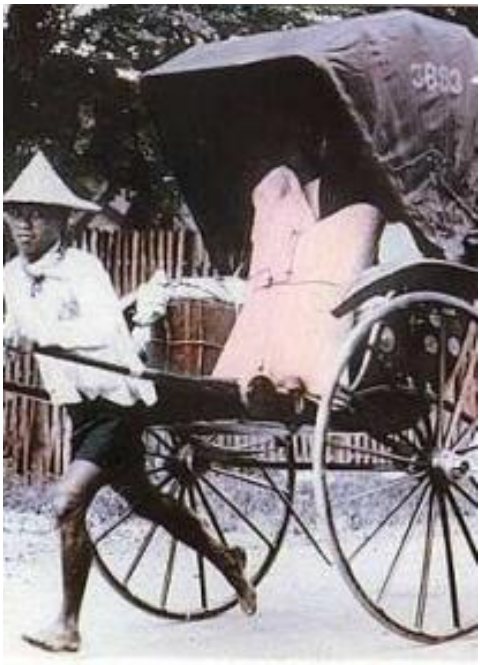


VISION 2020 IMPERATIVE

Leapfrogging development stages

Source: Access, Empowerment and Governance in the Information Age, Building Knowledge Societies Series, Volume 1, 2000, NITC Malaysia, NITC Malaysia Publication





TRANSPORTATION





PUBLIC TRANSPORTATION - TRAINS





PUBLIC TRANSPORTATION - BUSES

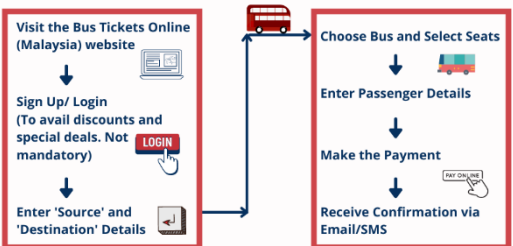




PUBLIC TRANSPORTATION - BUSES

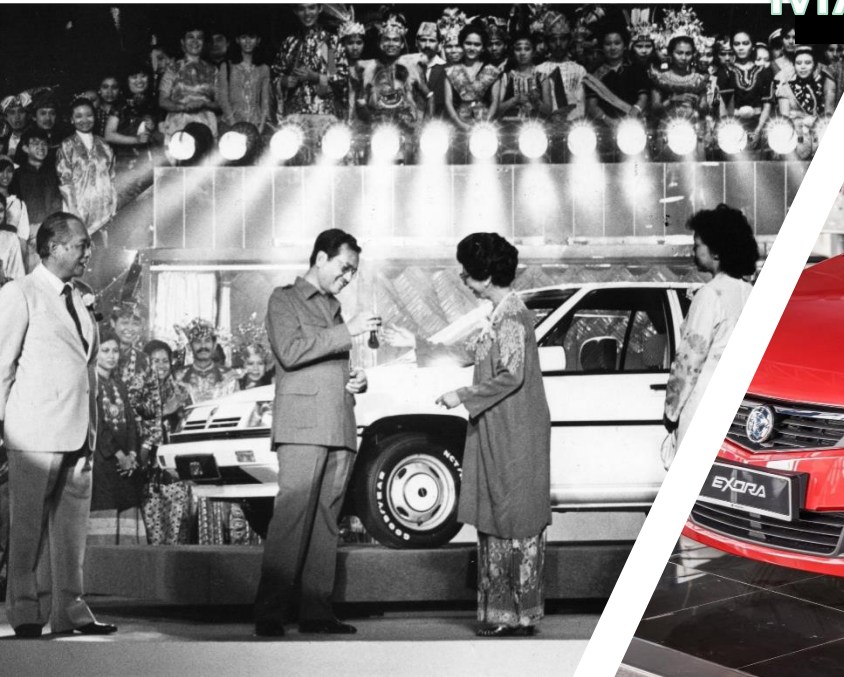


How to Book Bus Tickets Online?





MALAYSIA NATIONAL CAR



In terms of

CONSTRUCTION INDUSTRY



REVOLUTIONISING CONSTRUCTION 4.0



There is a need to improve efficiency and streamline the construction industry with the use of updated tools

**Modular Design and Construction
(also known as IBS)**

Building Information Modeling (BIM)





There was lukewarm reception from industry citing the following reasons:

- High cost of investment
- Low rate of investment returns
- Plenty of cheap foreign labour force



NATIONAL FOURTH INDUSTRIAL REVOLUTION (4IR) POLICY



**DISRUPTIVE TECHNOLOGY
TO CHANGE
SOON-TO-BE OUTDATED
MODE OF DESIGN,
PLANNING AND OPERATON**

4IR POLICY

SUPPORT RMK - 12

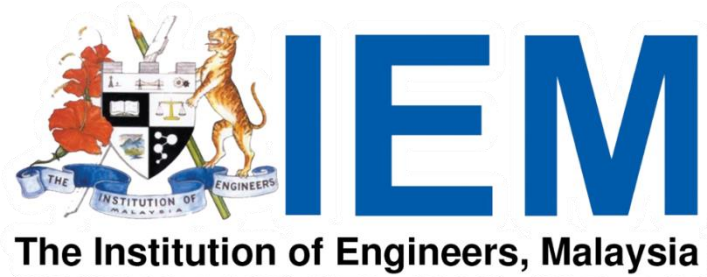
Complement Malaysia Digital Economy

**CONSTRUCTION
INDUSTRY**



1. Key guiding principles and strategic direction to ministries and agencies to formulate respective policies and action plans to implement such emerging technologies in a timely fashion.

