POLICY AND GUIDELINES ON ACADEMIA-INDUSTRY COLLABORATION

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January, 2016
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1. INTRODUCTION

To realize the delivery of the New Economic Model (NEM) and the 11th Malaysia Plan, the government recognizes the unique and special benefits that collaboration between university and industry/community can have. If the nation is to develop as an innovation-led economy then it is important to look at the concept of collaboration and the commitment to it as a joint venture project that adds increasing value. It is a three-way process of partnership, i.e. government, industry and academia and the fulfilment of the collaborative venture will bring multiple benefits especially to the community and nation at large.

Universities are major players in the innovation system of both areas of performing research and training skilled personnel. It is now recognised that the generation of knowledge and its development into new technologies for commercialisation can only be considered in line with the national innovation system and that the key to successful innovation is the flow of creativity, ideas skills and people between players in the innovation system, namely the universities, public research institutes and private enterprises. Understanding this system can help identify leverage points for enhancing innovative performance and competitiveness.

Knowledge transfer through R & D will no longer be an option but a necessity for survival in the business world especially in the areas of advanced technology and growing intellectual complexity. Due to this dependence on institutions of higher learning (IHL), industry players need to keep abreast with IHLs to obtain the specific needs necessary to generate new income potentials that will spearhead the country’s economy. Therefore, IHLs will have to forsake their image as ivory towers and work closely with the industries and vice versa. The success of innovation will very much depend upon knowledge flow stimulated by such mechanisms as joint industry collaboration, public-private sector partnerships, technology diffusion, shared infrastructure and movement of personnel through internship programmes. This in turn will provide a greater role of the industry players towards the enhancement of research, development and commercialisation of technological innovation. As such, there must exist strong networking amongst IHLs and industries as R &D should not be conceived by IHLs alone but importantly it must be done together with industries so that R & D products can become more marketable and meet the present and future demand of the nation.

University and industry/community have long been proposed as a means through which complex technological and social problems can be addressed. The world is becoming more technologically complex and therefore the forms of partnership outlined in the strategy have become an ever more urgent requirement. There is no doubt that there is a huge knowledge and skills and probably even more potential in universities and industries/communities. Academicians need to understand the needs of the industries and industries need to tap expertise from the academic community. Therefore enhancing university-industry collaboration is a corner stone of the New Economic Model.
2. CURRENT SENARIO

The only way that Malaysia could compete with its major competitors in the region, is through commercialisation and innovation. However, most commercialisation efforts have failed mainly due to the lack of co-operation between the industry and academia. More often than not, industry collaboration collaboration is initiated by the academia. The industry in Malaysia seem to shy away as they are merely trying to get benefits from the collaboration by utilizing the rights of the innovation products. Recent assessment by the Ministry of Science, Technology and Innovation (MOSTI) indicated that most academia research and development (R&D) activities are funded by the ministry and other governmental agencies with only 0.68% university R&D funding coming from the industry as compared to the more advanced countries such as Canada (11.8%), Germany (7.5%), UK (6.2%) and USA (5.5%) (Md Rasli(2014).

The main reason for the poor university-industry collaboration is the lack of development of the industrial sector which ‘prefers’ to be labor intensive and not focussing on technology to gain competitive advantage. As such, Malaysia’s commercialisation effort to date has been quite modest with low number of patents indicated by 8.8 patent applications per population million as compared to Australia (546), USA (623) and South Korea (1,561). What more is that the commercialisation movement has not resulted in any significant licensing revenue for the Malaysian universities, i.e., no R&D output from Malaysian universities has been commercialised yet on a national scale (Md Rasli(2014).

The following diagram which is taken from the annual report by The Universitas 21, a global network of research universities for the 21st century has depicted the assessment of higher education in 50 countries across four dimensions (released in May, 2015). As shown in the diagram, Malaysian government is ranked at number 12 with regard to providing resources which include the government expenditure, investments and R & D. However, when it concerns the connectivity which relates to the global collaboration and industry network as well as international student enrolment, Malaysia seems to lag behind, standing at number 35. Other than that, Malaysia also is seen to be ranked at number 44 in the output dimension which covers research outputs and employability among others.
The Universitas 21 report provides an assessment of Higher Education in 50 countries across four dimensions.

