2017

SCIENCE OUTLOOK

Academy of Sciences Malaysia

Converging towards Progressive Malaysia 2050

NOTES

Opening

1. ASM's Science Outlook is an independent advisory review assessing the STI landscape of Malaysia.
2. The review emphasises on a practical approach, well grounded in reality, evidenced through research, feedback, global trends and best practices.
3. Science Outlook 2017 – **Converging towards Progressive Malaysia 2050** is the **second** edition of the **biennial** publication.

The Principles of Science Outlook-

An independent review of the STI landscape in Malaysia and the way forward

- Stocktaking
- Study Key Trends & Challenges
- Data Gathering

- Identify Indicators
- Benchmarking
- Evaluation
- Analysis

- Way Forward
- Towards evidence based informed decision making
- Future Implications
- Recommendation

AKADEMI SAINS MALAYSIA

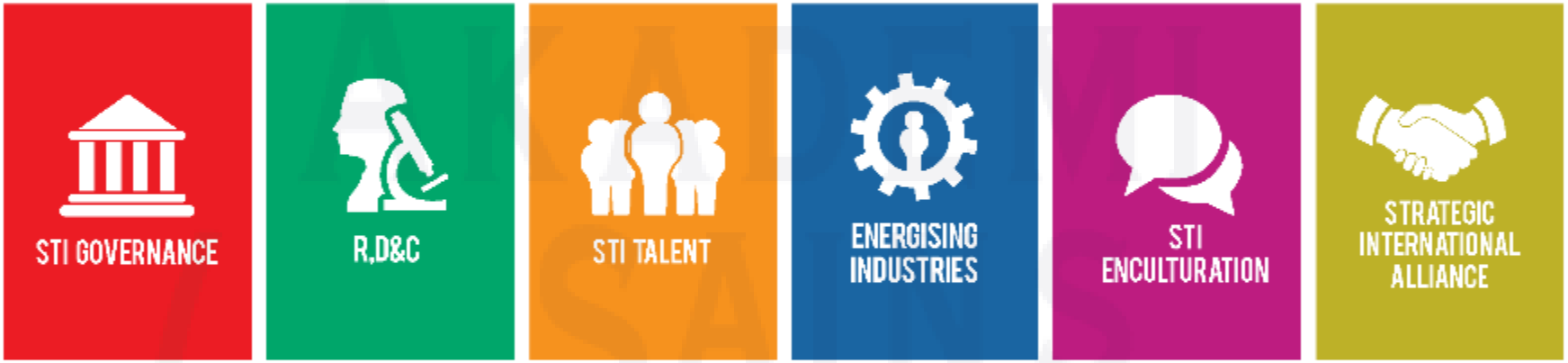
NOTES

The Principles of Science Outlook

1. The process includes **stocktaking** exercise to study key trends and challenges in STI, **data gathering and international peer review**.
2. This was followed by thorough **evaluation and gap analysis on various indicators** of STI development.
3. The review was done through **primary and secondary data analysis** as well as desk top study.

6 Chapters in the Science Outlook

aim to continue to provide evidence-based insights
and new perspectives on the Malaysian STI landscape



Key focus areas

that contribute to a robust STI ecosystem

NOTES

Pillars

The Science Outlook 2017 retains the six pillars of the National STI Policy (2013-2020) as it forms its guideline, similar to the 2015 edition.

Our ultimate objective is to **continue** to establish an evidence-based approach to STI decision making, recommendations supported by relevant data and insights.

6 Chapters in the Science Outlook 2017

ASM's Science Outlook initiative looks into the following 6 focus areas:

i) STI Governance

ii) R, D & C

iii) STI Talent

iv) Energising Industries

v) STI Enculturation

vi) International Alliance

Conduct of the Study

Inclusive input from members of Parliament, policy makers, scientific community, academia, industry leaders, international STI organisations, STI professional bodies and NGOs

77, 083 Individuals & **5** Experts
involved in Surveys & Discussions

68 Ministries/Agencies/Organisations
provided key information & data

229 References

1 International Reviewer

6 Working Groups

STI Governance
(10 members)

RDC
(13members)

STI Talent
(10 members)

Energising Industries
(11 members)

STI Enculturation
(8 members)

Strategic International Alliance
(11 members)

26 Analysts

NOTES

Conduct of the Study

The Science Outlook 2017 is supported by

68 Ministries / Agencies / Industries / Organizations

77,083 survey respondents

11 Stakeholder Consultations

229 journal articles

2015

Academy of Sciences Malaysia

SCIENCE OUTLOOK

action towards vision

NOTES

1. Let's revisit the Science Outlook 2015 recommendations and the progress.

Progress of the Science Outlook 2015 Recommendations

Out of the total of **18** recommendations in Science Outlook 2015,

at least from 2016-2017, government has tackled

11 recommendations through **16** initiatives and programmes.

NOTES

1. The findings of the Science Outlook 2015 were presented to the National Science Council, Cabinet, and Parliament.
2. The Academy of Sciences Malaysia is glad to see that a total of **11** recommendations that has been addressed by the Government.
3. Through our National horizon scanning, we have identified a total of **16** initiatives and programmes has been carried out with some has been completed and some is still on-going, and the Academy shall continue to monitor all initiatives that is related to the six strategic thrusts.
4. Among the success story are the **National STEM Agenda, National STEM Centre** and the **STI Master Plan.**

2017

SCIENCE OUTLOOK

Academy of Sciences Malaysia

Converging towards Progressive Malaysia 2050

NOTES

1. **Moving to the current edition –** Now let's zoom into the Science Outlok2017 findings.

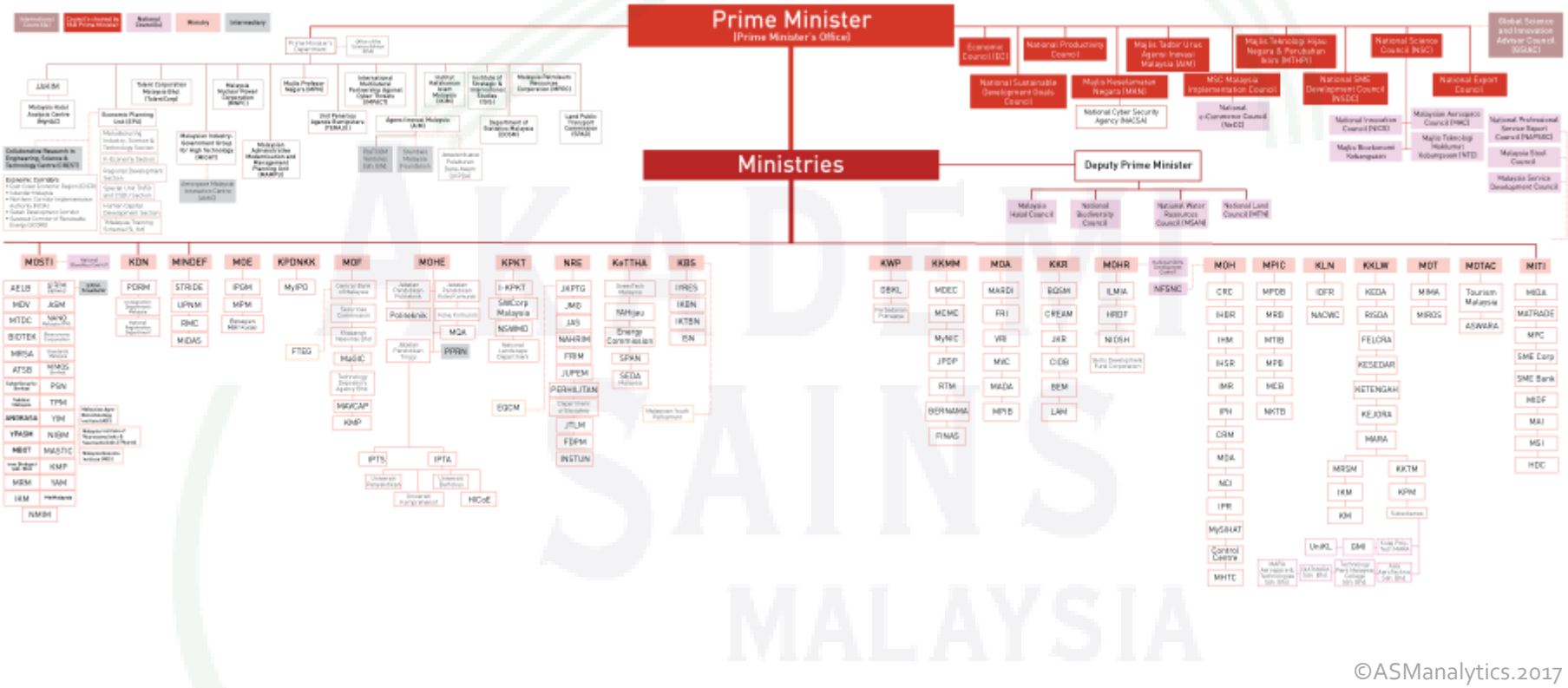
01

STI Governance

NOTES

1. The first chapter is on Governance

IS THE STI ECOSYSTEM WELL-COORDINATED?



