

OOI YOU!, YES YOU. WHERE ARE YOU GOING???



BY:

Dato Ir. Dr. CHE HASSANDI BIN ABDULLAH



CONTENT

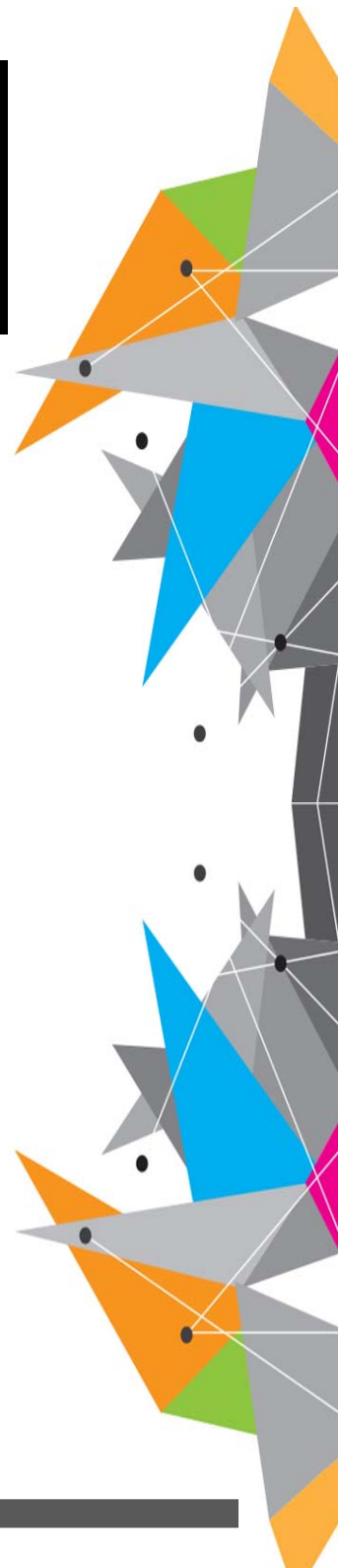
1. What's happening around us
2. Global trends and outlook
3. Malaysian construction industry
4. New technology
5. Turning disasters into opportunities
6. Niche areas in engineering
7. Where do we stand
8. Which way do we go





WHAT'S HAPPENING AROUND US

1. Frightening-pace period
2. Moving towards IR 4.0 or is it IR 5.0
3. Internet of things (IOT)
4. Borderless world
5. Political, social and economic uncertainty, within and beyond our borders
6. Sustainability
7. Climate change
8. Culture



Global Outlook

Top 5 Mega Trends



Rapid urbanisation



Demographic & social change



Technological breakthroughs



Shift in global economic power



Climate change & resource scarcity

Source: Megatrends PWC, 2017

Top 5 Global Risks



Extreme weather events

Large-scale involuntary migration

Major natural disasters

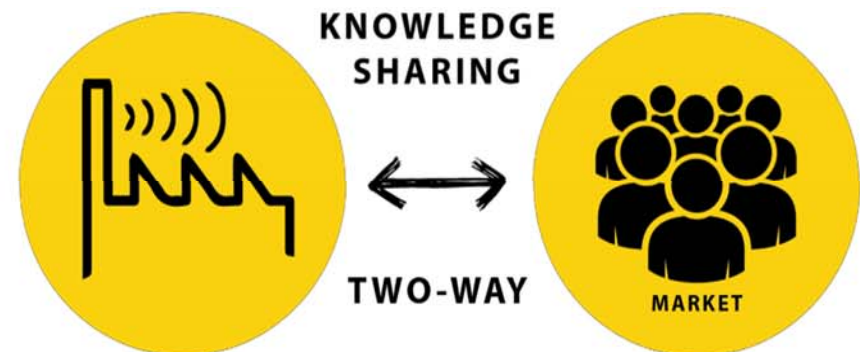
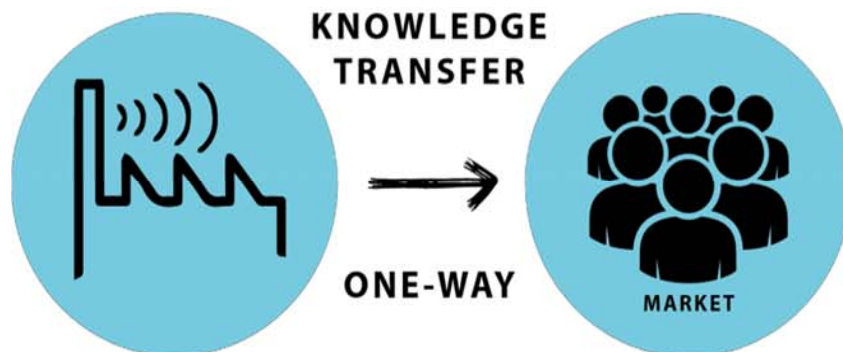
Large-scale terrorist attacks