### Fig. 1: The Universitas 21 Report on Higher Education assessment across four dimensions; May 2015

(Source: Abdullah, A. 2015)

Furthermore, the commercialisation status of Malaysian IHLs from 2007-2014 as reported by the Industry Relation Division, MOHE, stands at 4.2% success rate whilst the global commercialisation status is reported at 5% success rate. It is claimed that a total of 7234 Intellectual Property was filed across the 20 IHLs in the country.

### 3. THE OBJECTIVE OF THE POLICY AND GUIDELINES ON ACADEMIA AND INDUSTRY COLLABORATIONS

The objective of this policy and guidelines on academia and industry collaboration is to assist both academic staffs and supporting staffs of university and industry personnels in engaging academia- industry collaborations. The policy and guidelines would help the academia in fostering better relationships with the industries and vice versa in areas which collaborations can be established and sustained.
4. **DEFINITION OF COLLABORATION, COLLABORATOR, ACADEMIA AND INDUSTRY**

**COLLABORATION** is working with others to do a task and to achieve shared goals. It is a recursive process where two or more people or organizations work together to realize shared goals. In particular, teams that work collaboratively can obtain greater resources, recognition and reward when facing competition for finite resources.

**A COLLABORATOR** is an individual, group, organization, or institution that formally engages with UiTM through a Memorandum of Understanding (MOU), an Extended Collaborative Support agreement, a Letter of Collaboration/Letter of Support, a Data Services Agreement, or a mutually understood collaboration agreement. A collaborator may be an academic or non-academic researcher or research institution and may be located domestically or internationally.

**ACADEMIA** is the part of society, especially universities, that is connected with studying and thinking, or the activity or job of studying.

**INDUSTRY** refers to companies and activities involved in the process of producing goods for sale, especially in a factory or special area. It also include trade and commerce.

5. **THE PARADIGM OF ACADEMIA-INDUSTRY COLLABORATIONS**

Universities are organisations that perform a key role within contemporary societies by educating large proportions of the population and generating knowledge. Recently, often on the initiative of policy-makers, many universities have taken action to develop a ‘third mission’ by fostering links with knowledge users and facilitating technology transfer.

Amongst the various channels available for establishing these links, the commercialisation of academic knowledge, involving the patenting and licensing of inventions as well as academic entrepreneurship have attracted major attention both within the academic literature and the policy community. Commercialisation is considered a prime example for generating academic impact because it constitutes immediate, measurable market acceptance for outputs of academic research. To support commercialisation, many universities have established specialised structures, such as technology transfer offices (TTOs), science parks and incubators, and created supportive internal rules and procedures.

Whilst commercialisation clearly represents an important way for academic research to contribute to economy and society, there are multiple other ways in which university research is transferred. ‘Academic engagement’ is define as knowledge-related collaboration by academic researchers with non-academic organisations. These interactions include formal activities such as collaborative research, contract research, and consulting, as well as informal activities like providing ad hoc advice and networking with practitioners. Academic engagement is also sometimes referred to as informal technology transfer, even though most of these interactions tend to be formalised using contracts.
Academic engagement represents an important way in which academic knowledge is transferred into the industrial domain; many companies consider it significantly more valuable than licensing university patents. Universities’ income from academic engagement is usually a high multiple of the income derived from intellectual property.

The figure below which is derived from the Ministry of Higher Education specifies the roles of the universities in the globalized economy. In particular, it emphasizes the academia and its academic engagement which in turn creates a k-based nation.

“University of the Future”
Role And Expectations Of Universities In The Globalized Economy

![Diagram showing the roles and expectations of universities in the globalized economy.]

Fig. 2: Roles and expectations of universities in the globalized economy
(Source: Abdullah, A. 2015)

6. ACADEMIC ENGAGEMENT AND ITS CONTRIBUTION

Academic engagement refers to organisation engagement between academia and industry. As such, the objectives and priority of engagement should be observed carefully. First, academic engagement represents inter-organisational collaboration efforts that link universities and industry partners. The collaboration amongst the partners may be basically financial, i.e. the academic may work for a fee, or may consist of non-financial benefits such as access to materials or data for academic research projects. (Perkmann et.al.2013).

Second, generally the partners pursue goals that are broader than the narrow confines of conducting research for the sake of academic publishing, and seek to generate some kind of utility for the non-academic partners. For instance, the academic may offer his/her expertise to provide new ideas on application-oriented issues, solve problems and suggest solutions to collaborating organisations.
The following diagram depicts the commercialisation of ideas through the academia-industry collaboration. As the nation is striving towards a k-based nation in a globalized economy, the academia has potentials in contributing in terms of both products and services and/or solution providers.