NOTES

1. Since STI cuts across all government ministries and must be linked to industries; consultation, coordination and collaboration and harmonisation become both important and difficult.
2. This is our **1st** attempt to **map out all STI-related players** at Federal level

The National STI landscape is rather complex

14 State Gov + Federal Territories

23 Ministries

27 STI-related Councils

5 Economic Corridors

16 STI-related departments/ agencies/statutory bodies/companies under PM's Department

1 International Council

6 Intermediaries

10 National Councils chaired by PM

157 agencies/ departments/ statutory bodies/ foundations/ institutes/ platforms/ companies under respective ministries

20 public universities

16 National Councils (chaired by respective Ministries

46 National STI-related policies

NOTES

The National STI Landscape is rather complex. It has:

23 Ministries

14 State Government + Federal Territories

27 STI-related councils

- **1** international Council
- **10** National Councils Chaired by Prime Minister
- **16** National councils (Chaired by respective ministers)

5 economic corridors

6 intermediaries

16 STI-related departments/agencies/statutory bodies/companies under Prime Minister's Department

157 agencies/ departments/ statutory bodies/ foundations/ institutes/ platforms/ companies under respective ministries

20 public universities

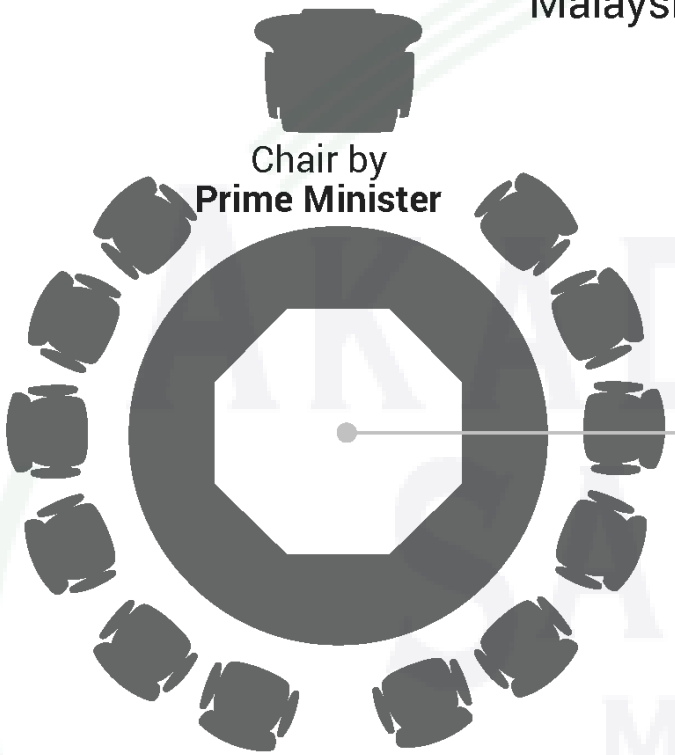
46 National STI-related policies

Through our analysis, we found out that there is multiplicity of actors; this increases **risk of redundancies, fragmentation of resources, overlapping competencies.**

Hence, there is an urgent need to establish a **coordinating body** to lead the **planning, implementation, monitoring and evaluating** of the nation's STI agenda across these institutions.

NATIONAL SCIENCE COUNCIL

Apex STI Council in Malaysia



MEMBERS

12 STI-related Cabinet. Inclusive of ministers, academicians and private sector representatives

* Membership as of 1st meeting in January 2016

Has brought closer Ministers and key scientists to discuss STI related matters.

NOTES

1. The **National Science Council (NSC)** is the apex STI Council in Malaysia established through a Cabinet decision in September 2015.
2.
3. 12 Ministers are members of the NSC and for the first time relevant ministries come together to discuss STI matters. This augurs well for better co-ordination of STI in the nation.
4.
5. It is commendable that the NSC has made several key decisions on advancing STI in the nation
6.
7. In order to enhance the sustainability of the NSC and the national science agenda, it would be good for the NSC to be backed up by a legislative mandate and a dedicated secretariat
8.
9. The national STI council that formulates the country's STI strategic direction in other **advanced countries such as Japan and Korea** are supported by a **strong secretariat** that is also empowered to follow through on the Council's decisions.
10.
11. **Note:** At present, the NSC secretariat support comes from a joint-effort of the Office of Science Advisor to the Prime Minister (OSA) and the Policy and Strategic Planning Division of MOSTI which also has 14 other functions under its portfolio.

Crosscutting monitoring and evaluation entity across ministries for STI matters is not in place

NOTES

1. One of the key components of any STI management cycle is monitoring and evaluation
2. In Malaysia's STI landscape, cross-cutting monitoring and evaluation specifically for STI is lacking.
3. There is a need for STI monitoring and evaluation at the national level similar to the monitoring role of EPU for economic planning and projects

NATIONAL STI LANDSCAPE

268 actors

- Too many entities
- Resources / Funds spread too thin
- Weak follow through

23	Ministries
157	Agencies under respective ministries
27	STI-related councils

- 1 international council
- 10 councils chaired by Prime Minister
- 16 national councils

16	Agencies under Prime Minister's Department
46	Active, STI-related national policies
20	Public universities
6	Intermediaries
14	State government & federal territories
5	Economic corridors

STATE STI LANDSCAPE

Formal dedicated platform between Federal & State Government on STI related matters is not institutionalised

NOTES

1. In terms of the STI landscape at the state level, out of 11 states in Peninsular Malaysia, 3 states do not have an Exco that looks into STI development.
2. As for **Sabah** there is a **Science Advisor to the Chief Minister.**
3. **Sarawak has a Minister of Education, Science and Technological Research**
4. There seems to be no formal platform for the Federal and State Governments to discuss STI related matters.
5. Effective delivery and coordination of STI governance at federal and state level require concerted cooperation
6. A formal structure with clearly delineated expectations, roles, and supporting network will benefit the development and implementation of STI policies in each state.

RECOMMENDATIONS

1. Strengthen Science Planning and Co-ordination through a dedicated body that also serves as the Secretariat of the National Science Council.

2. Establish formal STI platform between Federal and State Governments across Malaysia

NOTES

1. **Strengthen Science Planning and Co-ordination** through a dedicated body that also serves as the Secretariat of the National Science Council.

- The core business of this body would be to follow through decisions made by NSC

2. **Establish formal STI platform** between Federal and State Governments across Malaysia

In order to ensure that federal STI-related policies, /plans / strategies can cascade to the state levels and vice versa.

