Innovation and Commercialization: Malaysia Perspective

Purpose: Information
Submitted by: Malaysia
GOVERNMENT

ACADEMIA

INDUSTRY

COMMUNITY

14th APEC High Level Policy Dialogue on Science and Technology in Higher Education

“Innovation and Commercialisation: Malaysia Perspective”

13th to 14th August 2015

Philippine International Convention Centre

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Industry Relation Division
Higher Education Department
Ministry of Higher Education Malaysia

Wave 0 2013
Build momentum and lay foundations

Wave 1 2015
Accelerate system improvement

Wave 2 2020
Move towards excellence with increased operational flexibility

Wave 3 2025
Outline

- Stages of economy in Asia
- How can Higher education help move the innovation economy agenda of the country?
- Are we there yet?
- Innovation ecosystem
- R&D towards commercialization: Paradigm shift
Rubber, palm oil etc Multinationals at free trade zones Knowledge-based

From Resource-driven to Innovation-driven

Role and expectations of Universities in the globalised economy

Empower values-driven talents to be action-oriented leaders who deliver solutions that ensure sustainability of change

Engine of growth for the nation via commercialization of R&D products and development of K-based enterprises

Provide solutions through real-world experiences

Translate knowledge (Value Creation of knowledge through Innovation & Entrepreneurship)

Generate Knowledge

Disseminate Knowledge

Train innovators of tomorrow

• Curriculum that creates entrepreneurs to participate in Startups
• Graduates that job creators rather than job seekers
• Graduates that cares about humanity
We are expected to go through **R −D −C − E− Community engagement** (to help humanity and create wealth for the country) as **SOLUTION PROVIDERS**

**Brains to Business to Humanity**

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**Innovation drives Economic Success**

The assets that drive economic success:
- Patents (indicate that research findings are industrially applicable)
- Advanced research
- Venture capital
- University graduates and Ph.D.s
- Air, Rail and Sea hubs

*Source: Bruce Katz, TIME Magazine, 21st Oct 2010*
**How serious is a country about its R&D and the Innovation economy?**

- Political Will
- The need to develop innovative talents
- Allocation of GDP for Research
- Allocation of Research grants

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**Political Will**

- **9th Malaysia Plan:** Government committed RM 1.363 billion
  - FRGS: RM285 million
  - Implementing RUs: RM1.06 billion to
  - Establish and maintain HiCoEs: RM18 million

- **10th Malaysia plan:** Secured RM 2.388 billion
  - Implement FRGS: RM1.539 billion
  - RUs: RM800 million
  - HiCoEs: RM49.3 million

Malaysia has the political will to ensure that R&D is the national agenda to drive the K-economy of the country.

Ranked 35th out of 60 countries for having 1.07% gross expenditure on R&D.

Technofund and Innovation funds are also allocated to promote commercialization of research products.
Moving Towards Successful New Economy: R&D Challenge

PHASE 1
Making scientific discoveries

Phase 1: Consolidating Research
Research discoveries, acquisition of technologies

PHASE 2
Develop prototype

Phase 2: Consolidating Development
Design, engineering and technology integration

PHASE 3
Commercialize

Phase 3: Consolidating Commercialization
Patent, Marketing, Entrepreneurship and licensing

PHASE 4
K-enterprise

Phase 4: Consolidating Knowledge-based enterprise (Research Park)
Spin off companies/JV companies

Should see a smooth and continuous flow of R-D-C-E

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Reality check: Status of R&D in Malaysia

PHASE 1
Making scientific discoveries

Phase 1: Consolidating Research

PHASE 2
Develop prototype

Phase 2: Consolidating Development

PHASE 3
Commercialize

Phase 3: Consolidating Commercialization/Innovation/Technology licensing
Commercial arm of the University
✓ Entrepreneurship
✓ Spin-off companies
✓ JV Companies
✓ Licensing

WHY are we not there yet?