Massive incident of data fraud/theft

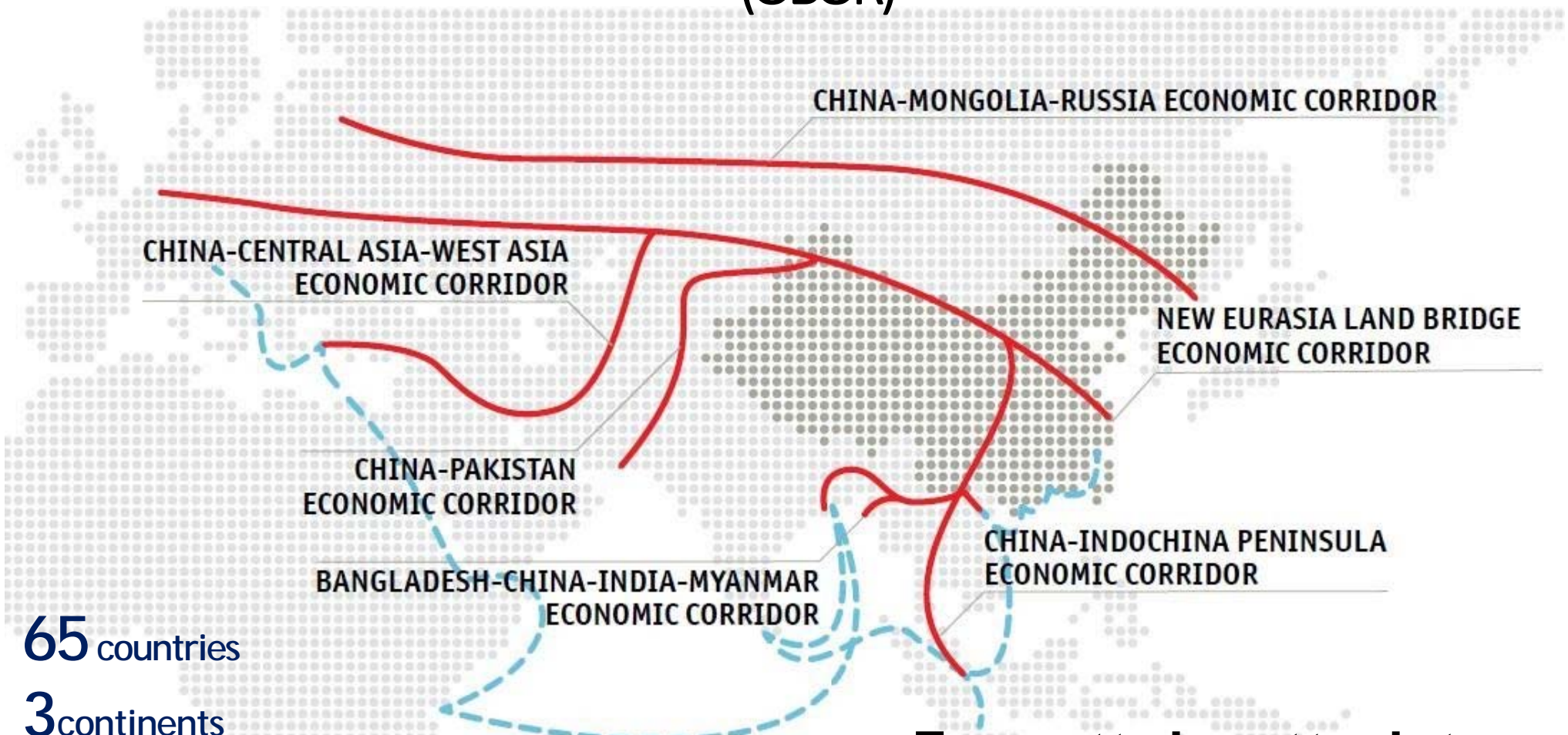
Source: Global Risks Report WEF, 2017

TRANSFORMATION FROM TRADITIONAL TO NEW ECONOMY

Resource focused	→	Knowledge intensive
Labour intensive	→	High-skilled talents
Requires control	→	Requires collaboration
Vertical	→	Horizontal trust orientation
Mass production	→	Mass customization
Proximity is important	→	Location less significant
Rigid	→	Flexible
Capitalist	→	Profit Sharing



China's Belt and Road will Reshape the 21st Century Economy (OBOR)



65 countries

3 continents

5 routes

6 international economic co-operation corridors

30% of the world's GDP

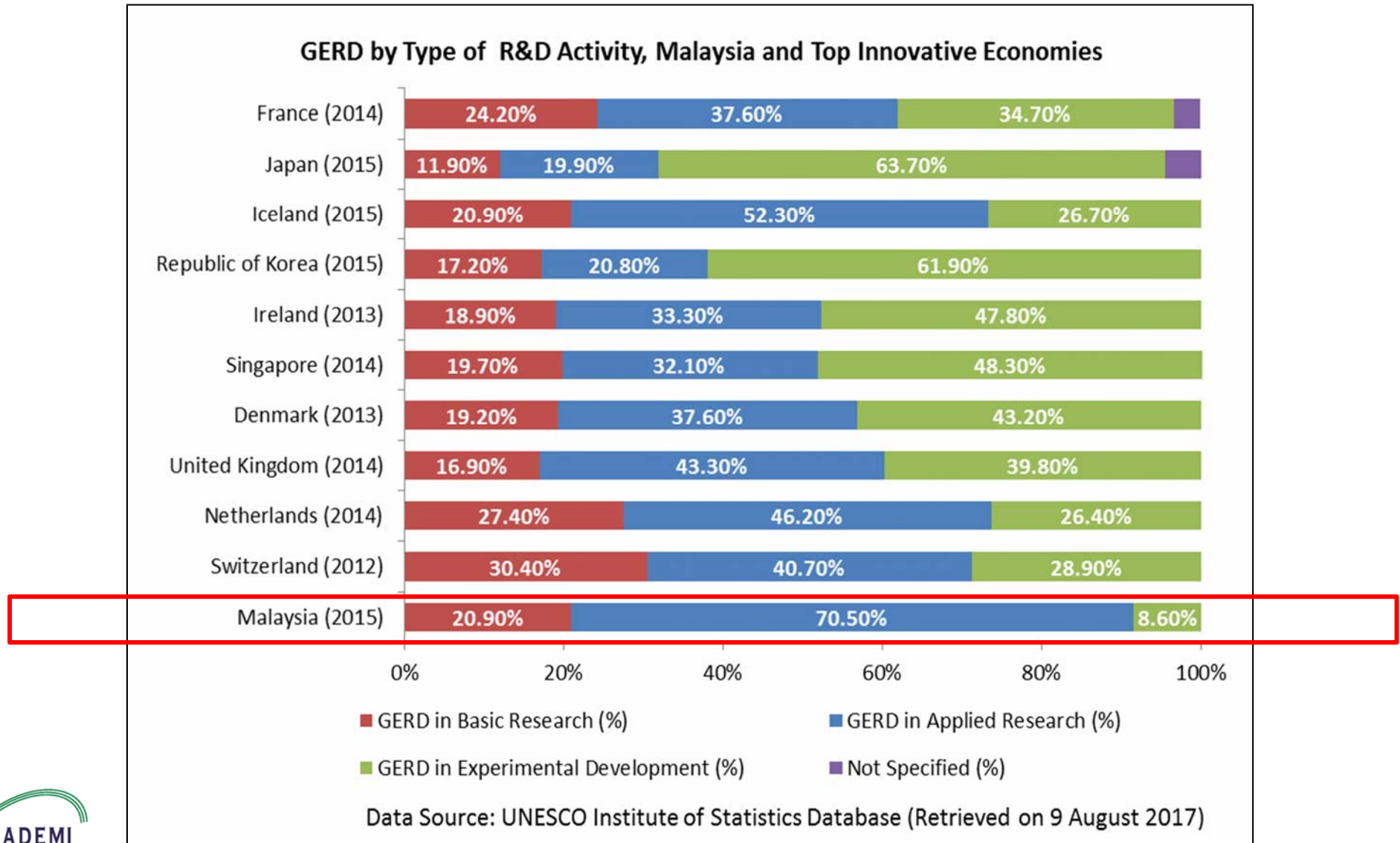
**Forecast to boost trade to
US2.5 tn per year in the next
decade and reaching 63% of
the world population.**

Source:

The Economist Intelligence Unit, 2016
The Fung Business Intelligence Centre, 2016

HOW IMPACTFUL IS RDC TOWARDS SOCIO-ECONOMIC DEVELOPMENT?