02

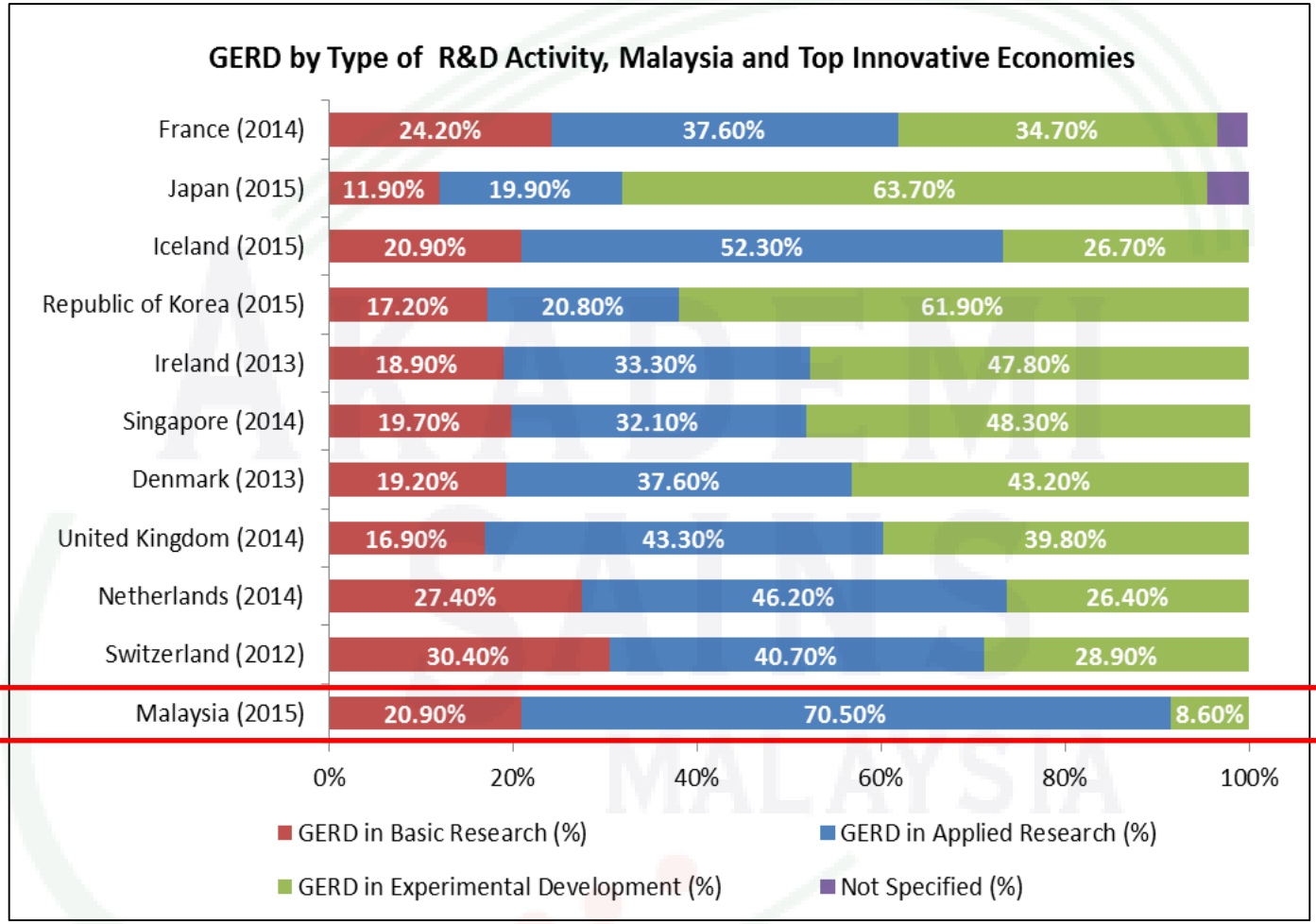
Research, Development & Commercialisation

NOTES

- Moving on to Chapter 2 of the Science Outlook 2017, we have Research, Development and Commercialization

HOW IMPACTFUL IS RDC TOWARDS SOCIO-ECONOMIC DEVELOPMENT?

Resource Distribution



NOTES

1. Two key aspects analysed are **research intensity** indicated through **Gross Expenditure on R&D (GERD)** and **Number of researchers (full-time equivalent)**.

2. Malaysia's percentage GERD/GDP was **1.3%** in 2015 and is ranked 29th globally.

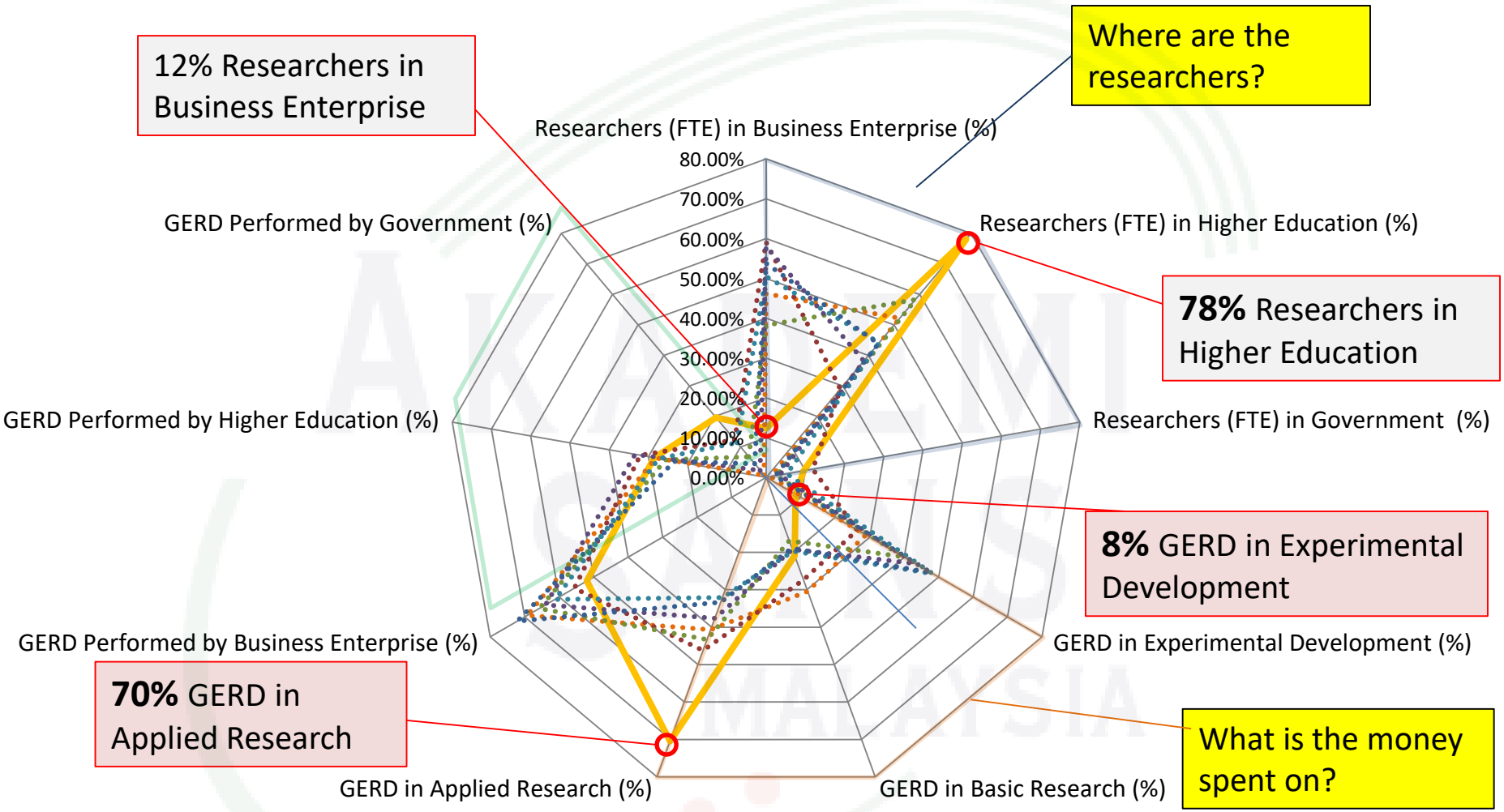
3. GERD can be analyzed by **type of research activities** such as basic research, applied research and experimental development or pre-commercialisation. For Malaysia, the GERD distribution is highly focused on applied research (70.50%), only **8.6% of the R&D expenditure was spent on experimental development**. This probably means most of the applied research in Malaysia remains on paper and is not taken up by industry to be translated translate into commercial-ready products and services.

4. Top innovative economies spend much more on experimental development or pre-commercialisation compared to Malaysia as shown in the chart

5. Considering that the experimental development or pre-commercialisation stage is the most expensive phase of the RDC&I value chain, more funds especially from industry and collaborative networks should be dedicated for this.

Note: Experimental development includes activities such as prototyping, pilot project and developing new process for scaling-up.

