

**Professional Development and Engagement on Governance, Regulatory and Policy Support for Knowledge Exchange and Technology Transfer in Malaysia**

## Review of Issues and Gaps

### 1. Background

ALP Synergy Ltd has been commissioned to help Malaysian stakeholders identify pressing barriers and gaps in resolving the key challenges of (1) Governance and Institutional Issues in Managing and Delivering Technology Transfer Linked to the Wider Regulatory Environment and (2) Policy Support for Technology Transfer.

This work is a project of the “Professional Development and Engagement” programme, under the Newton-Ungku Omar Fund partnership. The programme is funded by the UK Department of Business, Energy and Industrial Strategy (BEIS) and the Malaysian Industry-Government Group for High Technology (MIGHT), and delivered by the British Council and MIGHT. The Innovation and Technology Managers Association Malaysia (ITMA) assisted in providing local context.

The following four sub-topics were identified from the Higher Education Partnerships Programme Scoping Report on Technology Transfer in Malaysia to support the exploration of the key challenges:

- Topic 1: Fragmented technology transfer landscape in Malaysia.
- Topic 2: Technology transfer policy and legal framework for biology, medical, life sciences and engineering fields (compared to ICT).
- Topic 3: Promoting understanding of the technology transfer landscape for policy makers, universities’ senior management and legal advisors.
- Topic 4: Dedicated technology transfer personnel at universities.

A fifth topic had been proposed; ‘Researchers are not allowed to be involved in spin-offs due to conflicts of interest with their universities’ and was initially explored. This topic has now been addressed by a Task Force under the Public Universities Legal Advisory Council (MPUU). MPUU came out with a Legal Note detailing the legal explanation on conflict of interest in universities and recommendations to address this matter. In addition, the Ministry of Education through its task force, is in the midst

of preparing the guidelines for Consultation, Licencing and Commercialisation of University Intellectual Property.

This document summarises the initial key issues under the 4 topics identified in our analysis of the Malaysian reports supplied by ITMA and the British Council Project Team, and in scoping interviews with key stakeholders identified. The project team, reports and stakeholders are listed in Appendix A. We would like to express our gratitude to all of those who contributed.

This document is not a comprehensive research report on innovation in Malaysia. It is intended to form the starting point for workshop discussions in January 2020, where key stakeholders will be invited to explore and debate the issues further, identify other key drivers that need to be considered, and propose some initial solutions and actions to be considered by a potential multi-stakeholder forum. The initial analyses of this project are very much a starting point for the multi-stakeholder forum to consider following the workshop, and to explore which areas require further detailed research. Key issues and key solutions have been highlighted from the project team's viewpoint, but it is for the Malaysian stakeholders to review and decide on priorities and actions.

The importance of this to the future of Malaysia is clear. The research base advancement of science and technology is vital to develop new innovative products, services and businesses. It will make a major contribution to the progressive agenda of Prime Minister Tun Mahathir Mohamed, who has highlighted that the nation needs this to be able to move ahead.

## **2. Analysis by Topic**

### **2.1 Topic 1. Coordinated technology transfer landscape in Malaysia.**

#### **2.1.1 Flagged issues and questions.**

##### *The Ministry and Agency Landscape:*

- Malaysia like many countries does not have a seamless research, education and innovation ecosystem. There is some fragmentation with as yet no central body responsible for the entirety of research through to innovation. There is a great deal of activity supported by multiple Ministries and Agencies, in a rapidly changing policy and funding landscape. The two key Ministry players are the Ministry of Education and MESTECC, the former having responsibility for supporting universities, its responsibilities split between research, education and innovation, and the latter with its own research institutes and the formal mandate of promoting innovation and economic development. MESTECC also has overall authority over many statutory bodies including the Academy of Sciences Malaysia.
- Budget 2020 announcement shows that the Ministry of Education is the biggest budget recipient with an allocation of RM64.1 billion but how much of this budget is allocated for research and innovation remains unclear. It is notable that the Ministry of Education through the Department of Higher Education had a focus on fundamental research in the past. On top of that, a total of RM524 million would be allocated to Ministries and Public Agencies for research and development in 2020. Other budget like Cradle Fund who is under the purview of MESTECC would receive 20 million to continue coaching and growing high impact technology entrepreneurs and 10 million for the establishment of Research Management Agency and a one-stop Innovation Office.

**Key question?** How can the Ministry of Education and MESTECC liaise in the most effective way with the other Ministries and Agencies, to create a cohesive policy and funding framework for the support of innovation and technology transfer in Malaysia? And what more can be done to promote coordination at the top of Government to drive the whole system? At present the main mechanism for liaison between Ministries on technology transfer and innovation seems to be Joint Committees.