2. Guidelines to address risks from 4IR technologies whilst preserving values and culture.



POSITION PAPER ON REVOLUTIONISING CONSTRUCTION 4.0



Issues and challenges faced by the industry

1. Smart Construction

Issue (i) finance and return on investment

Issue (ii) people factor – lack of knowledge and awareness



Lack of pilot project

**Longer time needed to
experiment & implement**

**No requirement or mandate
to implement**

**Financial assistance/
incentive not strong enough**

Issue (iii) predicament in the process of implementation

The main challenges in a nutshell are:

(a) Technology

- Technology and software cost*
- Training cost*

(b) People

- Lack of knowledge and awareness on ability and benefit of BIM*
- Shortage of ready BIM training and manpower*

(c) Process

- Lack of time to experiment and implement BIM in projects
- Lack of reference to assist in BIM implementation
- No BIM requirement/mandate exist

Issues and challenges faced by the industry

2. Smart Materials

Main issues that inhibit its use are:

- the maturity of technology
- overall cost compared to conventional way of doing things
- change management in terms of applying new techniques
- lack of actual implementation.



PROPOSED SOLUTIONS

1. Smart Construction

To achieve a paradigm shift and transformation in the construction industry, government mandate is necessary to collaborate with the industry to adopt the revolutionary practices.

Recommendation	Agency to address
Monitor and provide subsidy for implementation of BIM	CIDB
Implementation of BIM on local district level	Kementerian Perumahan dan Kerajaan Tempatan (KPKT)
Specification of construction methodology and monitoring on government project	Kementerian Kerja Raya (KKR)
Implementation of BIM on government pilot project	Kementerian Kerja Raya (KKR)
Formulation of standard and guidelines on building and infrastructure	Standards Malaysia
Build up teams of trainers with BIM skills	Kementerian Sumber Manusia
Inclusion of smart construction courses in university class and for fresh university graduates	Kementerian Pengajian Tinggi (KPT), Institut Pengajian Tinggi (IPT)

Recommendations to be addressed by respective agencies

2. Smart Materials

- Tax cuts (especially on imports) to stimulate the adoption of technologies related to smart buildings that prove to be more efficient environmentally
- Develop incentives for smart building concepts and technologies adoption in construction development.

2. Smart Materials (contd/..)

- Increase investments in smart building technology courses
- Adopt proven effective technological standards and communication solutions to address lack of appropriate communication infrastructure
- Promote consumer engagement

Proposed solutions in summary are:

a) Economic constraint

- **Tax system that allow tax break in use of smart materials**
- **Provide incentives for adoption of smart building concepts and technologies**

b) Regulatory change

- **To provide predictability to stakeholders who want to invest and to permit the sharing of infrastructure costs for adopting smart building concepts and technologies.**
- **To include usage of new smart materials and relevant standards or cods in the regulation in construction material use**

Proposed solutions in summary are: contd/...

c) Social perception

- **Consumer engagement to create awareness the benefit and method to adopt the new smart building technologies**

d) Technical

- **Increase investments in smart building technology courses**
- **Develop courses by official associations and universities for technical development**
- **Provide professional certifications by associations to qualified personnel**
- **Availability of communication infrastructure for big volumes of data**

POSITION PAPER ON REVOLUTIONISING CONSTRUCTION 4.0

IEM website: www.myiem.org.my



**ENGINEERING
INNOVATIONS
FOR A MORE
RESILIENT
CONSTRUCTION
INDUSTRY**

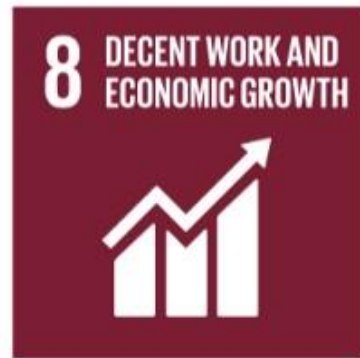




We are facing more
and more
challenges from
natural disasters



SUSTAINABLE DEVELOPMENT GOALS



A blue-tinted image of a man in profile, wearing a hard hat and safety glasses. The image is heavily layered with digital and industrial icons, including a robotic arm, a factory, a smartphone, a heart rate monitor, and various data charts. The background is a dark blue gradient with a network of white lines and dots.

Let us put all
our knowledge and
expertise together to
ENGINEER a better
and more
sustainable world for
our future
generations



**THANK YOU FOR
YOUR ATTENTION**