Resource Distribution





Collaborative Networks

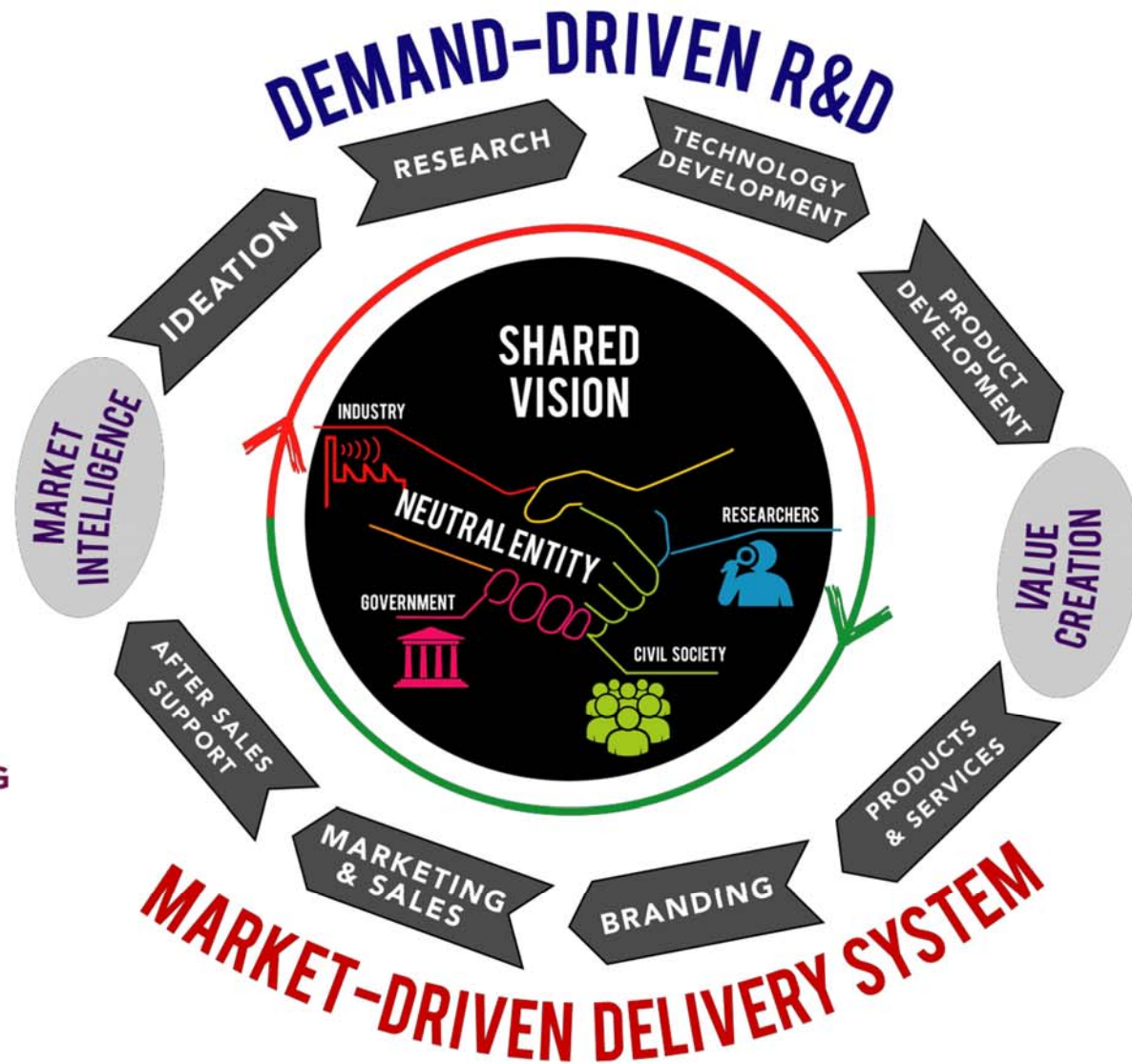
REALITY CHECK



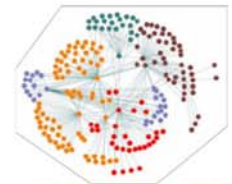
INDUSTRY GROWTH
CHALLENGES



INDUSTRY-DRIVEN
STRATEGIC PLANNING



OUTCOMES



KNOWLEDGE
CLUSTERS



TALENT HUB



DISRUPTIVE
INNOVATION

Foresight Initiative

9 Key Drivers of Change

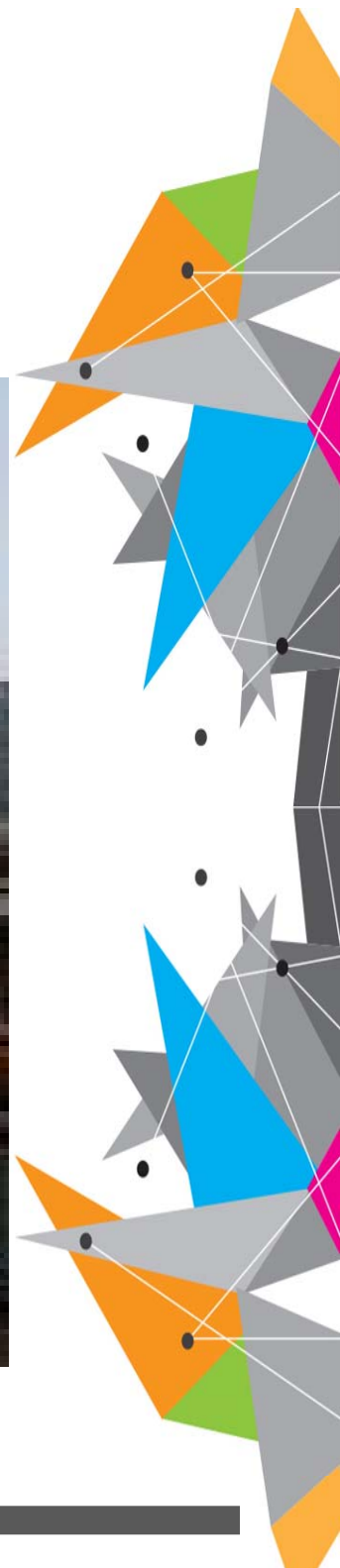


This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. 9 key drivers towards realising SMART Communities as featured in the Malaysia 2050: Foresight Initiative

If you'd like to know more about this work, please go to www.akademisains.gov.my to contact us.

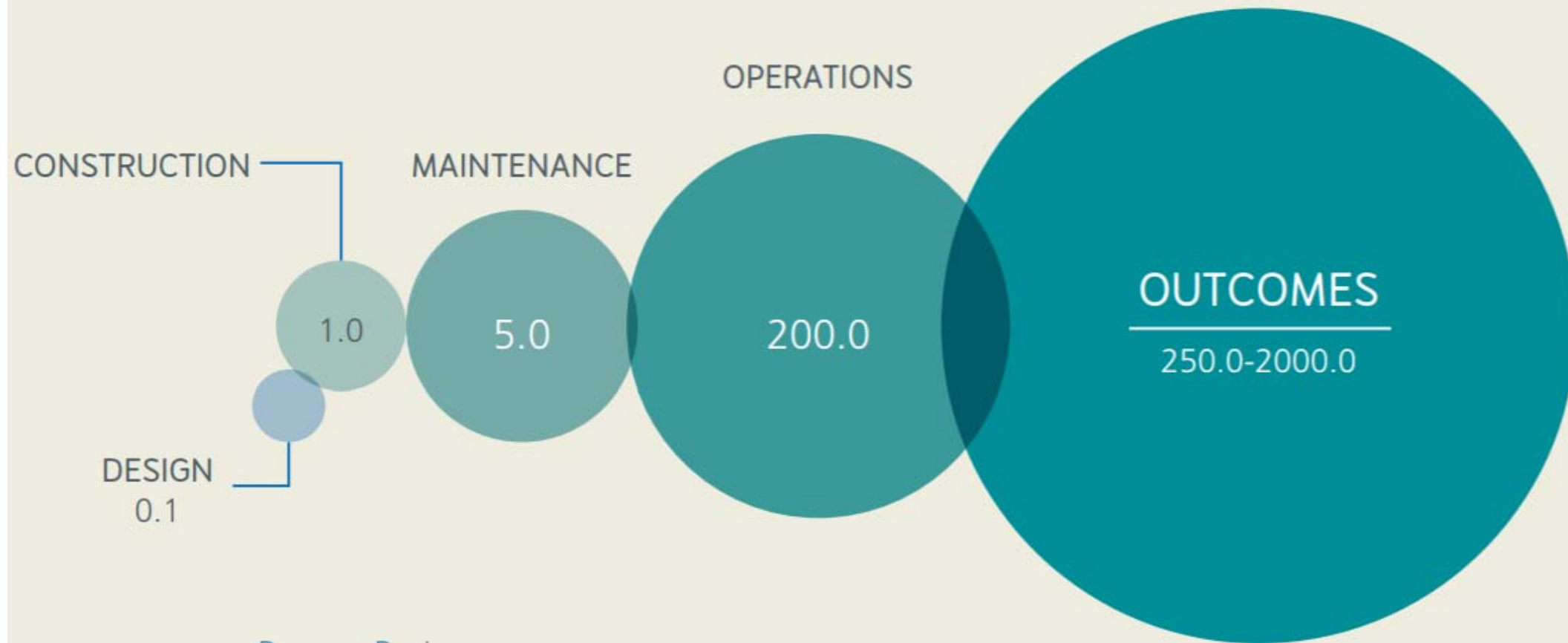


Malaysian Construction Industry





The value of outcomes for project owners



***Funding for SDG Programmes and Projects:
Through the existing development mechanisms
(5-year Malaysia Plans) - Sustainable Development Goals***