- An additional related question concerns the restructuring, transfer of responsibilities, creation and dissolving of Ministries and Agencies in the system. For example, it was announced in October 2019 that a new Research Management Agency (RMA) will be set up. It is assumed that this will act as a clearing house and coordinator for all Government funded research, but it is early days and many questions remain including which Ministry will be its key funder? How will it work with the Ministry of Education and university technology transfer offices? How will it work effectively with MESTECC which is still responsible for Technology Transfer?
- What would be the role of existing agencies and how would these agencies work together with the Research Management Agency? MIGHT, a technology think tank under the purview of the Prime Minister's Department, focuses in foresight and future thinking, optimising global strategies and outreach, developing technology priorities and advancement, promoting technopreneurship excellence, enhancing future talents, and driving the sustainable development platform for smart cities, renewable energy and industry 4.0. The Malaysia National Innovation Agency (AIM) is also a statutory body under the Prime Minister's Department created to jump start wealth creation through knowledge, technology and innovation to stimulate and develop the innovation eco-system in Malaysia, and which provided funding for platforms such as PlaTCOM Ventures. MaGIC (the Malaysian Global Innovation & Creativity Centre), an agency under the Ministry of Entrepreneur Development, enables and supports the sustainable growth of entrepreneurship in Malaysia and the start-up ecosystem. An agency that provided pre commercialisation funding, the Malaysia Technology Development Corporation, is seeking funding support from many Ministries.
- The announcement in 2018 to dissolve the National Innovation Agency, will PlaTCOM Ventures also have to go independent? Will the recently announced creation of the Research Management Agency continue and how will it work with the National Innovation Agency? Is there a possibility that we will see the creation of even more separate organisations and programmes?
- How do the different task forces and pool of expertise fit in? For example, ITMA, an association of technology managers; the Public University Commercialisation Integrity Task Force led by the Ministry of Education; the Ministry of Education Task Force to create guidelines on Licensing, Consultancy and Commercialisation for Public Universities; and MESTECC – MOE Working Committee.

**Key question?** What will be the final scope and shape of the players in the overall system in 2020, how should this be transformed by 2022, and what steps need to be taken to ensure a stable funding and Agency framework?

- There has been a tremendous drive to promote innovation friendly policies and programmes from Government. Initially there may have been a focus on profits that can be made from supporting the development of traditional consumer goods at the expense of broader community & other impacts. The broader social and economic impacts of projects could also be recognised in all funding. The special needs of high technology areas where it is not possible to make a quick return on investment could benefit from additional consideration.
- There are reported to be many different government policies for science, technology and innovation which might be streamlined. An underpinning Science Act driving legislation is yet to be enacted.
- The Intellectual Property Commercialisation Policy for Research and Development Projects Funded by the Government of Malaysia is currently being revised by MESTECC.
- The OECD talked about the cost of IP protection being an issue for universities and companies.

*Universities:*

- Universities, as a key source of research, technology and expertise, are essential platforms for innovation in the overall landscape in any country. The Ministry of Education's Education Blueprint and University Transformation Programme aims to transform the 20 public universities into truly modern institutions that can deliver these services. Is this therefore possibly the key pillar in developing a coordinated and effective framework for developing an innovation system in Malaysia? What are the lessons being learned in its implementation, and do the participating universities and the Ministry of Education have ideas/plans for how other funders in the system could help?
- Development of appropriate metrics linked to incentives is key to driving real change.

**Key question?** How can MESTECC support for research institutes be coordinated with the Ministry of Education's evolving agenda for universities to create a cohesive, world class research and technology base?

- Much of the funding and debate is about the role and needs of the public universities? What are the perspectives of the private universities and how can they be fully engaged in a national innovation system? The research strengths of private universities also need to be given the same exposure as public universities, particularly as some have exceptionally strong links to industry, with programmes geared to industrial needs. An example is Universiti Tenaga Nasional (UNITEN), which is wholly owned by Tenaga Nasional Berhad (TNB), and conducts contract research in areas of international priority, such as clean energy technologies with industrial partners across the globe.
- A bottleneck in the technology pipeline is the challenge of identifying research within universities that may be of interest to companies. Many universities now have IP Protection/Evaluation Committees but still struggle with IP protection and regulation, with outdated IP policies blindly copied from each other.
- Universities struggle with lack of information on appropriate markets for their inventions and how to do innovation. The Ministry of Education's Malaysia Education Blueprint is supporting the development of Playbooks on key issues for Universities. What more is needed by universities?
- The Academy of Sciences Malaysia has noted that most research is done in universities and that longer term the Government should aim to increase the numbers of researchers in industry.
- Malaysia also has some star academics that collaborate extensively abroad but could benefit from more support to forge stronger links at home.

*Engagement with Industry:*

- More mechanisms and funding for effective engagement with industry, including venture capital provision, appear to be needed. Some initiatives exist e.g. the Ministry of Education's Malaysia Education Blueprint Catalytic Role in Securing Investments e.g. Private-Public Research Network (PPRN). More support may be needed for demand-oriented research. Some supporting grant schemes exist including Smart Fund for applied R&D, and the Enterprise Innovation Fund for SMEs.
- The lack of connectivity between industry and academia is a key challenge affecting technology transfer office outcomes. The Ministry of Education's



Malaysia Education Blueprint is providing support for academic sabbaticals/secondments in industry, and for industry people to teach in academia. Level of support for academic and student entrepreneurship is also increasing through the Malaysia Education Blueprint Support for Business Incubators/Student Owned Businesses. Technology transfer professionals need networks to engage with industry, patent agents, lawyers, investors, marketers etc.