Phase 4: Enterprises

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Commercialization of research products

Commercialization of R&D products is not a simple process

Latest figures showed that among Malaysian Public Universities, commercialization of local R&D products at 5.1% in 6th and 7th Malaysia Plan (MP), 3.4% in 8th MP. Done mainly through consultation, licensing and entrepreneurship.

It is linked with the innovation ecosystem of the country.

Why are we not there yet?

Quality of Innovative Human Resource

- Curriculum lacks elements of creativity & innovation
- Limited pioneer mindset capability

Supply of Innovative Human Resource

- Need 70 RSE per 10,000 workforce to be a developed nation.
- Current status: 57 RSE per 10,000 workforce
- Insufficient number of postgraduates
- Brain drain due to weak strategies to retain talent

Moving idea to The-Market-Place

- Weak internal ecosystem for innovation
- Low number of IPs and commercialization efforts
- Insufficient pre-commercialization grants
- Limited entrepreneurial skills and business know-how
- Limited communication between academia and industry
- Absence of full-fledged incubator facilities
Why are we not there yet?

**REASONS**

- Poor academia-industry relationship and hence companies do not deal very much with universities / Our dateline for deliverables are elastic.
- MNCs do little R&D with universities here since they are very dependent on their mother country. Perception of industry to the universities needs to change.
- Universities are not collaborating with the industry fast enough

**Progress in IP filed and attained is low.**

- SMEs lack the resources and rarely involve itself in R&D
- Academic patents are early stage technological developments which is usually characterized by market uncertainty
- Majority of IP filed in Malaysia is owned by foreign multinationals
- Industries want incremental improvements and university is providing Blue sky research findings and discoveries. (MISMATCH)
- Progress in IP filed and attained is low.
- Weak academia-industry relationship since commercial arm and TLO are run by academics
The Universitas 21 report provides an assessment of Higher Education in 50 countries across four dimensions

**CURRENT STATE OF HIGHER EDUCATION**

**Rank out of 50 countries**

<table>
<thead>
<tr>
<th>Malaysia</th>
<th>12</th>
<th>26</th>
<th>35</th>
<th>44</th>
<th>OVERALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>9</td>
<td>11</td>
<td>5</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Thailand</td>
<td>47</td>
<td>30</td>
<td>30</td>
<td>47</td>
<td>42</td>
</tr>
<tr>
<td>Indonesia</td>
<td>50</td>
<td>37</td>
<td>25</td>
<td>50</td>
<td>48</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>19</td>
<td>4</td>
<td>7</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>South Korea</td>
<td>18</td>
<td>39</td>
<td>32</td>
<td>18</td>
<td>21</td>
</tr>
</tbody>
</table>

**Asian Neighbours**

| USA       | 4  | 3  | 15 | 1  | 1       |
| Global Benchmarks | 21 | 16 | 3  | 2  | 8       |
| Australia | 16 | 8  | 8  | 6  | 9       |

**SOURCE:** Annual report by Universitas 21, a global network of research universities for the 21st century with 26 members that enroll over 1.3 million students and employ over 220,000 staff and faculty. The U21 Index compares national Higher Education systems for 50 countries.

**Ministry Of Higher Education**

**Addressing the gaps: the need for paradigm shifts**
Create the Right Ecosystem for an Innovative Society

Each component must move in harmony to complement and synergize the efforts of the others.

10 Shifts
Inovation Ecosystem

1. Lingkaran Empat Pihak (Quadruple Helix)
2. Kerajaan (Government)
3. Universiti (Universities)
4. Industri (Industry)
5. Komuniti (Community)
6. PPRN (Public Private Research Network)
7. Establishing Support Systems for the Commercialisation of Ideas
   - ITMA, MyInnovationHub, Steinbeis Transfer Center
8. CREST (Collaborative Research in Engineering Science and Technology)
Challenge to Enhance Commercialization: Need for Paradigm Shift

Commercialization is the ability to provide solution to a need that can generate income.

The solution is called an invention. Only when it has been commercialised is it called an innovation.