ELEVENTH MALAYSIA PLAN

2016-2020

ANCHORING GROWTH ON PEOPLE



Priority SDGs



Funds are channelled through the programmes and projects under the 11MP strategic thrusts that fit the SDG goals

CONSTRUCTION INDUSTRY IS CRUCIAL TO THE ECONOMY

120+ INDUSTRIES
rely on
construction industry

2x

- ~4% of GDP, 2x multiplier
- e.g., consumes 15% of total manufacturing output

~RM 500 Bn in
project value
[2011 – 2014]

- Increasing at rate of 8% per annum



75%



resident
Malaysians

9.5% of workforce

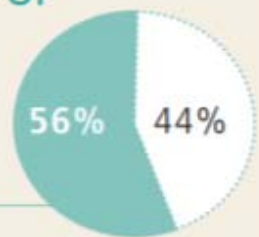
- 1.2 million registered workers
- Includes engineers, architects and surveyors
- Thousands enrol in TEVT and university courses

Sizeable entrepreneurial
activity

- ~90% of firms are SMEs

Inclusive and providing
opportunities for
Bumiputera

- 56% of firms



Bumiputera

...AND WILL BECOME EVEN MORE CRITICAL

Strong correlation with
economic development



- Construction share of GDP positively correlated with GDP per capita



e.g., MRT project

e.g., Pengerang Integrated
Petroleum Complex

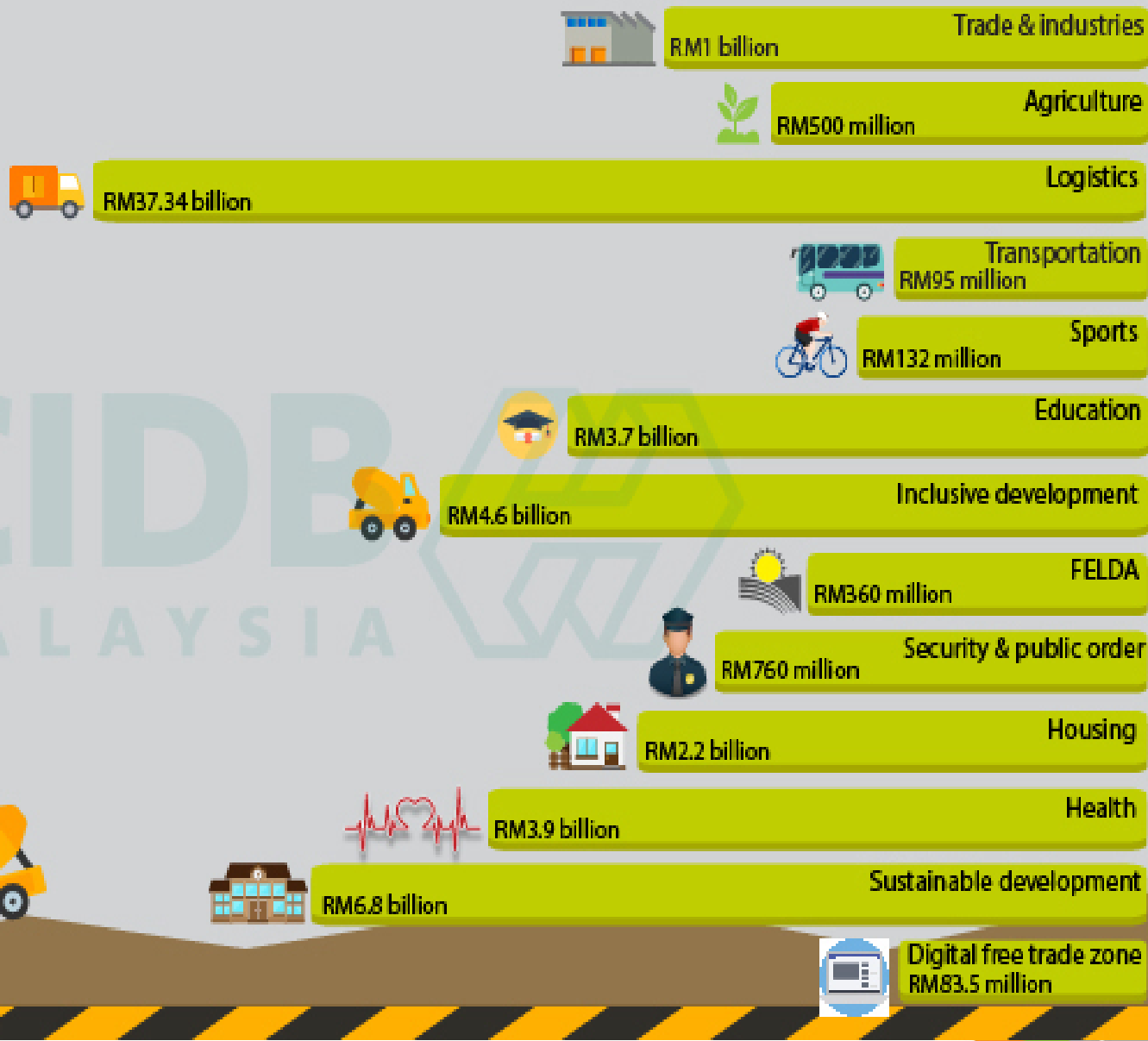
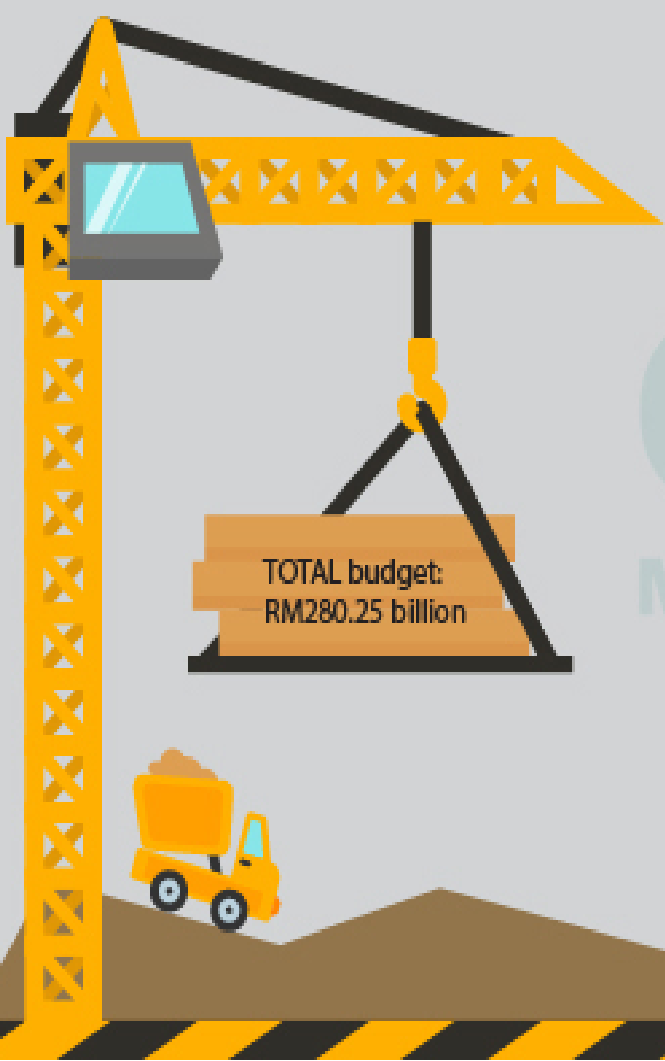