- A key area, highlighted by OECD and others, is the importance of building effective specific platforms for industry of all shapes and sizes, from start-ups, spin-outs, SMEs and large global corporations to engage with universities and research institutes in demand led R&D. More centralised technology transfer support organisations and intermediaries that companies can engage with may be needed. There have been some notable successes in Malaysia such as PlaTCOM Ventures and CREST.
- Innovation Hubs and Science Parks should be associated with universities to engage industry at early stages of commercialisation. The Ministry of Education's Malaysia Education Blueprint University Transformation Programme is encouraging setting up of innovation hubs within universities led by the technology transfer office to provide melting pots for academics and industry.
- Specific challenges in engaging with SMEs. Challenges include a lack of skilled people and absorptive capacity, and lack of understanding of IP in SMEs. PlaTCOM Ventures is the national technology commercialisation platform of Malaysia. It works with SMEs to help them commercialise their innovations. They have supported over 200 projects with 79 successful commercialisations across a range of sectors. However, they receive 5 times more applications than they can support.
- One SME interviewed, highlighted that access to research and expertise is a major issue for small companies conducting R&D to create new products, as it is impossible to have all the skills in-house. Without university input and partnerships, they would never have been able to create a viable mosquito trap product, ensure credibility in field trials, make international links and ensure that the product met WHO standards to be marketed internationally. Relationships with university partners are also very important in establishing overall credibility with potential buyers. As a small company they would have had great difficulty finding their university collaborators without participating in a showcasing and partner matching programme "Dengue Tech Challenge" delivered by the British Council and PlaTCOM Ventures through Newton-Ungku Omar Fund. And as an innovation entrepreneur, where it took 6 years for their company to become commercially successful and profitable, the R&D phase would not have been possible without funding support from the British

Council and PlaTCOM Ventures. This SME also highlighted that the assistance of a Director of a Research Management Innovation Centre in a university was vital as a bridge to navigate and build partnerships.

- Collaborative Research in Engineering, Science and Technology (CREST) operate a triple helix model which is a catalyst for demand driven research. How could CREST's support for collaborations between priority sectors (e.g. LEDs and Advanced Manufacturing) and researchers be replicated or scaled up?

**Key question?** What lessons do PlaTCOM Ventures and CREST have for how to engage with industry, what more might they need from funders and policy makers to build on their success, and how can these models be extended to support all significant industrial sectors in Malaysia? What more might be done by MESTECC and the Malaysia Technology Development Corporation to support the industries and corporations in R&D and their engagement with academia and universities? Do companies seeking research and innovation support from universities know how, and who to engage?



## 2.1.2 Planned and potential solutions

*The Ministry and Agency Landscape:*

**Key solution?** The Academy of Sciences Malaysia is proposing to Government that a key part of addressing any fragmentation would be to bring the whole system under a clear legal framework by implementing a Science and Innovation Act. This should also help address other issues such as creating solid policies and regulations to put proper IP protection regimes in place within universities.

- Additional coordination may be helpful at policy level. An organisational hub/forum may be needed to help coordinate the work of policy makers in developing clearer policy and strategic frameworks for innovation in Malaysia. A National Science Council was formed in 2016, chaired by the PM, to bring all Ministers together. The Academy of Sciences Malaysia proposed that this Council, previously facilitated by the Ministry of Science, Technology and Innovation (MOSTI) and the Science Advisor Office, should be adapted to: Include representation from more diverse stakeholders including business and industry; Establish a Science Planning Unit to work with the Prime Minister on science, technology and innovation development; Have a supportive science and innovation literate secretariat; Create a dedicated centralised body to implement science and technology decisions; Implement a monitoring system for the entire science and technology landscape and; Develop a comprehensive regional innovation cluster policy. The Academy of Sciences Malaysia has recommended that the Council also focus on coordinating the work of Ministries engaged in Economic Affairs, Education, International Trade, Entrepreneurship Development, and Science. Policies being developed by these Ministries include technology transfer to support manufacturing, helping the development of startup companies commercialising home grown technologies, identifying and funding key research sectors, and filling in skills gaps. The work of any implementing agencies, such as the National Innovation Agency, Research Management Agency, and Technology Commercialisation Accelerator, needs to be coordinated alongside this. Progress is being made with the creation of Select Committees in Parliament. One might be set up for Science, Technology and Environment along the lines of the UK Parliament.
- MESTECC has identified from stakeholder workshops that a national debate is needed to discuss whether it would be appropriate to invest in a national level platform for technology transfer, and/or to continue with different strands of work under different Ministries and Agencies. The multiplicity of Ministries

and Agencies working in technology transfer may need a central coordinating body to help them.

- More coordination may also be needed at programme funding level. A coordinating body for the 14 Ministries plus related agencies could be useful. The Research Management Agency has great potential, but may be a coordinator rather than a funder of research. Would it need to be given more control over the funding for research to set directions? Would it need to reset research direction to make it more demand driven? It could map out and solve the issue of the huge diversity of grants with different purposes from different sources. A possible model to look at in more detail is UKRI which brings together 7 Research Councils, Innovate UK and Research England (formerly HEFCE) to allocate research and business grants. The creation of the Technology Strategy Board, later rebranded Innovate UK, was a significant milestone for the UK's R&D&I ecosystem, supporting business led R&D through funding for R&D projects and networking.
- PlatCOM Ventures supports R&D from 25% ready through to 80-90% ready (TRL 8). It might simplify the landscape for SMEs if PlatCOM Ventures were able to continue to support businesses through to full commercialisation (TRL9).
- The 2016 UK McMillan Review stressed that technology transfer is just one route to impact. National policy should continue to be focused around all forms of knowledge exchange. Previous Governments have invested heavily in research and innovation, but the associated 'systems' may not have been ready to make the best use of that investment. It may help to identify some impact case studies which can help evidence the value of investing in research and innovation.
- OECD suggested streamlining and lowering the cost of patents by using the 'Utility Model' as an alternative to patents. OECD recommended providing discounts and support for IP protection processes. OECD suggested MyIPO should have more resources to fully coordinate IP.