**Commercialisation of Ideas**

![Diagram of Commercialisation of Ideas]

*Fig. 3: Academia’s commercialisation of ideas*  
(Source: Abdullah, A. 2015)

7. **THE LAMBERT MODEL OF BUSINESS - UNIVERSITY COLLABORATIONS**

In drafting the policy and guidelines on academia – industry collaborations, ICAN Office has adopted The Lambert Review of Business-University Collaboration that has been recommended in the *Lambert Review* and *Wilson Review of Business-University Collaboration* as a benchmark for university’s excellence towards achieving excellence in higher education via collaboration with industry, community and alumni.

The Lambert Review summarizes that:
the best form of knowledge transfer comes when a talented researcher moves out of the university and into business, or vice versa;
the most exciting collaborations arise as a result of like-minded people getting together – sometimes by chance – to address a problem;
encouraging academics and business people to spend more time together should be a high priority for knowledge transfer professionals;
the innovation process is non-linear, so knowledge transfer is not simply a question of channeling clever ideas from researchers down a production line into commercialisation. “Great ideas emerge out of all kinds of feedback loops, development activities and sheer chance. This is another reason why it is so critical to build dynamic networks between academic researchers and their business counterparts” [p12]
diversity is good, both in mission and in funding. “The type of business collaboration that would make sense for one kind of university might be either impossible or irrelevant for another” [p12]
proximity matters when it comes to business collaboration; [p13]
“business-university collaborations need careful and consistent management by both sides, and a number of joint programmes have failed for lack of such attention” [p13]
an emphasis on knowledge transfer requires institutions to put in place new mechanisms for establishing institutional priorities; [p13]
universities are more complex to manage than businesses, with a variety of different stakeholders – academics, students, and funders. [p13]

8. QUADRUPLE HELIX MODEL

Besides The Lambert Review Report, ICAN Office refers to The Quadruple Helix Model in drafting the policy and guidelines on academia-industry collaborations. The Quadruple Helix Model aims to emphasise the investment in innovation transmission mechanisms in terms of economic growth and productivity gains, in one-high-technology sector, by stressing the role played by the helices of the Quadruple Helix Innovation Model: Academia and Technological Infrastructures, Firms of Innovation, Government and Civil Society.

According to the Quadruple Helix Innovation Theory (QHIT), a country’s economic structure lies on four pillars/helices: Academia; Firms, Government and Civil Society, and economic growth is generated by the clustering and concentration of talented and productive people. Academia and Firms, together with Technological Infrastructures of Innovation, provide the integrated innovation ecosystem where all forms of creativity can rise. In turn, Governments provide the financial support and the regulation system for the implementation of innovation activities. Civil Society demands for ever innovating goods and services. Local economic development is, in fact, nowadays promoted through various initiatives that link universities to industrial innovation based on university research, such as the creation of science parks, business incubators and other bridge-institutions.

The following diagrams illustrates the Quadruple Helix in the context of academia-industry collaboration as proposed by the Ministry of Higher Education.
Fig. 4: The Quadruple Helix Model: Academia-Industry-Community-Government (A-I-C-G) Framework

(Source: Abdullah, A. 2015)
9. THE BLUE OCEAN STRATEGY – THE FOUR ACTIONS FRAMEWORK

ICAN Office, UiTM also employs the four actions framework to enhance the decision making on the academia - industry collaborations policy and guidelines (see Fig. 5). The four actions are: Eliminate, Reduce, Raise and Create. These actions facilitate the mechanism of ICAN Office as a one stop centre of collaboration between universities, industry, community, government and alumni.

THE FOUR ACTIONS FRAMEWORK

<table>
<thead>
<tr>
<th>ELIMINATE</th>
<th>REDUCE</th>
<th>RAISE</th>
<th>CREATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Academics working in silos</td>
<td>• Beureocratic red-tapes when initiating collaborations</td>
<td>• Inter-connectivity between university departments</td>
<td>• Industry Relation Division, ICAN as a 'one-stop-centre' for industry</td>
</tr>
<tr>
<td>• Ignorance of industries’ needs</td>
<td>• Redundant and duplications of job descriptions between university</td>
<td>• Academics’ awareness to collaborate with the industries</td>
<td>collaboration database</td>
</tr>
<tr>
<td>• University departments working in silos</td>
<td>departments</td>
<td></td>
<td>• Strong relationship between ICAN, UiTM and Industry Relation Division,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MOHE</td>
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<td></td>
<td></td>
<td></td>
<td>• Industry Relation Division, ICAN engagement with faculties and</td>
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<td></td>
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<td></td>
<td>campuses</td>
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</table>

Fig. 5. The Four Actions Framework

The following are examples how the Four Actions Framework has facilitated the decision-making involved in drafting the policy and guidelines on academia-industry collaboration.