Major infrastructure projects
planned make construction
even more critical

- e.g., intense demand for infrastructure development in Sabah and Sarawak
- e.g., demand for more efficient urban transportation



Construction Industry in Budget 2018

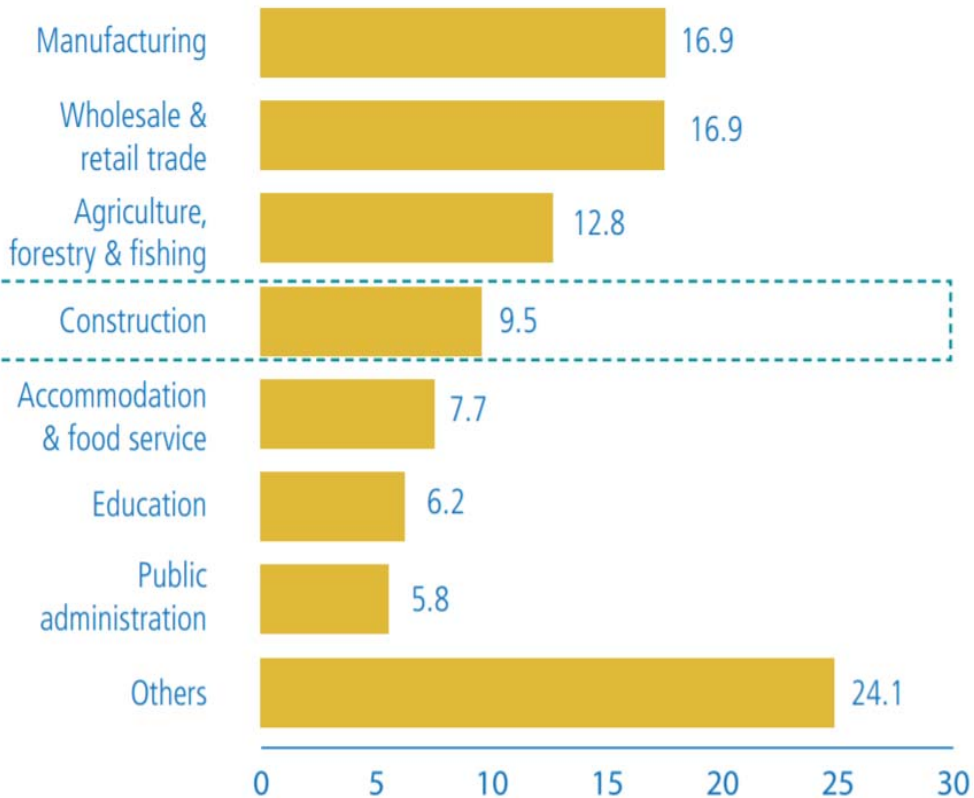


Total construction element RM61.5 Billion = 21.9%

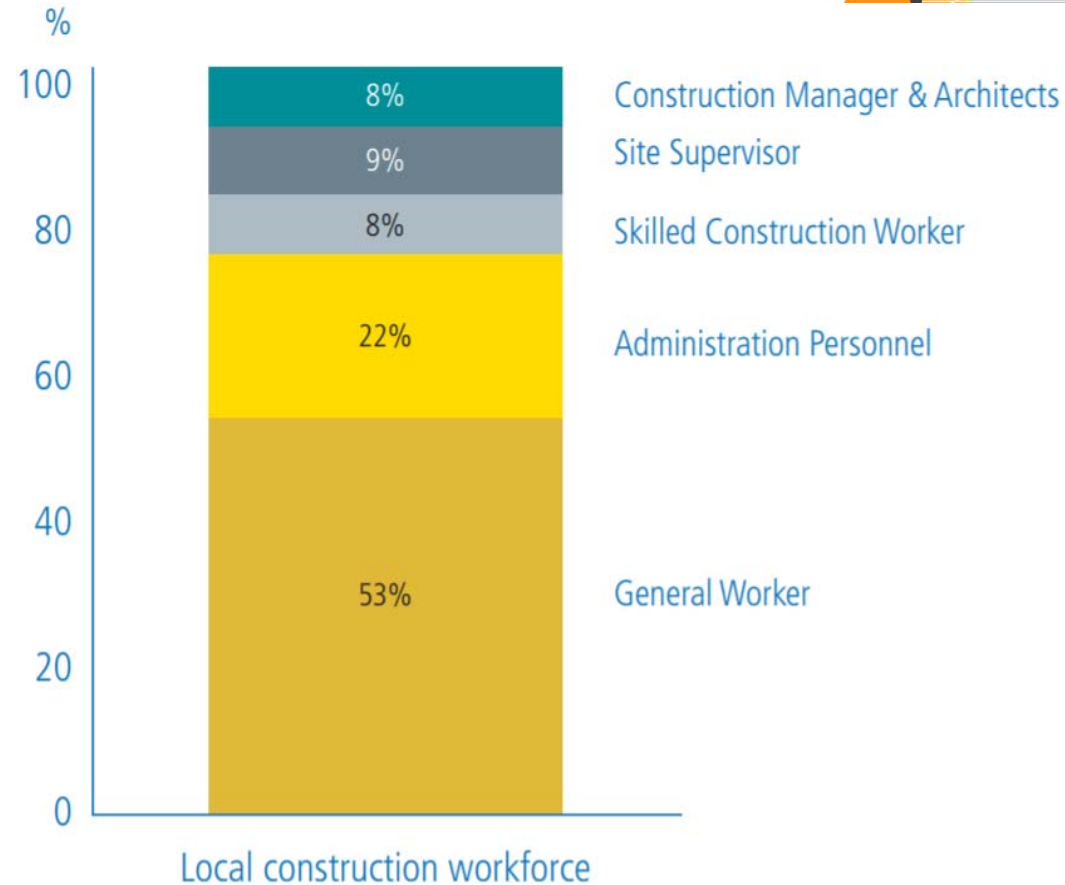




Employees by Industry



Composition of Construction Workers





CONSTRUCTION INDUSTRY TRANSFORMATION STRATEGY

QUALITY, SAFETY &
PROFESSIONALISM

ENVIRONMENTAL
SUSTAINABILITY

PRODUCTIVITY

INTERNATIONAL-
ISATION

OUTCOMES



Quality, safety and
professionalism ingrained
in industry culture



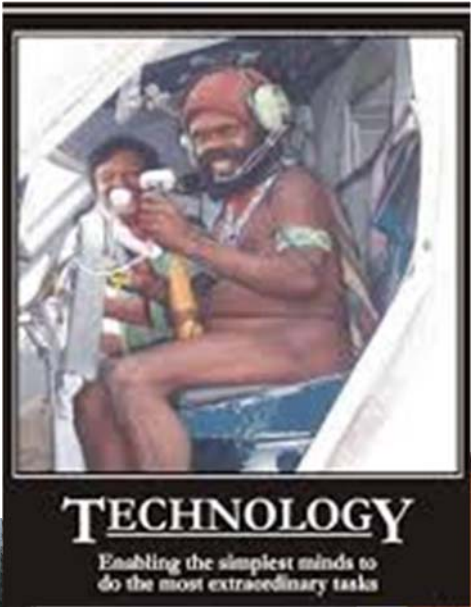
Malaysia's sustainable
infrastructure:
a model for the emerging
world