#### *Universities:*

- The Ministry of Education Blueprint says, "*Malaysia needs to move from academia operating in isolation, to the quadruple helix of academia, industry, government and local communities coming together in partnership for the incubation, development and commercialisation of ideas*". It has 3 main strategies to build an innovation ecosystem: Get focus by prioritising a few strategic research areas of national importance; Facilitate greater private investment and involvement and; Build the supportive services such as technology transfer offices. The Ministry of Education is currently working to

get all their university technology transfer offices together to create a strategic plan up to 2024.

**Key solution?** The Ministry of Education is one of the largest recipients of government annual budget in the research and innovation landscape and thus an important pillar of the entire system. The workshop could seek to understand barriers the Ministry of Education may be facing in delivering their blueprint and identify ways to remove those barriers.

- More coordination may be needed between universities in undertaking research. A possible model is that developed by 3 universities working together to form an R&D group, the University of Malaya, the University of Science Malaysia, and Monash Kuala Lumpur. Could the Ministry of Education create more of these? Could the Research Management Agency be assigned the role to do the interests matching?
- OECD suggested focusing on commercialisation for those institutions with good research capabilities in disciplines that lend themselves to commercialisation. We would suggest using UK Technology Audit approaches to help identify research areas that may be of interest to industry and build a pipeline.
- The Academy of Sciences Malaysia has called for more support for demand driven research with industry and for more researchers to be funded within industry.

**Key solution?** There may be a need to develop appropriate KPIs to incentivise all actors. MESTECC has flagged that the development of appropriate metrics is vital. The lack of metrics to measure the success of technology transfer offices in universities may be a barrier to successful implementation. Results should be measured and evaluated. Build academic incentives and rewards for technology transfer alongside existing systems for recognising publications etc. Potential models are the UK HESA's HE Business and Community Interaction Survey metrics & REF systems for judging the impacts of research through case studies.

- OECD also suggested incentives for researchers to work on topics set by industry that they will pay to commercialise. Possibilities include using UK KEF/REF type approaches such as quantitative metrics and impact case

studies. Interviewee feedback has suggested that adoption of an impact case studies narrative approach to evaluating research, commercial and social impacts might be the best route forward, rather than solely relying on developing rigid quantitative measures which might inhibit some desired behaviours, promote some undesirable ones and prevent understanding of lessons learned. The Ministry of Education is already starting to look at some of these approaches.

- Increase focus on tailored individual institutional transformation plans in Malaysia Education Blueprint University Transformation Programme. All universities need an income generation policy, a dedicated office to deliver it, and incentives to motivate.
- Support university and industry partnerships by providing materials benefiting universities and industry such as developing Malaysian version of the UK Lambert Agreements (a suite of R&D template agreements covering IP etc).

#### *Engagement with Industry:*

- Stimulating general business demand for R&D and technology transfer is a core element of the UK's Industrial Strategy. This includes taxation, funding and other incentives. Malaysian funding could incentivise industry engagement in existing and new research and development programmes.
- Funding from Innovate UK plays a key role in supporting the commercial development of technologies being licensed or spun out of UK universities. An important enabling tool for technology transfer officers is access to small scale grant funding to allow opportunities to be progressed quickly. Many reviews in the UK have consistently stressed the importance of the relatively small but flexible HEIF (Higher Education Innovation Fund) as a key enabler for universities to make things happen. Also, the 1999/2004 University Challenge Seed Funds (locally managed investment funds for university IP typically managed by VC companies who also connected to later stage funds) and the 2017 Connecting Capability Fund.
- MESTECC has identified from stakeholder workshops that the lack of continuous funding from pre-commercialisation through the entire innovation process is a barrier, with companies having to re-apply for funding at every stage of the process. A university observation is that grants tend to get projects up to TRL4, but that funding to then promote them to industry is lacking, the innovations get shelved, and the researchers go back to the laboratory. Funding streams could also be developed for companies and universities to work together to draft proposals for research grants, building routes to market in at the very beginning. Progress is being made with funders

starting to require evidence that university applicants in the highly competitive grants systems show evidence of having engaged potential end users.

- It has been suggested that a central technology transfer agency/office should be created to act as a coordinating hub supporting all other technology transfer offices throughout the system. It might act as the leader of hubs/platforms for industry and bring these together with university technology transfer offices. Could this be created and funded by MESTECC, perhaps in partnership with the Ministry of Education? MESTECC is creating its own Commercialisation Centre but who will run it? PlaTCOM Ventures is a possible model for centralised expertise in technology transfer. Some centralised technology transfer provision aids building critical mass of expertise and links with industry. But devolved provision has closer links to researchers to find the innovations. Both are probably needed. A particular challenge with the devolved model is that unless the research and IP flow is significant, developing an experienced & well-connected technology transfer office to ensure successful innovation is difficult. The UK has moved from a centralised, British Technology Group (BTG), to a devolved model. A mix may be appropriate for Malaysia to help the technology transfer offices?
- SMEs could benefit from the establishment of more intermediary organisations helping them to meet the right researcher and university partners. Showcasing/partner matching events are very important for companies, especially SMEs, to find university collaborators. So it could be particularly helpful for them to attend workshops on research and technology areas that academics could attend, and also to provide a matching service. These should be accessible, affordable, and address diverse scientific areas/industries. Once partnerships are forged, access to seed funding for R&D projects is enormously important.