Malaysia's Gross Expenditure on R&D (GERD) and Researchers Comparison with Top Innovative Economies



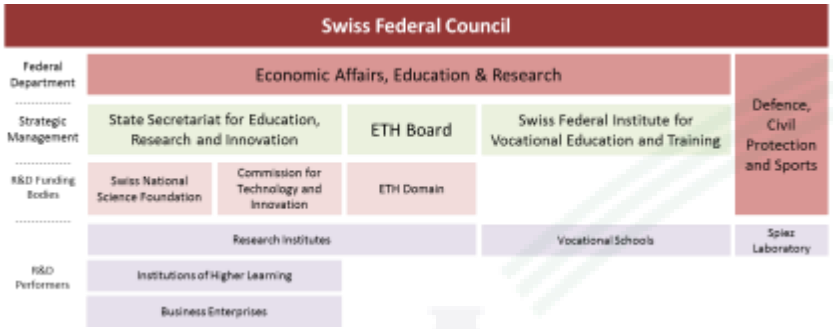
Malaysia (2015)
Switzerland (2012)
Netherlands (2015)
United Kingdom (2015)
Denmark (2015)
Singapore (2014)
Ireland (2015)

NOTES

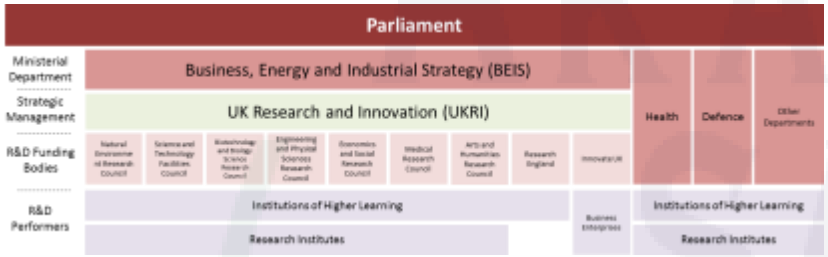
1. When illustrated in a combined chart, benchmarked against other countries, we realize Malaysia has a distinctly **different landscape** compared to top innovative economies.
2. Where are the researchers? **78%** of our researchers are in the Institution of Higher Learning (IHLS)
3. Where is the money spent on? **70%** is spent on applied research.
4. Malaysia invests a huge amount in applied research but its outcome did not seem to move on to the experimental development stage which is the critical precursor to commercialisation; unlike top performing economies that invest more in basic and experimental development research, rather than applied research.

4 Key Differences Between Innovative Economies and Malaysia

Swiss Education, Research and Innovation Ecosystem



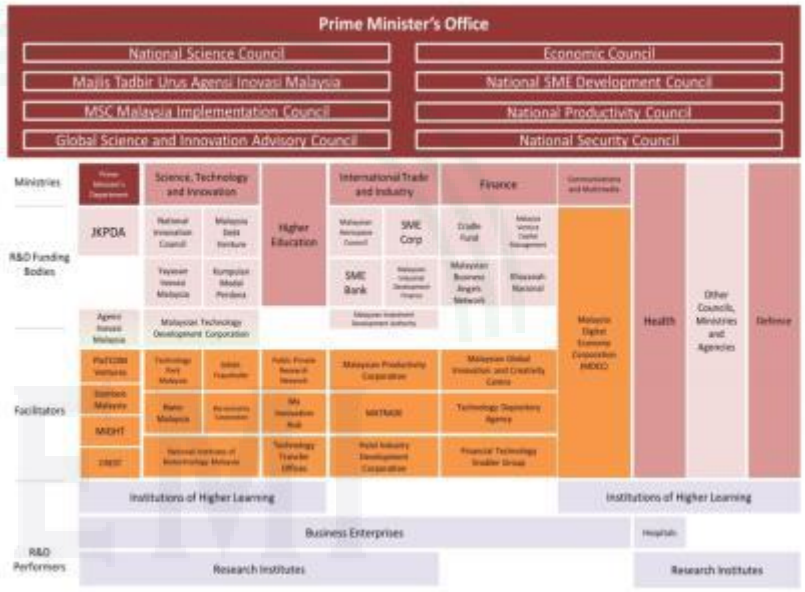
British Research and Innovation Ecosystem



Singaporean Research, Innovation and Enterprise Ecosystem

VS

Malaysian Research, Development and Commercialization Ecosystem



- Lean Ecosystem
- Direct linkage between research and industry
- An agency to manage research efforts
- Research Councils to streamline research

NOTES

1. In the Science Outlook 2017, we also attempted to illustrate the Malaysian RDC Ecosystem.
2. By comparing our ecosystem to Switzerland, United Kingdom and Singapore, we realize these developed economies have a **lean ecosystem** with less players compared to Malaysia. Secondly, **research and industry have direct linkage at the ministerial level** as research is under their respective Ministry of Trade and Industry.
3. They also have a **centralized agency** (State Secretariat for Education, Research and Innovation, UK Research and Innovation, A*STAR) to manage research.
4. Lastly, these developed economies have **Research Councils** with subject matter experts to streamline research.
5. This tie back to the earlier complex STI governance presented and the need to have a centralized coordinating body instead of multitude entities.

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RECOMMENDATIONS

1. Accelerate establishment Research Management Agency (RMA)

2. Innovation clusters

3. National RDC priority areas

4. Emphasis on Experimental Development

NOTES

1. Accelerate establishment Research Management Agency (RMA)

It is important to expedite the establishment of a Research Management Agency (RMA) to catalyse demand driven collaborative research with effective utilization of funds.

2. Innovation clusters

Development of regional innovation clusters by enhancing collaboration between industry and knowledge institutions as the case in Malaysia's E&E sector.

3. National RDC priority areas

Identify national RDC priority areas by aligning to Malaysia's research and economic strengths and needs.

4. Emphasis on Experimental Development

Increased funds for experimental development will encourage more collaboration between university and industry towards demand driven research.

03

STI Talent

NOTES

The next chapter is on Talent.

IS ASPIRATION AND ACTION WELL-ALIGNED?