How we provide the solution can be seen in 2 forms:
• **University-driven** (providing solution to either society or industry by researchers; initiated by the researcher), create IPRS, spin-off companies, talents for nation building, competitive edge in K economy
• **Demand –driven** (providing solution to industries: initiated by industries)

Both ways are known as **commercialization of ideas** or solution providers.

Commercialisation of Ideas (Solution Providers)
Malaysia needs to transform from a traditional, government-led, commodities-driven economy into a knowledge-centric economy. Innovation ecosystems are essential to such knowledge-based growth.

**PUBLIC-PRIVATE RESEARCH NETWORK (PPRN)**

Public-Private Research Network (PPRN) is a new initiative by Ministry of Higher Education (MOHE) as one of the strategies to increase productivity and strengthen Malaysian economic development through innovation and commercialization programs.
Public-Private Research Network (PPRN)

Focus on demand driven research, via PPRN to provide solutions to SMEs

This is done to facilitate meeting with industries by design and no longer by chance.

The collaboration will move the companies up the value chain and enhance the bringing of solution to the market place.

Public-Private Research Network (PPRN) - Service/Solution Providers

- PPRN is a quick win platform to drive the A-I collaboration through knowledge and technology transfer program.
- The problem must be driven by industry or market and using the top down concept where the Universities or Research Institute must bid for the identified project.
- The funding will come from the matching grant from the Industry/Company and the Government Agencies.
- The program will increase the "Commercialisation of Ideas" with the collaboration between Academia and Industry.
- 9 projects took off in Jun 2014 worth RM216k. 100 more worth RM3m took off in November. 1000 Projects in 2015.
### Return on Research Investment (2007-2014)

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
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<tbody>
<tr>
<td>Grant spent / patent</td>
<td>RM704K</td>
</tr>
<tr>
<td>Grant spent / (patent &amp; IP)</td>
<td>RM408K</td>
</tr>
<tr>
<td>Ratio commercialized product (306) / patent (7,234)</td>
<td>1:23 (4.2%)</td>
</tr>
<tr>
<td>Cost per commercialized product</td>
<td>RM17m</td>
</tr>
<tr>
<td>Grant spent / publication</td>
<td>RM46k</td>
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<tr>
<td>Total RU funding</td>
<td>RM3.54 billion (2007-2014)</td>
</tr>
<tr>
<td>Total RU *revenue</td>
<td>RM5.33 billion (2007-2014)</td>
</tr>
<tr>
<td>Total Revenue of 20 IPTAs</td>
<td>RM6.56 billion (2007-2014)</td>
</tr>
<tr>
<td>NRU = RM1.23B</td>
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</table>

**Notes:**
- Income generated including courses, training, services, consultancies, PG students registration fees, gifts and endowment

### Commercialization (2007-2014)

**Total IPs:** 7,234 for 20 HLI's

**4.2% commercialization success rate**

**Commercialize project by 20 HLI’s for RMK 9 and RMK 10:** 306 by the definition of -

- Total of commercialize new product (produce income)
- Total licensed knowledge technology (technology know-how)

**Low ROI**
Talking about ROI

- In USA, commercialization of R&D provided a low ROI. Invested USD 147 billion in research with USD 90 billion going to the universities but generated around 5-10% return on investment.

- Problem is that we are too focused on numbers and not really on the impact of the patent to the marketplace. There is a need to come out with new measurements and indicators.

- A better metrics on technology transfer is needed.

- We need to measure the bigger picture of the technology transferred eg Korean model.
Way forward

Government has to look on commercialization Ideas rather than focusing on commercialization of R&D products. Not all IPs can be commercialized due to mismatch with industry capability.

Most training, consultancy and research contracts have been executed together with the help of industry to increase the value chain of the sector. There is a need to evaluate the impact to the sector.