**Key solution?** OECD has suggested continuous hand-holding support for SMEs with the establishment of Regional Innovation Centres to provide critical resources. The Academy of Sciences Malaysia has called for more support for the development of regional innovation clusters to engage industry. UK type Catapults may provide a model for bridging university and industry?

- An example of clusters in Malaysia that engage industry - CREST is an industry led brokerage and engagement vehicle for collaborative R&D, talent development & commercialisation in electrical engineering. CREST focuses on 3 activities: Collaborative R&D grants; Talent development and; Commercialisation. Members are universities, multinational companies and local SMEs. CREST has supported 150 co-funded projects, 60 of which have



been completed and 20 commercialised. They have established clusters around specific sectors and have success in creating international research links (e.g. with Professor Shuji Nakamura, Nobel Physics Prize winner for LED technologies). Despite their success, CREST states that more industrial participation is needed in developing strategies around areas of R&D strength in Malaysia. There is also a need for greater transparency and accountability for managing projects and funding in areas which are relevant for the long-term (30 years). The CREST model might be applied to other research sectors?

- An Innovation Connect Pilot has been launched to create clusters in industry sectors improving engagement between industry, academia and government. The clusters are: Halal Industry (products and services specifically for Muslim countries); Health and Wellness; Manufacturing Industry 4.0 and; Finance Technology for Islamic Banking. These invite industry to participate to clarify the real needs of industry and inform what research is undertaken in universities, building on the successful CREST model.
- Possibly UK models such as: Nottingham Trent University's Innovation Community Lab which uses student recruitment to drive innovation in clusters of local SMEs; The Knowledge Transfer Partnership (KTP) Scheme which engages companies in R&D with universities who have never previously done so, and; Small grant schemes to incentivise industry, and SMEs in particular, to open up about their issues so universities can work with them.
- Develop networks for technology transfer professionals to engage with industry, patent agents, lawyers, investors, marketers etc. ITMA, the national association of technology managers who is now a member of the Alliance of Technology Transfer Professionals might be supported by PraxisAuril in developing programmes for technology transfer professionals to network with themselves and this wider group?
- Develop a national forum for research and business leaders to discuss and champion innovation such as the National Centre for Universities and Business in the UK. The National Centre uses case studies to help champion innovation.
- OECD suggested that Malaysia consider implementing a Utility/Petty Patents model to lower the burden of proof and help SMEs engage with IP protection and universities.
- MESTECC's MCY (Malaysia Commercialisation Year) 2.0 Framework Programme helps researchers within universities to take their ideas from laboratory to market. More funding may be needed to help more universities.



## **2.2 Topic 2. Technology transfer policy and legal framework for biology, medical, life sciences and engineering fields (compared to ICT).**

### **2.2.1 Flagged issues and questions:**

**Key question?** How does the Malaysian Government determine its overall priorities for funding, research and innovation, and link this to the needs of the economy? Has this been affected by restructuring of Ministry responsibilities such as the moving of biotechnology/bioeconomy from MESTECC to the Ministry of Agriculture? Or the responsibility for green technologies, formerly under the now defunct Ministry of Energy, Green Technology and Water, now being divided between MESTECC and the Ministry of Water, Land and Natural Resources?

- Can PlaTCOM Ventures, CREST and individual influential companies comment on how research priorities relating to industry might be determined?
- What metrics and incentives are the Government/Ministries considering using to drive desirable behaviours in the overall system? Some existing measures, such as comparing the number of commercial product outputs to the research funding inputs, may be counterproductive to supporting truly innovative work.
- The uncertain regulatory environment for commercialisation. There is an absence of clear regulatory frameworks and legislation in some areas e.g. in biomedical devices, making it difficult for innovators to work. It is difficult to understand what regulations need to be met in developing high tech products which can hold projects back e.g. medical implants. There is also a need to understand regulations in foreign markets to sell abroad.
- Is there a focus on supporting ICT and engineering rather than other areas? This may be because there are strong consumer electronics and engineering industries in Malaysia, drawing attention through their interactions with universities and policy makers. ICT and engineering researchers' better engagement with industry may also give them an edge in highly competitive grant processes, where evidence of likely impact can make or break a case for funding.

### 2.2.2 Planned and potential solutions

**Key solution?** If a “fix” is needed it may be simpler than we think. Scientific areas other than ICT and engineering are generally well funded, but more support could be needed for industry to engage with them so that they can make stronger cases for potential impact in their applications in a highly competitive grants system.

- There are various Ministerial initiatives. The main Ministry coordinating an overall industrial strategy and roadmap for Malaysia is MITI (Ministry of International Trade and Industry). MITI has launched “National Policy on Industry 4.0” comprising 13 strategies to prepare and transform industries for Industrial Revolution 4.0. A study could be carried out on relevant policies in developed countries such as the UK Government Industrial Strategy to understand and identify best practices to support biology, medical, life sciences and engineering fields.
- The Ministry of Education’s Malaysian Education Blueprint Initiative Implementation Roadmap is working with other Ministries to elevate a few priority research areas deemed vital to national growth. The Ministry of Education also seeks to establish centres of excellence with prominent international partners (and may note that OECD suggested consolidating technology platforms). MESTECC has a National Techventure Blueprint. MESTECC is also funding a Malaysia Social Innovation Programme. This supports the development of a wide range of research and technologies that solve critical social needs, for example health, clean water, and green technologies.
- Coordination between these initiatives may be helped through the Malaysian Technology Foresight Report and Emerging Science, Engineering and Technology Report. Areas identified as being important are: ICT; Food processing; Automotive; Petroleum; Pharmaceuticals; Electronics and Electrical Engineering; Financial Services for Islamic Banking; Education Services; Materials Sciences and; Health and Wellness including ICT for Connected Health.
- In developing appropriate metrics, more emphasis might be placed on Key Results Indicators (which measure what is important to people and help Government decide what to fund that is economically and socially useful) and could learn from the UK Knowledge Exchange Framework approaches.