Snapshots of Malaysia: 5th Pillar - Skills

Global Competitiveness Index (GCI) 2016 - 2017

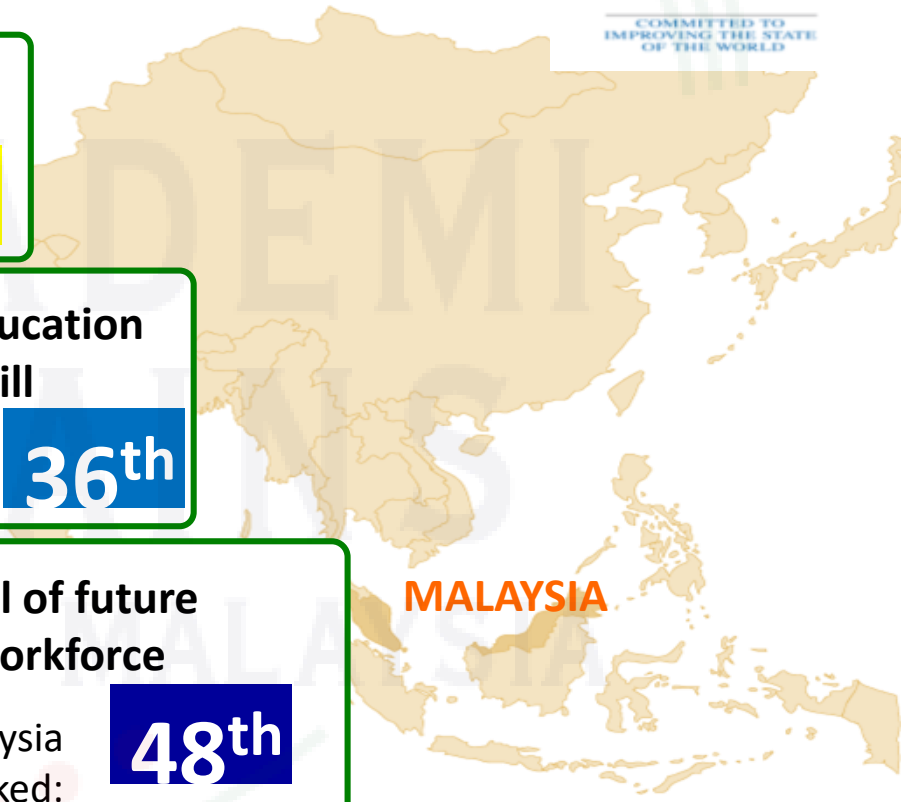
Malaysia ranked: **25th**

5th Pillar: Education and Skill

Malaysia ranked: **36th**

Skill of future workforce

Malaysia ranked: **48th**

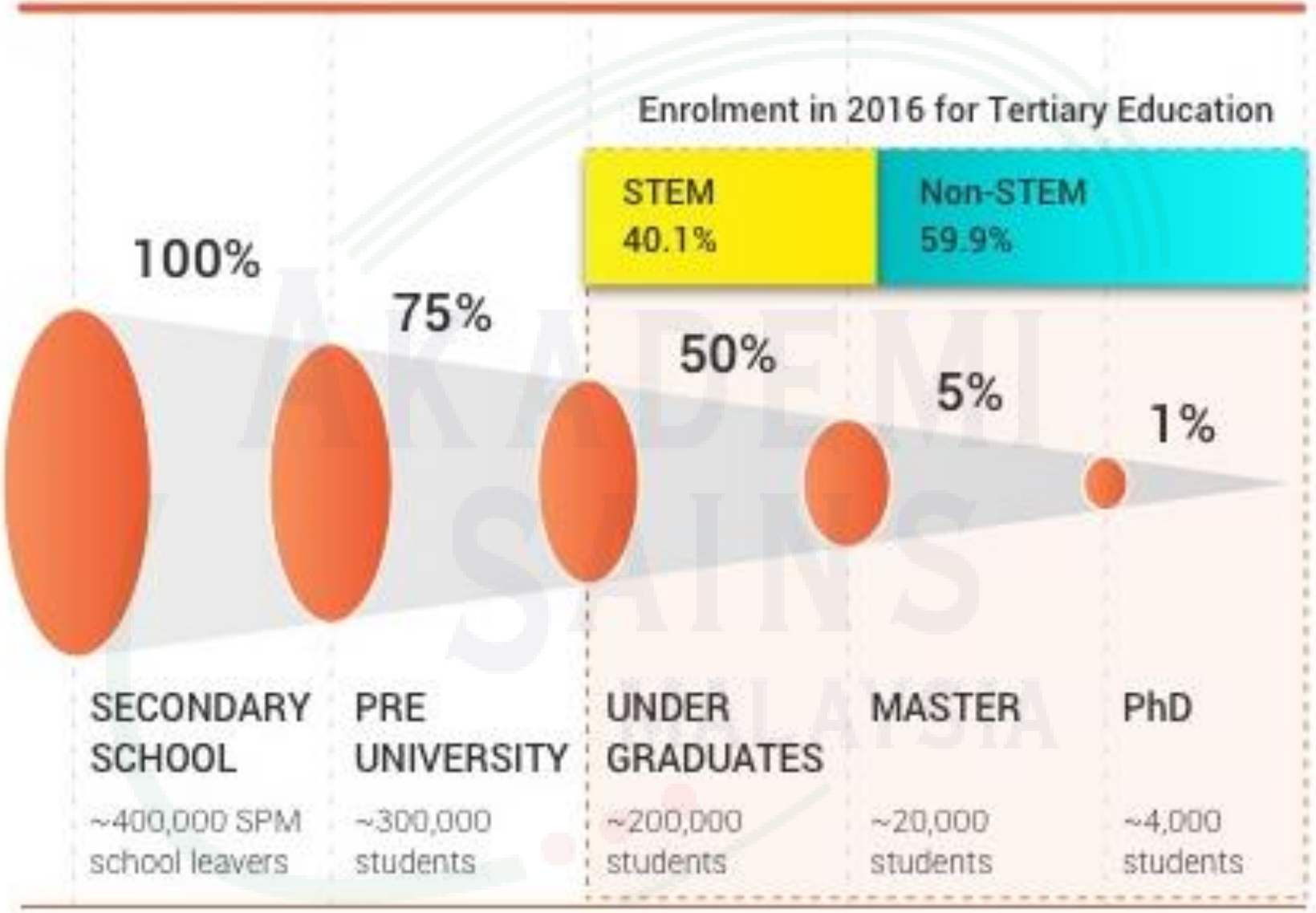


NOTES

1. Malaysia is ranked **36th** in the **Education and Skill pillar** of the Global Competitiveness Index (2010-2017) and **48th** in the **Skill of the future workforce.** The index measures an individual's ability to acquire, develop and deploy skills throughout their working life. Our ranking indicates that our talent is still unsatisfactory to keep the country on the trajectory for sustainable knowledge-based economy.

Note: (Global Competitiveness Index (GCI) 2016-2017: Malaysia's overall - **25th** out of 127 countries.)

Malaysia's Talent Pipeline in 2016



NOTES

Let's start with Malaysia's overall Talent supply pipeline.

1. On average we produce **400,000** SPM leavers anually. **50%** of these students enrol for tertiary education. Our analysis shows that for every **100** SPM school leavers, only 50 enter tertiary level education and out of this only 5 obtain a Master degree and **1** graduates with PhD.
2. It is also interesting to note that despite the 60:40 Science/Technical: Arts Policy is in place since 1967, we still have only approximately **40%** enrolment in total at all levels of tertiary education in STEM fields.

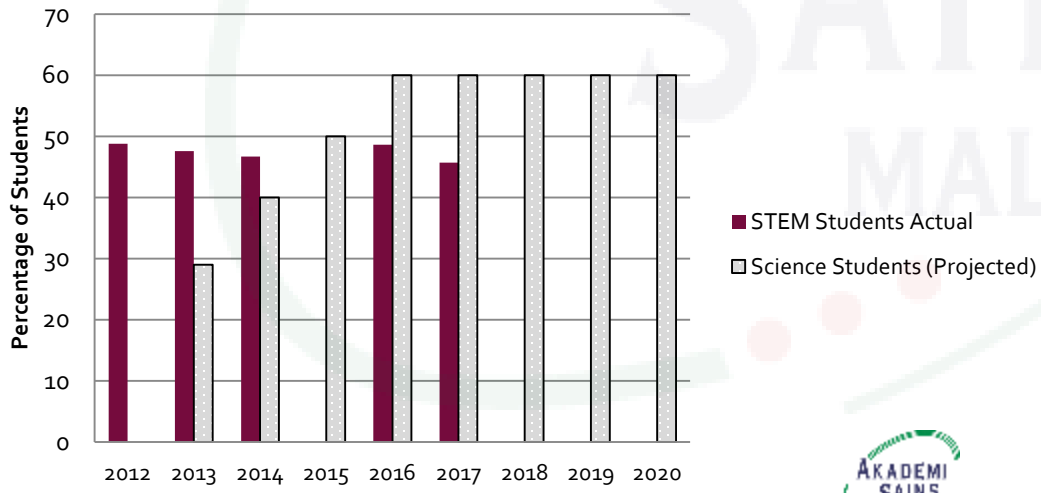
Decline in the number of students enrolled in Science and TVET streams over the years.

Enrolment of Students in Form 4 and Form 5 in Government Schools

	STEM %	NON-STEM %
TARGET	60.00	40.00
1986	31.00	69.00
1993	20.00	80.00
2001	29.00	71.00
2004	36.00	64.00
2011	44.00	56.00
2012	48.15	51.85
2013	46.96	53.04
2014	46.33	53.67
2016	47.82	52.18
2017	45.74	54.26

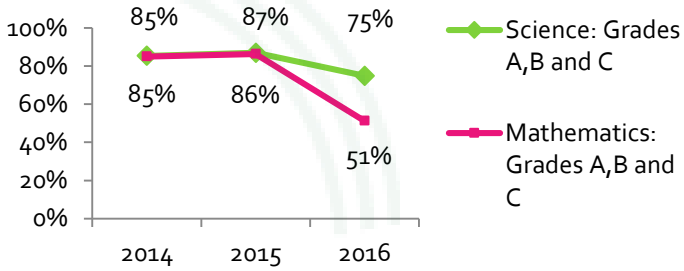
* Data for year 2015 is incomplete

Actual Percentage of Form 5 Students in Science and STEM Stream, and Projected percentage for Science Stream

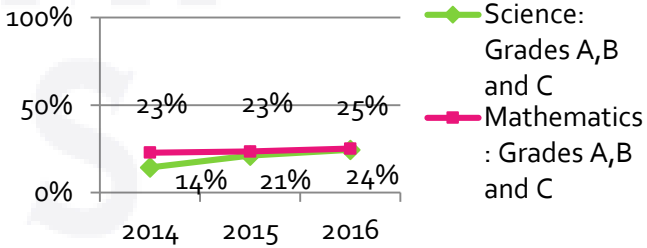


Performance of students

Percentage of students scoring Grade A,B or C in UPSR Science and Mathematics



Percentage of students scoring Grade A,B or C in PT3 Science and Mathematics



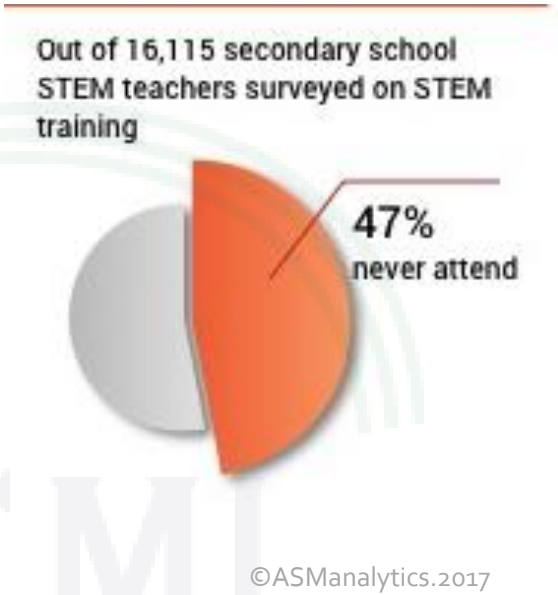
In 2016, students eligible for Science Stream in Form 4 were approximately 25%.