More than doubling
productivity, matched by
higher wages



Malaysian champions:
leading the charge locally
and globally



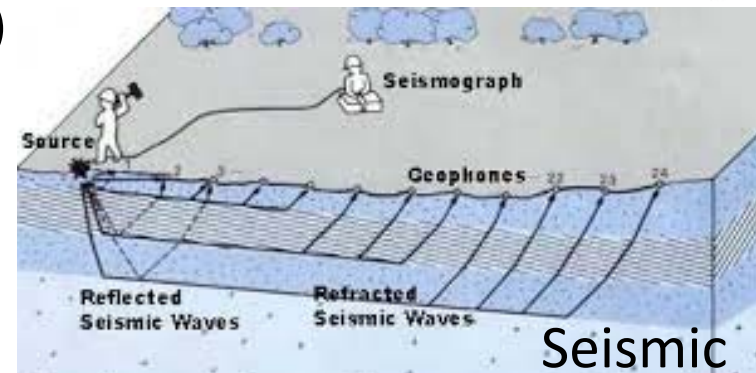
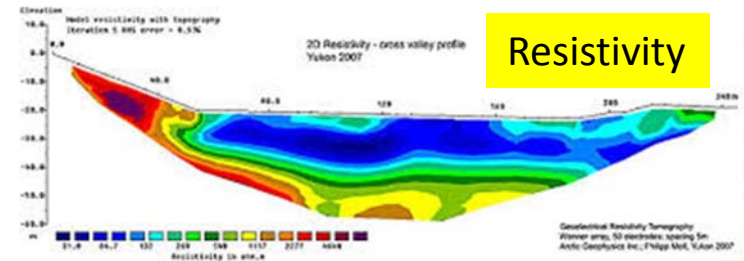
NEW
TECHNOLOGY???



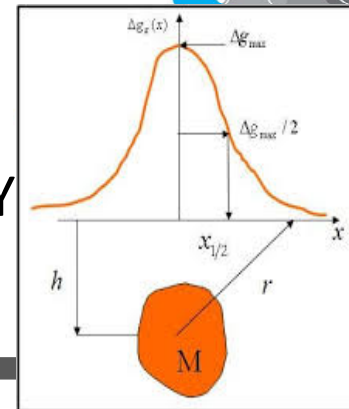
Near Surface Geophysical methods

Commonly used method in civil engineering

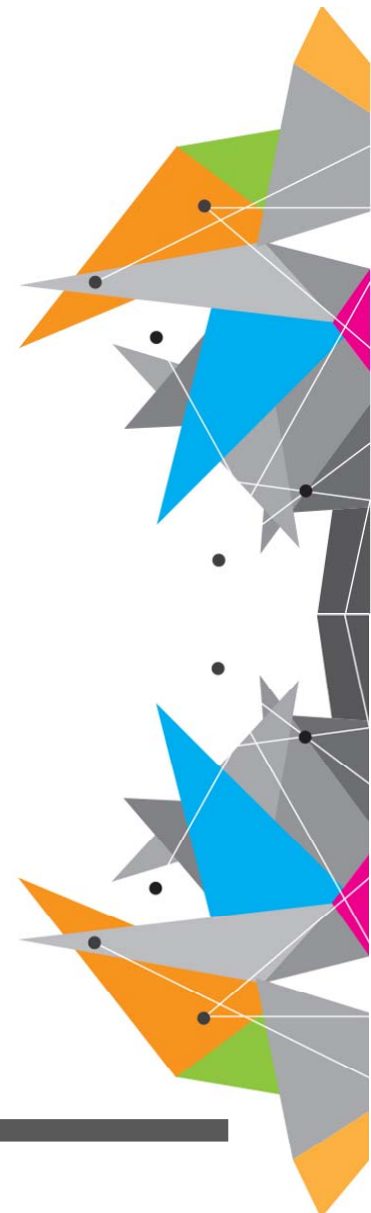
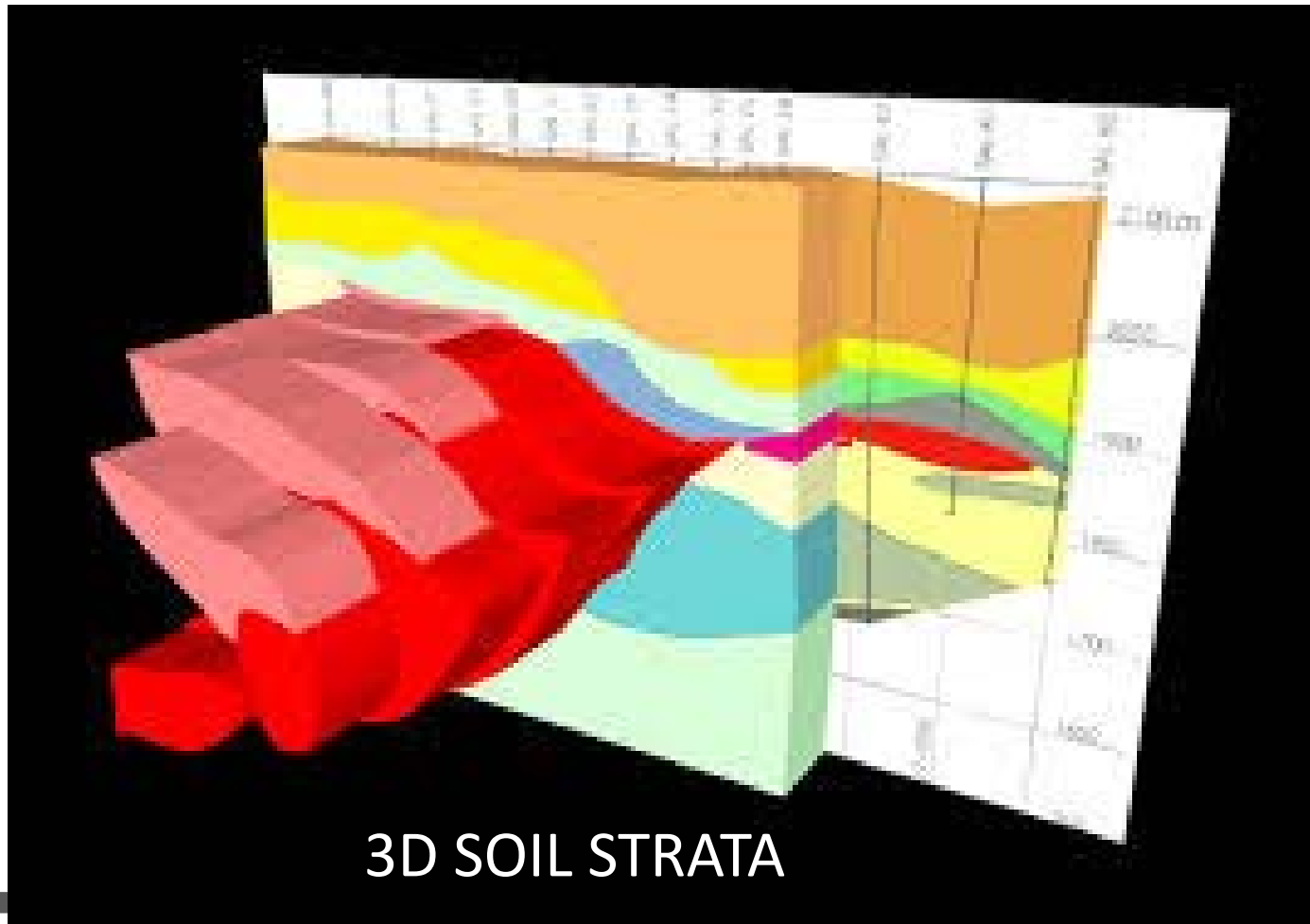
1. Resistivity (underground water, soil layers)
2. Seismic (soil layers)
3. Ground penetrating radar (GPR)
4. Gravity (Different soil densities in the ground)