## **2.3 Topic 3. Promoting understanding of the technology transfer landscape for policy makers, universities' senior management and legal advisors**

### **2.3.1 Flagged issues and questions:**

- Malaysia is a trading nation with a strong focus on micro-electronics and fast-moving consumer products. Much of the dominant thinking in Ministries may still be about supporting this focus, so universities developing such tangible products tend to get attention and resources. Much consumer led R&D is done abroad with foreign companies coming to Malaysia for cheap manufacturing. Malaysian policy makers may sometimes tend to think manufacturing rather than science, focus on immediate economic impacts and goods that can be immediately sold, and might be less aware of the long-term economic importance of truly innovative industries. It is may therefore be difficult for universities to engage with them.

**Key issue?** Key people move on too quickly so critical mass of expertise does not develop.

- There may still be a culture in some Ministries and Research Institutes of trying to develop innovation and technology entirely in-house, like the behemoth Western industries of the early twentieth century. Innovation is now far too complex for this to be possible, with organisations elsewhere in the world having abandoned this for a more collaborative R&D approach. It may be important to promote understanding that an old-fashioned technology push approach doesn't work.
- However, the culture is changing. The change of Government means that there are now new policy makers in the Ministries that are more interested in new programmes and industries. New Ministries such as MESTECC are finding new ways of doing things.
- Some senior academics and policy makers have a really good understanding of the technology transfer system and issues. How can we identify these people and enable them to help raise the awareness of others?
- From the point of view of SMEs, the outlook of academic researchers may need to change. The perception is that they tend to be very focused around their academic research and teaching lives, an issue that is familiar in other countries, and that younger researchers are being brought up in the same tradition. Universities are also perceived as being mainly interested in talking to big companies about big projects, their horizons may need to be broadened

to think about working with small companies on smaller projects. Such small projects are also important to develop a national platform for innovation. MESTECC has identified from stakeholder workshops that the issue of researchers not being interested in technology transfer, preferring instead to publish in academic journals, is a concern.

- A number of stakeholders highlighted the need to educate Technology Transfer Officers on specific industrial topics when creating industry collaborations.

### 2.3.2 Planned and potential solutions

**Key solution?** Create new forums where research managers, administrators and tech transfer managers from public and private sectors can engage with policy makers, academics and industry to build mutual understanding. The Malaysia Association of Research Management and Administrators (MyRMA) is looking at creating such platforms (<http://myrma.org/>)

- Recognise that technology transfer is a big field to understand, and senior people have so many other areas that they need to deal with and know about. They need to be kept informed in a time effective and accessible way. A quick win may be to identify researchers and policy makers who do understand the system and issues, and enable them to network, make presentations at appropriate forums, and mentor others.
- All Party Parliamentary Groups can also play a big role in raising awareness. Malaysia might consider setting one up along the lines of the Parliamentary and Scientific Committee in the UK Parliament which brings together politicians, scientists, companies and other stakeholders to debate issues in a friendly environment.
- Provide training for Government policy makers, university senior management, and other players in the system, for example building on the new educational investments being made under the Education Blueprint. University senior leaders may need training and guidance on practice, freedoms and limitations to aid effective decision making. The training systems such as “Civil Service Fast Track System” in the UK could be referred. WIPO provide training for university senior management, helping universities and companies understand how to talk to each other, but only for the research-intensive universities.

- The Trade and Industry Advisory Council also provides international residential summits for universities in Malaysia and 3 other countries. Equivalent training opportunities may be needed for the senior management of all universities.
- Train academics. The Malaysia Education Blueprint is increasing provision for entrepreneurial training. Technology transfer officers desperately need to work with innovation literate academics. PhD students need to see a career path through research and development, rather than moving into teaching too soon. Need to develop the future talent stream for academics comfortable with innovation and working with industry. Consider UK models like CASE studentships, KTP Scheme and placements for students? There is also a strong case for training academics in science communication so that they can promote their research to broader audiences.

**Key solution?** Train a cadre of technology transfer professionals such as exist in the UK to form the professional core of the system that can coordinate and educate people. Legal advisors on university senior management teams need specific training on technology transfer too, including how to handle conflicts of interest and transparency.

- Provision of training materials and information are being developed, including Malaysia Education Blueprint Playbooks for Universities on Critical Improvement Areas, ITMA journals and other resources. The Ministry of Education's Blueprint is increasing provision for entrepreneurial training, new MOOCs etc, and funding a massive increase in relevant university course places. The Education Blueprint is also planning to establish a national e-learning platform.

**Key Solution?** Keep people in roles longer term so that they can build up expertise and networks of contacts. Ensure universities make organisational commitments to technology transfer.

- The development of common KPIs might help to develop a common framework for understanding, and to facilitate conversations and consistency between Ministries and other stakeholders.
- Start early for a long-term solution. Teach innovation at all levels of the education system, starting in schools.