There is a need to look and evaluate the bigger picture of the technology transferred and not just concentrate on the number counts.
10 LONJAKAN
Talent Excellence

1 2 3 4 5 6 7 8 9 10

Empat Laluan Kerjaya
(Four Career Path)

Pendidik
(Educators)

Penyelidik
(Researchers)

Pemimpin Institusi
(Leaders)

Pengamal Profesional
(Practitioners)

Program Fakulti CEO
**MODE OF ENGAGEMENT**

<table>
<thead>
<tr>
<th>MODE 1</th>
<th>MODE 2</th>
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<tbody>
<tr>
<td>• The CEO will Co-teaching with a Professor on a particular subject at one selected Host University.</td>
<td>• The CEO will conduct Keynote Address/Public Lecture/Motivational Talk/Seminar/Advisory Panel etc. at Host and several Affiliate University</td>
</tr>
<tr>
<td>• Guest Speaker Invitation by MOHE (Minister):</td>
<td>• Guest Speaker Invitation by MOHE (Minister):</td>
</tr>
<tr>
<td>- Dr. Richard Parker (Group Director of Research &amp; Technology) Rolls Royce) – (UPM)</td>
<td>- Dato Yasmin Mahmood (CEO MDEC) – (UTM)</td>
</tr>
<tr>
<td>- Dato Yasmin Mahmood (CEO MDEC) – (UTM)</td>
<td>- Alois Hofbauer, Nestle (Malaysia) Berhad Managing Director (UIAM)</td>
</tr>
</tbody>
</table>

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**CEOs Matching**

- Tan Sri (Dr) Tony Fernandes (Group CEO, Air Asia Berhad)
- Tan Sri Johan Jaafar (Independent Non-Executive Chairman of Media Prima)
- Tan Sri Dato’ Azman bin Haji Mokhtar (Managing Director, Khaazanah National Berhad)
- Datuk Wei Chuan Beng (President of Redtone International Berhad)
- YM Tengku Dato’ Zaiful Aizani (Group CEO of CIMB Malaysia)

HOST UNIVERSITY 2015-2016

- UPM
- UTM
- UTHM
- RMG
- MDEC
- BNM
- APU
- IUKM
ACADEMIA– INDUSTRY COLLABORATION

- Structured Internship
- Practical Training
- Adjunct Lecturers
- Industry Centre Of Excellence (ICOE) Program
- Ind-E-Zone
- Industry University-CSR Program
- Scholarship Award
- Professional Exam Program
- Bridging the Gap Program
- Entrepreneurship Program
- Talks, Coaching, Mentoring

Research & Development

- Research Contract
- Collaborative Research Agreement
- Clinical Trial Agreement
- Utilizing Lab Facilities
- Research Endowment
- University/Industry Research Centre
- Post Graduate Program (Masters, PhD, Eng. Doc)
- Industry Sabbatical

Commercialization

- Spin Off/Startup Companies
- IP/Technology Licensing
- Incubation spaces at Science/Technology Park
- Co-development of Universities Land Banks
- Academic Entrepreneurship Program

Graduate Employability

- PPRN Public Private Research Network
- Solution Provider to Industry
- Industry-Led Innovation Competition

Innovation

- University as Expert Service Provider
- Continuing Professional Development (CPD) Training
- Short Courses

Consultancy

- Energyzing
- Tech. Transfer Office
- AKEPT Training
- Professional Certification
- Innovation and Technology Managers Association

The Quadruple Helix Model
A-I-C-G Framework

Component 1:
- 1 Graduate 1 Industry/company Academic Industry Council
- Talent Matrix
- Pre-symbiosis
- Cross Fertilization A-I Program
- Recognition A-I Engagement
- IND-E-ZONE

Component 2:
- Public Private Research Network
- MyBrain Malaysia
- Extensive Networking/Matching Event

Component 3:
- Energyzing
- Tech. Transfer Office
- AKEPT Training
- Professional Certification
- Innovation and Technology Managers Association

Component 4:
- Strengthening Academia–Community Ecosystem
- Science/Technology Park
- ICOE
- CSR with Academia
- NBOS4

NEW ACADEMIA–INDUSTRY NETWORK
(BLUE OCEAN STRATEGY)