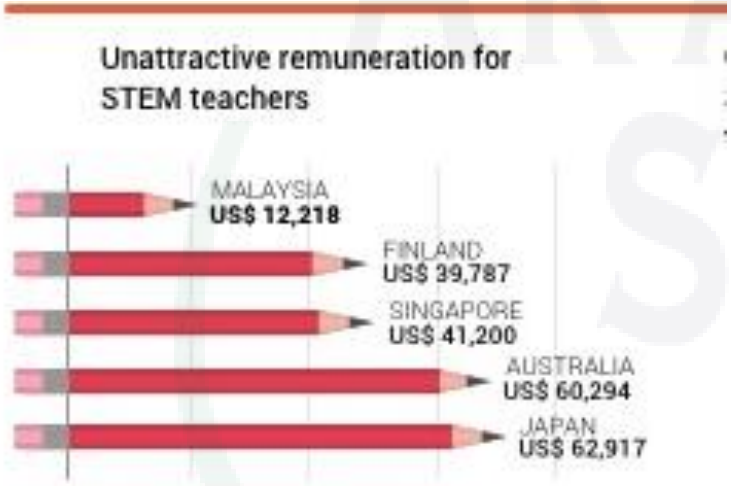
NOTES

1. Enrolment in Science and TVET streams at school level is on the decline. In 2016, only approximately 25% students were eligible to enrol in the Science Stream.
2. Total number of students scored either A, B or C in PT3 2016 - Science (25.1%) and Maths 24.3%)] (Source: MOE and MOHE statistics).
3. 2016 was the first year where 20% of the questions were set based on the higher order thinking skills (HOTS), which was incorporated in the syllabus in 2014.
4. One of the probable indications could be that the students are not prepared for HOTS-style evaluation and neither teachers for HOTS syllabus delivery. This has to do with teaching and learning of Science and Maths

STEM Challenges

Teachers	Students
Insufficient teaching materials	Limited and out- dated infrastructure
Inadequate time allocated for STEM lessons	Teaching of science is too theoretical
Students' interest	Lack of awareness on career pathway in STEM





Unattractive remuneration

- The median salary of fresh graduates in 2016 is RM 1501 – RM2000.
- Example: Science Officer (C41) earns RM 107/day while in the USA the basic daily wage of STEM worker with a Bachelor Degree is USD 39.28 per hour.

NOTES

1. ASM conducted a survey to get a snapshot of STEM education by the front liners. 16,115 secondary school STEM teachers responded to the online questionnaire. Our analysis indicated that **47% never attended STEM related training in the course of their career.**
2. Thus, how will Malaysia produce good quality STEM students if teachers are not equipped with adequate training?
3. Most of the STEM teachers agree on the importance of STEM and they acknowledge that jobs of the future will require basic understanding of Mathematics and Science.
4. However, there are challenges such as student interest, inadequate facilities /materials/resources and not enough teaching time.

RECOMMENDATIONS

1. Attracting and Retaining STEM Talent through Improved Remuneration and Continuous Career Development
2. Numerical and technical competent talent development
3. National STEM Talent and skill gap assessment

NOTES

1. **Attracting and Retaining STEM Talent through Improved remuneration and Continuous Career Development**

2. Engaging and attracting young people to first enrol in STEM-related degree programs and then to pursue careers in STEM remains a challenge. Therefore, revisiting of the entire education pathway to be in-line with current global demands, STEM pedagogy and curriculum is proposed. An improved remuneration scheme comparable to other nations and continuous career development is proposed to ensure sustainability and succession.

3. **Numerical and technical competent talent development**

4. Numeracy skills is the foundation of most STEM courses at tertiary level and it is predicted to come in handy in most future jobs. Therefore numerically competent talent development must be prioritised to develop technical competency.

5. **National STEM Talent and skill gap assessment**

6. Development of a biennially nationwide STEM talent and skills gap assessment is proposed to gauge and identify the mismatch of our STEM talent - if there is either an oversupply or an under-demand of for especially critical jobs.

04

STI Energising Industries

NOTES

1. The next chapter is on STI Energising Industries

ARE MALAYSIAN INDUSTRIES POISED TO BE INNOVATORS?

Innovation capacity is **NOT** realised

NOTES

1. Malaysia enjoys a reasonably competitive position in the overall global competitiveness whereby we are ranked 23rd out of 137 countries in the Global Competitiveness Index.
2. However, when it comes to specific innovation indices, Malaysia is lagging for example under the 10th pillar on Product Innovation for the Global Entrepreneurship Index 2018, Malaysia is ranked 130th out of 137. This shows that the role of industry is not effectively realised as alluded to in the previous chapters.
3. This shows that there is a need to elevate the innovation capacity of our industries, infrastructure, workforce competency as well as technology utilisation to be on par with global players.

Malaysia's Industry Landscape

98.5% (907,065) of Business Establishments are SME

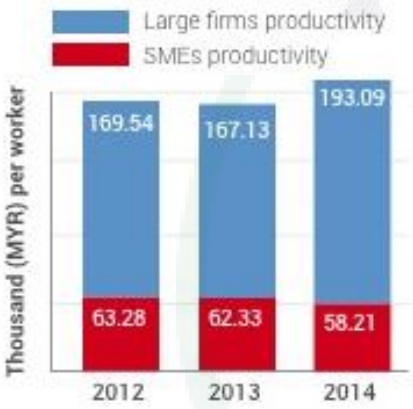
Performance of the SMEs	2016	Target 2020
Contribution to GDP	36.6%	41.0%
Exports	17.8%	25.0%

Many SMEs are merely ADAPTERS & IMITATOR.

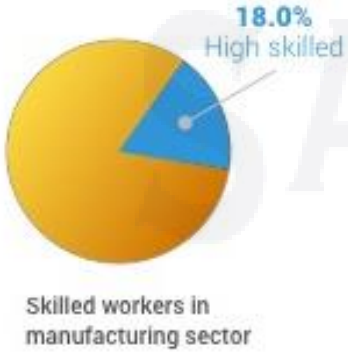
Only 6% of Malaysian companies are CREATORS, whilst majority are ADAPTERS.

** Source:*
1. Malaysian Technological Innovation Capability Study (MPC, 2012)
2. The Knowledge Content in Key Economic Sectors in Malaysia Study MyKE-III (ASM, 2017)