## **2.4 Topic 4. Insufficient dedicated technology transfer personnel at universities.**

### **2.4.1 Flagged issues and questions:**

**Key issue?** MESTECC has identified from stakeholder workshops, that the lack of technology transfer officer professionals with appropriate IP and entrepreneurial skills, lack of permanent roles, and existing roles being dual purpose are key issues that need to be solved. Experienced technology transfer officers may need to be enabled to mentor new recruits.

- There have been some successful early initiatives. One of them is the accredited training for technology transfer managers funded by Newton Ungku-Omar Fund (NUOF) and delivered by the British Council, MIGHT and PlaTCOM Ventures, which has seen benefits to participating universities. ITMA has been providing training to technology transfer officers and recently as a legacy of the NUOF initiative, ITMA became a country member of ATTP (Alliance of Technology Transfer Professionals) aiming to produce internationally recognised technology transfer professionals for Malaysia and South East Asia through the provision of accredited training.
- The Ministry of Education University Transformation Programme has been assisting the 20 public universities to restructure to address the following: Development of effective supporting institutional policies and strategies; Funding of properly resourced technology transfer offices; Recruitment, training, contracts/career structure for technology transfer staff. Have any issues been coming up in its implementation, and do the participating universities and the Ministry of Education have any ideas how other funders in the system could help?



- There have been some notable successes in building individual successful technology transfer offices such as Putra Science Park at UPM and UMCIC at UM. They are known to be successful in partnering with organisations such as U-Start, WIPO and many funding agencies such as PlatCOM Ventures and Cradle Fund. What lessons can we learn from their experience which can inform our next priorities and steps? How can the capacity/expertise being developed here help all 20 public universities?

**Key issue?** The issue that people keep being moved on to other roles within universities is a concern. The rotation of staff seems to be a factor of the Ministerial career system applied to Universities. This even affects private universities with strong connections to industry. People typically expect responsibility to be limited for a few years but must be able to stay in role for more than a few years to build expertise and networks of contacts. The small pool of trained people who do exist also often move onto better paid jobs in industry.

- An initial cohort of technology transfer officers has been trained and accredited as Registered Technology Transfer Professional (RTTP) by ATP. But there is a risk they are being moved on to other roles within universities. It may mean that the insufficient professionally trained technology transfer personnel at universities will remain an issue, even after actions have been taken by Government to address the fragmented landscape, following the advice of the Academy of Sciences Malaysia and others.
- This may be being driven by counterproductive university employment contracts, short term roles, public sector pay scales with no relationship to technology transfer roles etc. Different types of staff contracts are currently set up on civil service lines by the Public Services Department in predetermined schemes such as academic, administrative or technical. There is currently no scheme for technology transfer professionals. At present they tend to be called Research/Science Officers who are expected to produce research outputs or serve other areas. As they do not meet the KPIs for a career promotion, they move on to other roles and the Tech Transfer Officers continue losing skilled personnel. Diversified, well rewarded, career pathways are needed.
- CREST has highlighted that success so far has been driven by individuals in universities. Organisational commitment is needed from universities to technology transfer, a commitment which is greater than the individuals involved. When staff move roles or organisations, collaborative technology transfer projects can be significantly delayed or damaged.

- Technology transfer staff also need help to identify research strengths in universities to develop the pipeline of technologies that may be of interest to industry, and funding to support it.
- Technology transfer staff need to be backed up by legal colleagues trained in technology transfer as well as IP.

#### **2.4.2 Planned and potential solutions**

**Key solution?** An organisation could take overall charge of developing the talent pool. Policy support is needed from Government to get people recruited, trained, and provided with stable jobs with a technology transfer career path. This needs to be seen mission critical by the Government.

- The provision of training is the key issue. Skills training needs to include IP management, technology auditing and pipeline development, business case analysis and how to market to industry. It is also important to ensure that the right staff are receiving training and cascading it to others, making sure that it focuses on operational staff.
- The Malaysia Education Blueprint University Transformation Programme addresses talent development. Discussions are going on with MESTECC which show that they are also serious about tackling this. UTM has a course to develop student's technology transfer skills, which has an internship/training environment linked to PlaTCOM Ventures. This course, the Bachelor of Management (Technology), is graduating 50 students per year so should be building a pipeline of future technology transfer officers. UPM, in collaboration with ITMA are known to conduct micro-credential programmes to local and international participants in specific knowledge and skills required for the key players in a conducive innovation ecosystem.
- Can we rely on enough technology transfer staff being trained in the public sector? Is there a role for the private sector to take on some of this technology transfer office work as an outsourced service to universities? Companies already developing capacity in business evaluation might extend this to IP evaluation.
- The Ministry of Education University Transformation Programme advocates moving away from one size fits all contracts, and notes issues of rigid career development pathways & insufficient specialisation. This is aiming to incentivise HEIs to develop this provision.

- The Public Services Department may be able to help by adding technology transfer professionals to their predetermined categories such as academic, administrative or technical.

**Key solution?** Universities need to create dedicated technology transfer jobs in which people can be expected to work for an agreed minimum of 3 to 5 years. Universities need to develop robust policies for how to recruit and train staff, develop appropriate career development structures, and to understand that rotating staff in some areas is damaging. Roles need to go beyond being IP registration officers. Universities have done great work redefining Research Officer roles to include research/innovation management, but still need to change their approaches to how such staff are recruited, retained and rewarded.