Example 1:

Eliminate: Programmes that do not directly benefit the university, industry, community and other stakeholders.

Reduce: Irrelevant costs that are not reasonable and do not bring direct benefits to stakeholders.

Raise: Encourage collaborative programmes that are beneficial to and fully sponsored by the industry or any other interest groups.

Create: Opportunities for industry and alumni to participate in sponsoring various programmes that provide direct benefits to universities, industries, communities and other stakeholders.
Example 2:

Eliminate: Academics and industry working in silos

Reduce: The ignorance of lecturers on the need and benefits to share and transfer their knowledge to the industry

Raise: The need to enhance collaboration with the industry through various platforms such as ‘Knowledge Transfer Programmes’ (KTP), Public Private Research Network (PPRN), Ind-E-Zone, iCOE which enables activities such as research, consultancy, innovation and commercialisation of innovation products

Create: An eco-system that encourages sharing and transfer of knowledge between academia and industry

10. FOUR MODELS OF ACADEMIA-INDUSTRY COLLABORATION

There are four models that are related to ICAN Office’s approach to academia-industry collaboration. They are: Open, Short-term, Open, Long-term, Protected, Short-term and Protected, Long-term. The details are given in Table 1 below:

<table>
<thead>
<tr>
<th>What to achieve</th>
<th>Open, Short-term</th>
<th>Open, Long-term</th>
<th>Protected, Short-term</th>
<th>Protected, Long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attract new partners</td>
<td>• Shape innovation ecosystem</td>
<td>• Solve near-term problem</td>
<td>• Tackle fundamental challenges</td>
<td></td>
</tr>
<tr>
<td>Build</td>
<td>• Develop research agenda</td>
<td>• Gain advice &amp; support</td>
<td>• Access new areas of expertise</td>
<td></td>
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<tr>
<td>relationships</td>
<td>• Meet societal challenges</td>
<td></td>
<td>• Access pipeline of discoveries</td>
<td></td>
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<tr>
<td>Generate options</td>
<td>• Hire talented graduates</td>
<td></td>
<td>• Hire talented graduates</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How to structure collaboration</th>
<th>Open, Short-term</th>
<th>Open, Long-term</th>
<th>Protected, Short-term</th>
<th>Protected, Long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple and standardized contracts</td>
<td>• Special purpose vehicles</td>
<td>• Consulting agreement with individuals academics</td>
<td>• University centre sponsor ship</td>
<td></td>
</tr>
<tr>
<td>Open calls</td>
<td>• High-leverage-industry consortia</td>
<td>• Contract research agreement with university</td>
<td>• Framework agreements allocating decisions rights to downstream intellectual property</td>
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<tr>
<td>Outline research priority areas</td>
<td>Internal selection</td>
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<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Examples</th>
<th>Open, Short-term</th>
<th>Open, Long-term</th>
<th>Protected, Short-term</th>
<th>Protected, Long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Great Lab</td>
<td>• Shell Grand Challenge</td>
<td>• Training (CRMS, Cagamas)</td>
<td>• Anchor Industry (UTeM-Samsung)</td>
<td></td>
</tr>
<tr>
<td>Industry Training</td>
<td>• Shell Eco Marathon</td>
<td></td>
<td>• UIUM-MTDC Incubator Centre</td>
<td></td>
</tr>
<tr>
<td>Industry Attachment</td>
<td>• Freescale Cup</td>
<td></td>
<td>Program Review</td>
<td></td>
</tr>
<tr>
<td>Sabbatical</td>
<td>• ICOE</td>
<td></td>
<td>Examiner</td>
<td></td>
</tr>
<tr>
<td>CEO Faculty Program</td>
<td>• HEIGIP</td>
<td></td>
<td>Facility rental (UniRide, COMOS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Innovate Symposium</td>
<td></td>
<td>Endowment (LTAT, Affin Bank)</td>
<td></td>
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<tr>
<td></td>
<td>• Industry Driven Program (OOCL, Coca Cola, etc)</td>
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<td></td>
<td>• KTP</td>
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<td></td>
<td>• PPRN</td>
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</table>