Productivity



High-skilled workforce

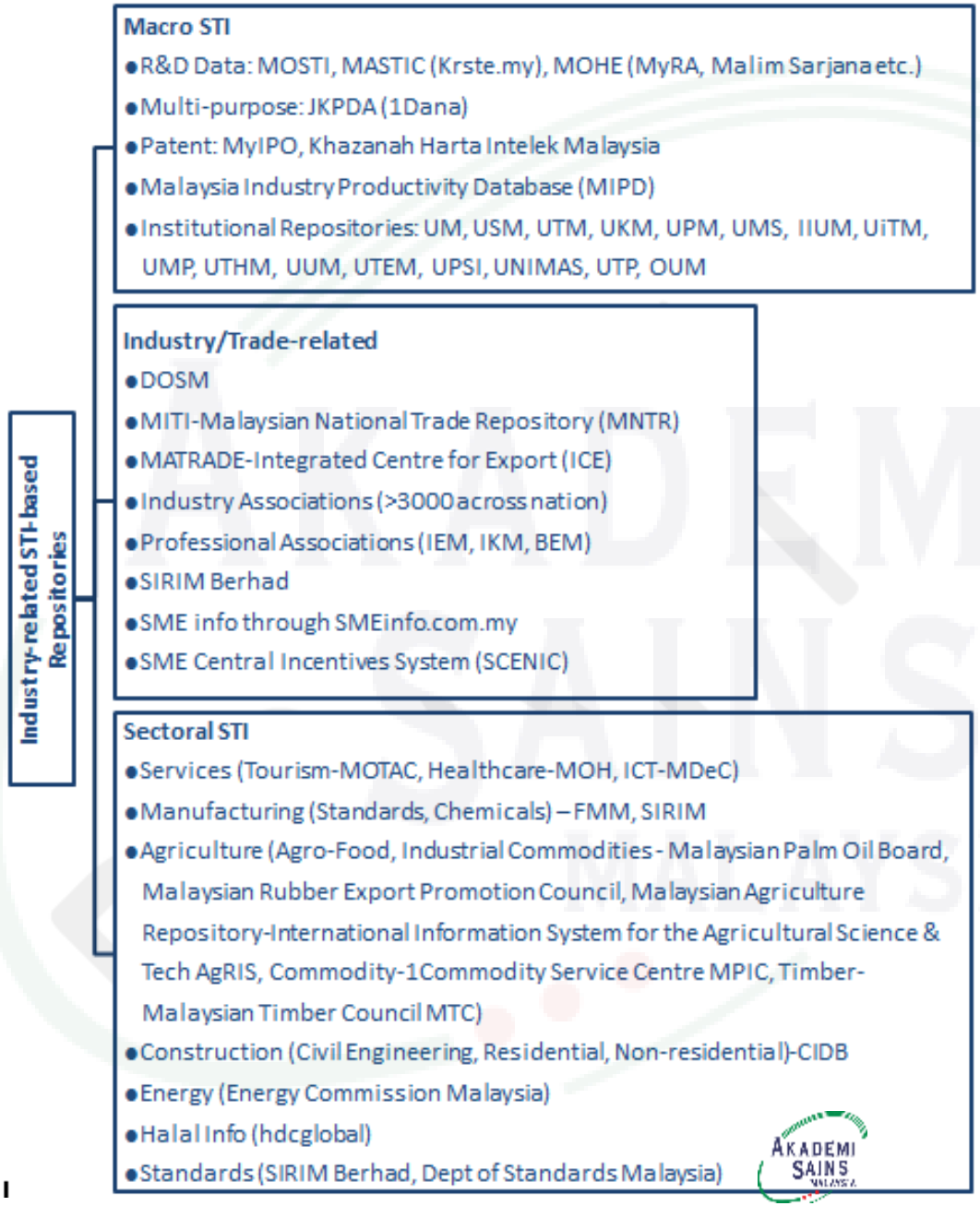


- Many initiatives are in place
- Innovation intermediaries are a good start but these entities are not industry led

NOTES

1. Malaysian industry landscape is built by almost **98.5%** small and medium enterprises. However, only **6%** are innovators (creators).
2. This corresponds with the data in chapter 2 that most of the high skilled, knowledge workers are not in business enterprises. For eample, only 18% of the workforce in the manufacturing sector are high skilled.
3. SME's also contribute less than **40%** to the nation's GDP and employ a **smaller fraction** of high-skilled workers.
4. Going by this trend we will be handicapped in adopting Industry 4.0 elements in our industries.
5. Innovation Intermediaries are important agents to boost innovation. So far in Malaysia there are at least 6 intermediaries but many of them are highly government orientated and not industry-led.

INDUSTRY RELATED STI-BASED REPOSITORIES



NOTES

1. There are many industry related STI-based repositories providing information relevant to industries in Malaysia. However, they are not integrated and consolidated whereby industry cannot access relevant information and data through a single repository.

2. This increases fragmented information dissemination and complicates access to relevant input that industries may require.

RECOMMENDATIONS

1. Establish Industry-led collaborative networks enhance demand driven research and private sector participation

2. Facilitate dissemination and monitoring of industry related information through a virtual centralised STI knowledge repository and data centre

NOTES

1. Establish industry-led collaborative networks to enhance demand driven research and private sector participation.
   i. The collaborative network will catalyse knowledge clusters, talent hub and disruptive innovation
   ii. The collaborative network is aligned to the recommendation in chapter 2 on developing innovation clusters.
2. In order to enhance the development of STI-based SMEs and innovative start-ups, it is essential to provide sufficient industry related STI resources. Therefore a virtual centralised knowledge repository and data centre to make the full range of STI-based resources as well as market intelligence information known to all, is pertinent to energise the industries.

05

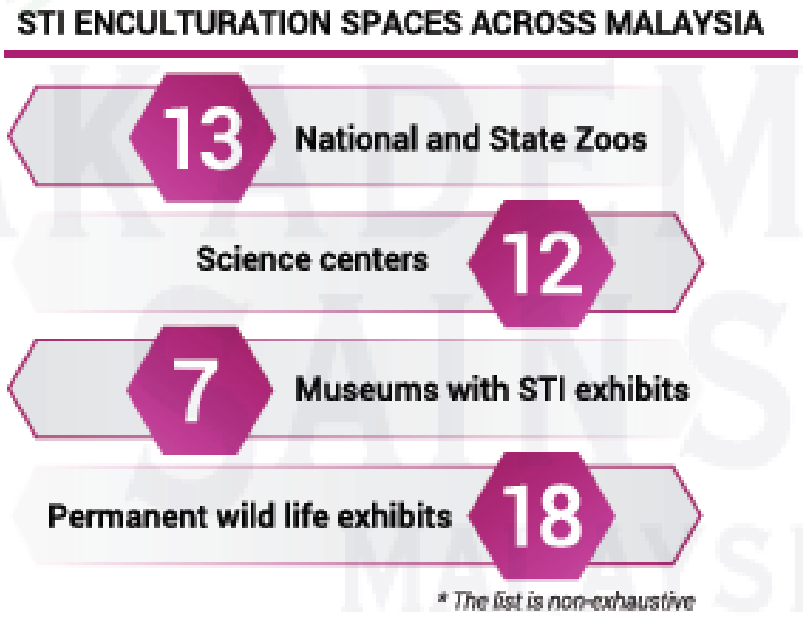
STI Enculturation

NOTES

- STI enculturation makes the chapter of this study

SCIENTIFICALLY ENCULTURED SOCIETY: WHERE ARE WE?

OVERALL, THERE ARE MANY STI ENCULTURATION SPACES AVAILABLE

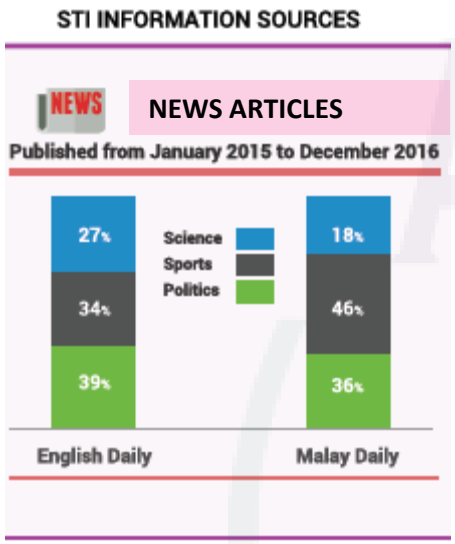


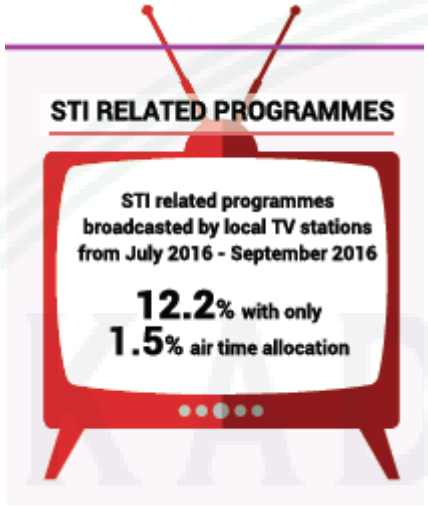
BUT THECONTENT CAN BE MADE MORE EXCITING AND CURRENT

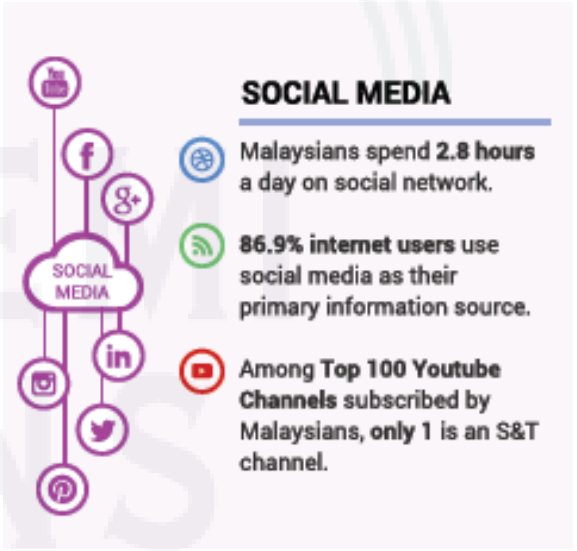
NOTES

1. Overall, there are many STI enculturation spaces available in Malaysia. However, many of them are underutilised as the content is not engaging, exciting or current.
2. To take Science and Technology to the masses, we are fortunate that there are many STI-spaces of interest such as **Zoos and Wild-life Exhibits, Science Centres** and **Museum with STI exhibits** across Malaysia.
3. The biggest challenge for all STI enculturation spaces is to have enjoyable and well-maintained displays to attract new and repeat visitors. This requires periodical revamps and the funds to do so. Setting up public-private partnerships would be a way for science centres to leverage available resources to keep their exhibits fresh and attract more visitors to their venue.
4. As such, we should mobilise all STI enculturation spaces effectively.