- We could potentially build on the Newton-Ungku Omar Fund “Accredited Technology Transfer Training” project (2017-2019), and the British Council’s Higher Education Partnership project (2018-2020) which exchanges best practice with UK universities and technology transfer professional associations like PraxisAuril and Oxentia to catalyse the production of globally recognised technology transfer professionals.
- We could refer to the UK Higher Education Innovation Fund model which funded the creation of technology transfer offices in UK universities and the training of personnel through PraxisAuril. The role of technology transfer professionals is also becoming prominent in the thinking of the Innovation Connect pilots that support academic/industry collaboration.
- We could build on the experience gained from the Newton-Ungku Omar Fund project “Malaysian Research Management and Governance” (2015-2019) delivered by the British Council and Department of Higher Education (formerly Ministry of Higher Education). The project developed research management profession and dedicated research manager jobs in public universities. This could be a good case study for developing the technology transfer profession and dedicated technology transfer managers in public universities.
- The need for grant and other enabling funding streams. The Ministry of Education is a major funder of innovation, from research through to R&D and pre-commercialisation, and could look at the specific needs of university technology transfer offices in developing technology pipelines.
- Suggest studying and developing a Malaysia version of the UK Technology Audit to help identify research areas that may be of interest and build a pipeline. Not just universities, we mustn’t forget to include the specialist Research Institutes in developing this!

### **3. Reflections for the workshop**

The scoping exercise using the 4 topics as a focus has collated existing knowledge and refined new insight to inform consideration of the two broader key challenges of:

(1) Governance and Institutional Issues in Managing and Delivering Technology Transfer Linked to the Wider Regulatory Environment, and;

(2) Policy Support for Technology Transfer.

It is clear that the fragmented technology transfer landscape in Malaysia has dominated the discussions, and that it is an issue which affects and underpins the other topics. However, this report is intended to inform the workshop and allow a full discussion by all stakeholders of the key issues and gaps, and the solutions that are required.

This Issues and Gaps report will be used to raise workshop participant awareness and to inform the specific discussions which take place.

## **Appendix A**

### **Core Project Team:**

- Ant Parsons, *Director, ALP Synergy Ltd.*
- Dr Liz Bell, *Associate Director, ALP Synergy Ltd.*
- Yen Sim Kuek, *Head Newton Fund (Science and Research), British Council Malaysia.*
- Rowena Lim, *Programmes Manager (Science), British Council Malaysia.*
- Ida Semurni Abdullah Ali, *Vice President, Malaysian Industry Government Group for High Technology (MIGHT).*
- Ahmad Razif Mohamad, *Manager at President and CEO's Office Malaysian Industry Government Group for High Technology (MIGHT).*
- Dr Samsilah Roslan, *President, Innovation Technology Managers Association (ITMA) Malaysia.*
- Prof Dr Mohd Shahir Shamsir Omar, *Exco Member, Innovation Technology Managers Association (ITMA) Malaysia.*

### **Malaysian Stakeholders Interviewed:**

- Madam Hazami Habib, *Chief Executive Officer, Academy of Sciences Malaysia.*
- Mr Jaffri Ibrahim, *Chief Executive Officer of Collaborative Research in Engineering, Science and Technology (CREST).*
- Prof. Dato' Dr Muhammad Fauzi Bin Mohd Zain, *Director – Higher Education Institutions Research Excellence Division, Department of Higher Education, Ministry of Education.*
- Mr Koguladas Kamalanathan, *Principal Assistant Secretary, Commercialisation Division, MESTECC.*
- Mr Rizmi Ahmad Shapiei, *Principal Assistant Secretary, Commercialisation Division, MESTECC.*
- Dr Zamir Aimaduddin Zulkefli, *ASEAN Science and Technology Fellow 2019/2020, MESTECC.*
- Puan Nor Fazlin Supari, *Assistant Secretary, Commercialisation Division, MESTECC.*
- Mr Lim Chee Hwa, *Managing Director, One Team Networks Sdn. Bhd., Dengue Tech Challenge Recipient under Newton-Ungku Omar Fund.*
- Mr Muhammad Lofty Abd Karim, *Chief Executive Officer, PlaTCOM Ventures.*
- Prof. Dr. Shaliza Ibrahim, *Association Vice-Chancellor (Research and Innovation), University of Malaya and President of MyRMA.*
- Ms Biruntha Mooruthi, *Chief Commercialisation Officer, UNITEN R&D Sdn. Bhd.*

### **Malaysian Reports Reviewed:**

- Ministry of Education Malaysia *Malaysia Higher Education Blueprint 2015 to 2025* (published 2015).
- Academy of Sciences Malaysia *Science Outlook Converging Towards Progressive Malaysia 2050* (published 2017).
- Ministry of Education Malaysia *Enhancing University Income Generation Endowment and WAQF. University Transformation Purple Book* (2017).
- Ministry of Science, Technology and Innovation Malaysia (MOSTI) *Intellectual Property Commercialisation Policy For Research and Development (R&D) Projects Funded by the Government of Malaysia* (published 2009).

- British Council and Research Consulting Ltd *Higher Education Partnerships Programme: Enhancing the Sustainability of Technology Transfer and Research Management in Higher Education Institutions Through Strategic UK- Malaysia University Partnerships* (published April 2019).
- OECD *Reviews of Innovation Policy: Malaysia 2016* (published 2016).
- OECD *Boosting Malaysia's National Intellectual Property System for Innovation* (published 2015).