GRAVITY



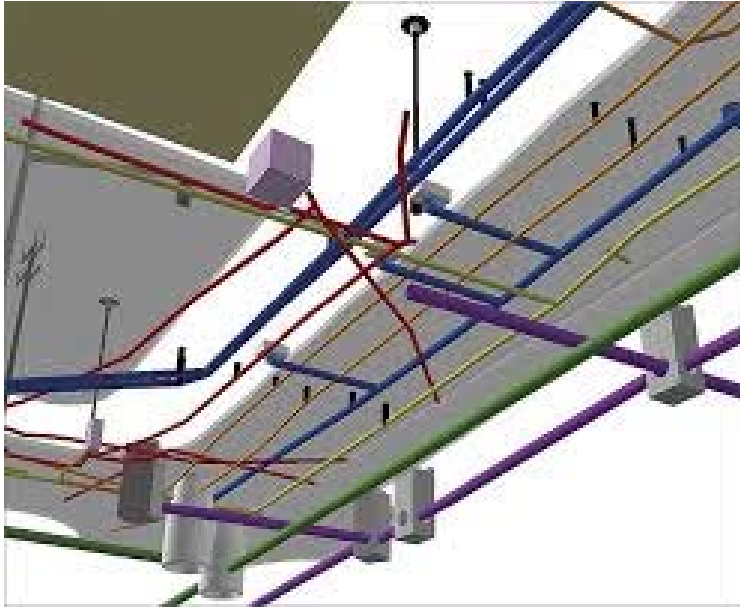
3D SOIL STRATA



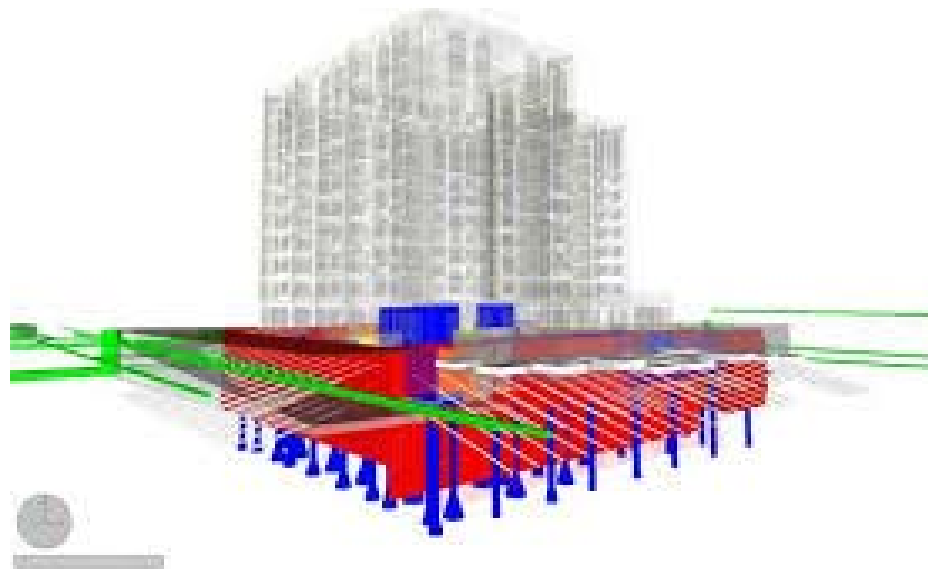
ADVANCED TECHNOLOGY IN CONSTRUCTION



BUILDING AND GEOTECHNICAL INFORMATION MODELLING (BIM & GIM)