MALAYSIANS ENGAGE IN MANY PLATFORMS WHERE STI RESOURCES ARE AVAILABLE







HOWEVER VIEWERSHIP/READERSHIP ON STI RELATED MATERIALS IS NOT ENCOURAGING

NOTES

1. There are three major mediums to reach out to public:
2. News articles through printed media – not encouraging because only 18% STI content in Malays Daily and 27% in English Daily
3. STI related programmes in local TV stations – only 12.2% are STI related and the airtime is limited i.e. 1.5% airtime allocation
4. Social media – average Malaysian spends 2.8 hours per day on social media, 86.9 % internet users, use internet as their primary information source but sadly among top 100 Youtube channels subscribed by Malaysians, only 1 is an S7T channel.
5. Therefore we need to increase the quality and content of STI that is entertaining and educational.
6. More emphasis should be placed on enhancing STI content in social media as this is the primary information source for Malaysians today.

Note:

1. YouTube data analysis: *Based on real-time data as of 30 June 2017*
2. *Newspaper and television analysis: Duration: July 2016-September 2016*

STI ENCULTURATION PROCESS

Build awareness through dissemination of simple information attracts interest

With interest, an individual delves into learning STI eventually building their literacy

Aware and STI literate individuals engage in casual discussion on STI matters, promoting further the habits of the mind for STI enculturation.

NOTES

1. STI enculturation occurs through a variety of formal and informal methods throughout a person's lifetime.
2. Aware – An individual first needs to become **Aware** through the dissemination of simple and understandable information to attracts his/her interest.
3. Literate – With awareness, an individual is interested to learn more about STI and delve into learning STI, building STI **literacy**. Learning STI must be through both theoretical and hands-on in order to strengthen a person's understanding of STI. The media, either mainstream or alternative, play a tremendous role in encouraging or discouraging science literacy.
4. Engaged – Aware and STI literate individuals engage in casual discussions with peers and family on STI matters, promoting further habits of the mind for STI enculturation.
5. Although there is a process in place, the evolution of the STI Enculturation of Malaysians has a long way to go.

RECOMMENDATIONS

1. Encourage Public-Private Partnerships to Update and Upgrade STI Enculturation Spaces

2. Virtual Science Media Centre to Strengthen STI Content in Various Media Platforms

3. Prioritise Development of STI-based Creative Content

NOTES

1. Public-Private partnership must be encouraged to update and upgrade STI enculturation spaces to attract more visitors. STI places should also leverage on local scientists, scientific associations and social innovators such as content providers giving input on STI.
2. A virtual science media centre that focuses on communicating science in layman terms in Bahasa Malaysia and English should be developed.
3. The trend shows Malaysians are inclined towards entertainment-based programmes hence creative edutainment-based STI-content will likely increase interest in STI.

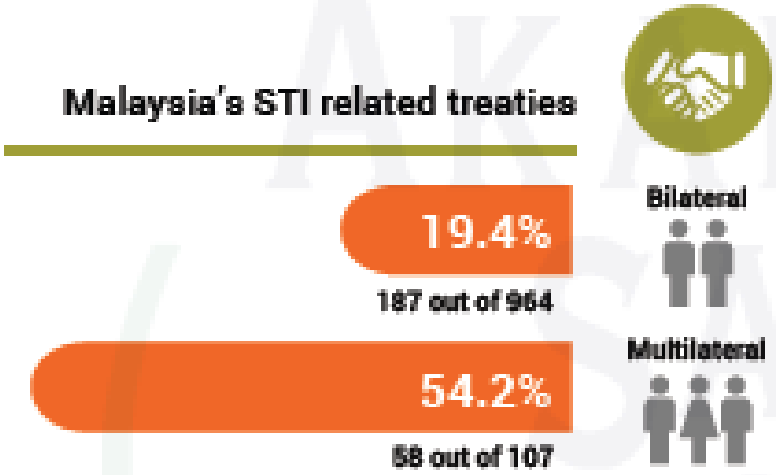
06

STI International Alliances

NOTES

1. The final chapter for this study is on Strategic STI International Alliances.

HOW DO INTERNATIONAL STI ALLIANCES (SCIENCE DIPLOMACY) STIR MALAYSIA'S COMPETITIVENESS?



- Agreements need to translate to benefits related to STI development for Malaysia
- Attract strategic partners
- Effective positioning of Malaysia's STI competencies & capability

NOTES

1. Through stocktaking from this edition we identified **187** (out of **964**) bilateral and **58** (out of **107**) multilateral **STI**-related agreements.
2. Most agreements were signed to promote cooperation in **scientific research and development and safeguarding our national interest**.
3. **No** new STI-related agreements were signed over the last two years (2016-2017) although 15 new bilateral agreements were signed during the period.
4. However, just as the previous edition, we found **no documented evidences** on how these agreements translate to benefits related to STI development for Malaysia.
5. Malaysia however, remains committed to collaborate, co-create and foster strategic S&T partnerships for socio-economic growth. There is a steady increase in Memoranda of Understandings (MoUs), agreements and treaties with high-potential partner countries signed through individual Ministries, agencies and other institutions.

HOW DO INTERNATIONAL STI ALLIANCES (SCIENCE DIPLOMACY) STIR MALAYSIA'S COMPETITIVENESS?

FUNDING

Newton Fund

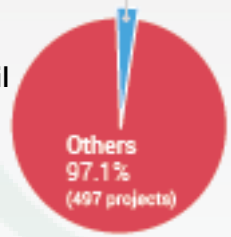
Access to £735 million in research grants through the Newton Ungku Omar Fund

Secure: GBP12.2 mil

APEC

Malaysia 2.9% (15 projects)

Member countries STI-related projects funded from 2006- 2016



KNOWLEDGE TRANSFER

Benefitted more than 32,000 participants from 143 countries since 1980

JICA

Project for Development of Low Carbon Society Scenarios for Asian Region
- 135 Joint publications
- 100 workshops, seminars and symposiums were held

EXPERT ENGAGEMENT

Involvement and Recognition of Researchers in Malaysia's Research Universities for year 2016

NOTES

1. Individual impacts from these agreements are measured through knowledge and technology transfers and amount of R&D fund secured.
2. For instances, in **2016 alone,** Malaysian Research Universities (MRUs) managed to secure funding for **127** Research and Development Projects which amounted to **RM21.7 Million** in research funds.
3. Out of GBP 735 million, that is offered under UK's **Newton Fund,** Malaysia through the Newton-Ungku Omar Fund has secured GBP 12.1 million from 2014 until April 2017.

RECOMMENDATIONS

1. Leadership in positioning Malaysia's strategic STI international alliances
2. Enhance Science Attaché roles in Malaysian embassies
3. Strengthen Linkages between MOFA and Malaysian Scientific Community
4. Leverage Malaysia's trade platforms to facilitate market intelligence in STI based industries

NOTES

1. **To further strengthen the STI Strategic International Alliances,**
2. **The various international platforms where Malaysia is a member must be fully utilized by our STI key opinion leaders to** add to global competitiveness and **increase the visibility of Malaysia's STI capacity and capabilities.**
3. **The roles of the science attache in Malaysian embassies should be enhanced** to include strategising, monitoring and evaluating STI-related issues pertinent to the nations' interest.
4. **The linkages between the Ministry of Foreign Affairs (MOFA) and Malaysian scientific community should be strengthen to include** scientific evidences as an avenue for diplomatic decision makings.
5. Malaysia's should also leverage on the trade platforms globally for gathering STI-related intelligence to develop the right STI-related strategies for the Nation.

Converging Towards Progressive Malaysia 2050

Positioning STI:

- STI inputs and interventions are often seen as a prelude to policy development or a support for decision making but not part of the whole value chain of policy implementation
- STI must converge with economy and finance, geopolitics, society & culture to fuel a robust ideation process for socio-economic transformation
- Calls for transformative thinking, growth mindset,integrated planning & inclusive implementation

1. All the 6 chapters show that we need to work together, connected the dots, be agile and responsive to ensure STI development along the global competitiveness trajectory and converge towards Progressive Malaysia 2050.