BIM & HIM

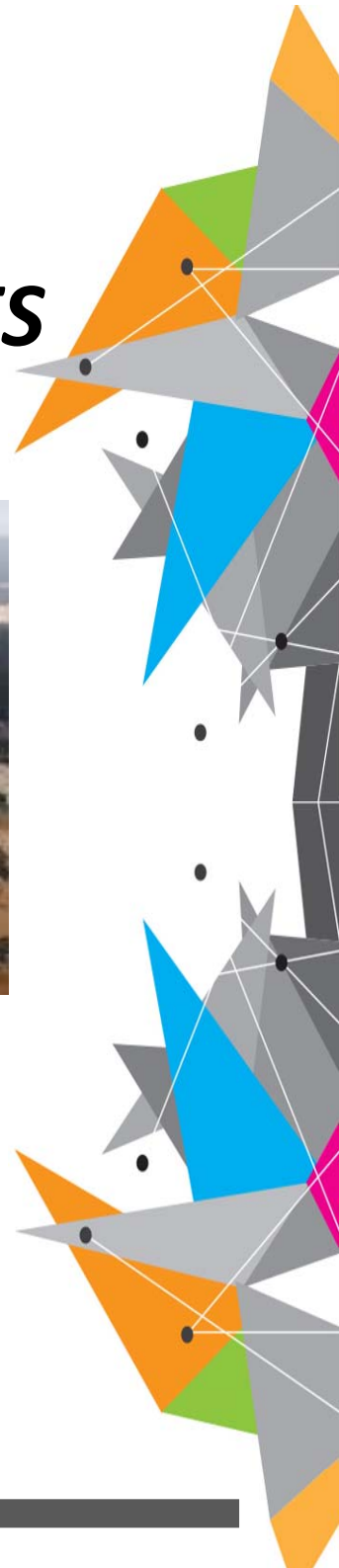


GIM

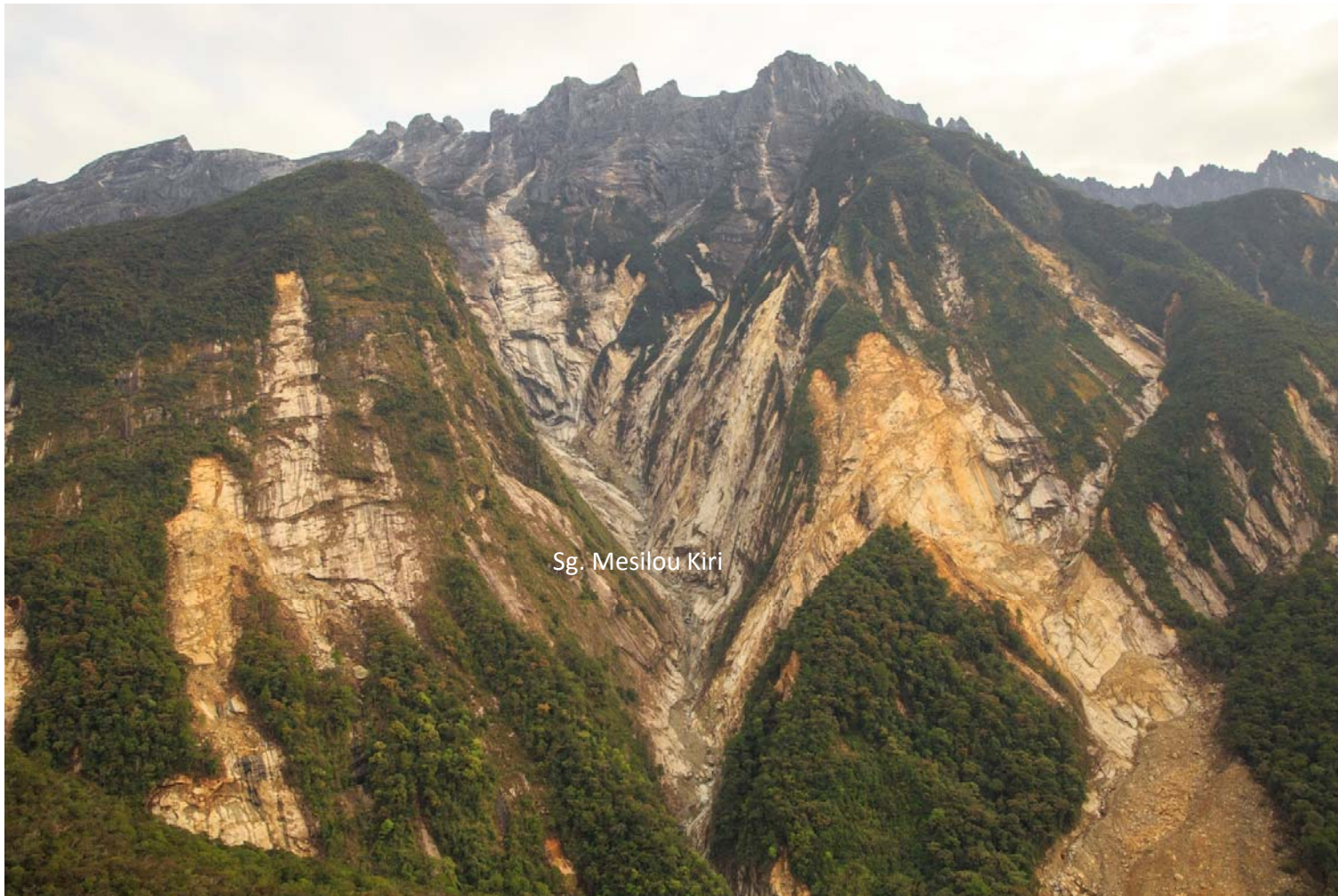




TURNING DISASTERS INTO OPPORTUNITIES



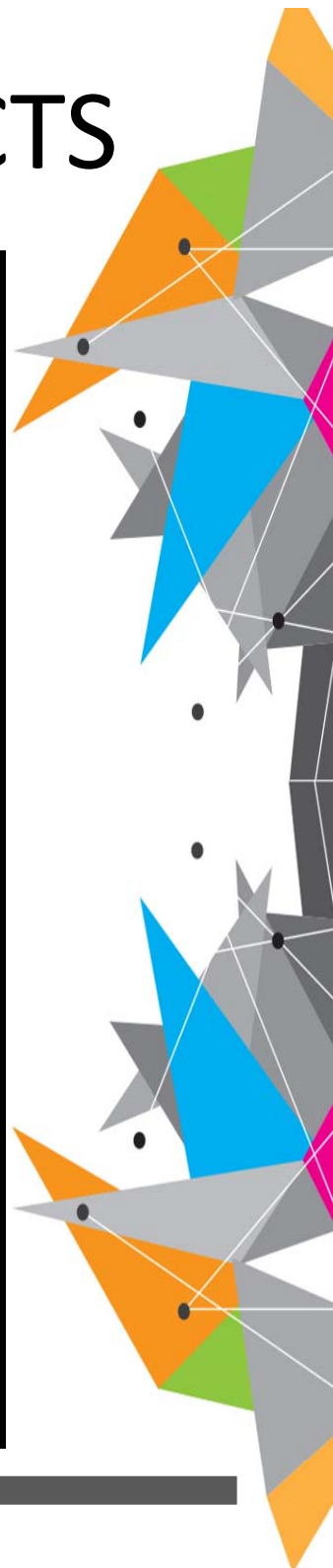
BARREN ROCK SURFACE





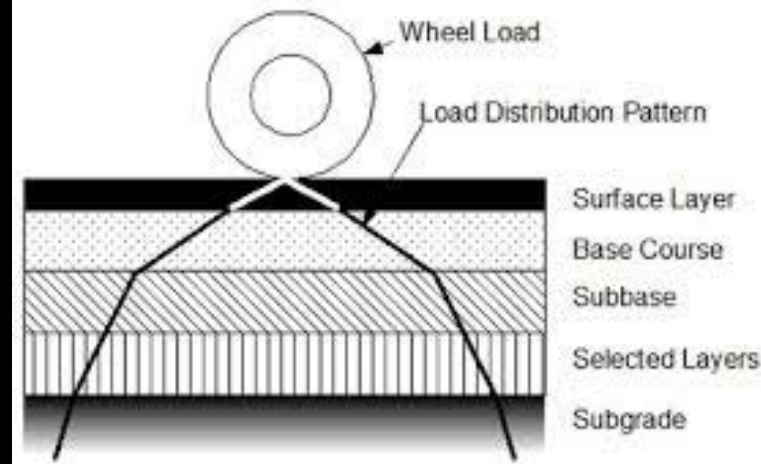
CIVIL ENGINEERING SUBJECTS

1. Structural engineering
2. Road engineering
3. Geotechnical engineering
4. Slope engineering
5. Railway engineering
6. Tunnel engineering
7. Seismic & Vibration engineering
8. Project management
9. Forensic engineering
10. Sustainable technology
11. Asset Management
12. Disaster management



CIVIL ENGINEERING NICHE AREAS

1. Seismic hazard mitigation
2. Sustainable materials (bitumen, structural, geotechnical materials)
3. Geotechnical, structural & road innovation (e.g. microbiology in peat)
4. Pavement geotechnics
5. Forensic engineering



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GENERIC ENGINEERING NICHE AREAS

1. Building conservation
2. Smart city
3. Energy efficiency and renewable energy
4. Sensing, monitoring, intelligent systems
5. Engineering informatics and simulation



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OUR SHORTCOMINGS/ACTIONS

SHORTCOMINGS

1. Projects are still delayed
2. Data integrity problematic
3. Contract administration ignored
4. Poor safety & health
5. Sustainability ignored
6. We are consumers of technology

ACTIONS

1. We have to be cruel to be kind
2. Gamified data entry, reward, competition
3. Mechanized, checkers, Apps
4. Train, train, punish
5. Remind, remind & inculcate
6. Innovate & CREaTE

All these and more we can achieve via mindset & cultural change