(Reference: MIT Sloan Management Review: How to create productive partnerships with universities)
Note:
- Open: both parties free to share outputs of projects with those other than the collaborators
- Protected: both parties require the consent of the other before sharing outputs of projects with those other than the collaborators
- Short-term: projects take less than 2 years
- Long-term: projects take more than 2 years

11. AREAS AND TYPES OF ACADEMIA-INDUSTRY COLLABORATION

The following diagram illustrates the types of academia-industry collaborations which are strongly recommended by the Ministry of Higher Education and echoed by ICAN Office.

![Diagram of Academia-Industry Collaboration]

Fig. 6: Areas and types of academia-industry collaborations

(Source: Abdullah, A. 2015)

12. ACADEMIA-INDUSTRY COLLABORATION POLICY STATEMENTS

ICAN office has a clear mission of being a facilitator that interfaces in the development and dissemination of high impact knowledge amongst university, industries, communities, government, alumni and other stakeholders.

To achieve the mission, ICAN office has drafted four policy statements:
First Policy:
- Collaborations shall enhance the culture of sustainability between university, industry, community, government and alumni.

Second Policy:
- Collaborations shall be strategic to support the university’s vision and mission.

Third Policy:
- Collaborations shall embrace entrepreneurial characteristics that encourage industry contribution towards university’s income generation and infrastructure development.

Fourth Policy:
- Collaborations shall be in line with the aspiration of MOHE and national agenda.

13. ACADEMIA-INDUSTRY COLLABORATIONS GUIDELINES

13.1 IMPORTANT ASPECTS TO CONSIDER
In order to see that the collaborations between academia-industry work well, there are several important aspects to be considered. They are:

a. Governance and management structures for mobility
   Effective institutional strategies for mobility and internationalization require fit-for-purpose and well-articulated management structures. There is a need to have the support of relevant offices namely; Registrar, Academic Affairs, Student Affairs and Research Management.

b. Integrating all stakeholders (Quadruple Helix)
   Institutional strategies should put more emphasis on the integration of university, industry, community, government & alumni, which among other benefits could improve impact of collaboration.

c. Strategizing collaboration
   Institution needs to pay more attention to the different types of collaboration, given the potential link to strategic internationalization, enhancement of research and teaching and general professional development.

d. The potential of international collaboration
   International collaborations are one area of growing interest and also show the potential for further diversifying collaboration opportunities. The institution needs to provide facilitation for international collaborations.

13.2 RESPONSIBILITIES OF ACADEMIA
a. Identify strategic industry partners
   - Reference to the list of strategic industry partners provided by Industry Relation Division, MOHE.
   - Reference to the list of anchor industry and top industry partners provided by Industry Relation Division, ICAN.
• Identify niche areas of the targeted industries.
• Identify the industries’ needs and areas for collaboration
• Match the industries’ needs with the university’s expertise

b. Strategically engage with industries
• Formulation of a governance system on academia-industry collaboration in the university.
  o The university shall ensure the existence of effective governance and performance measurement system to monitor and audit effectiveness, efficiency and sustainability of university-industry collaborations.
• Enhancement of the role of Industry Advisory Board in universities especially pertaining to curriculum development.
• Enhancement of students’ industrial training.
• Improving laboratory testing facilities, training and consultancy services.
• Increasing the number of relevant industry experts and enhancing the role of Adjunct/Honorary Professors from industries.
• Having a ‘one-stop centre’ in the university.

c. Re-align and focus its direction and resources in collaboration with industries
• Employment of professional academic staff or with industrial experience.
• Enhancement of recognition and reward system.
• Creation of academics as social mentor and succession plan.
• Determination of the university’s leadership/niche area with respect to the resources available.
• Institution of policy on directorship and shareholding in ‘spin-off’ companies.
• Careful selection of industry collaborators.

d. Implement the collaborative activities
• Introduction of Knowledge Transfer Partnership.
• Protection of IP and sharing of technology and innovations.
• Marketing and promoting of expertise in the universities.

e. Grow and sustain the strategic collaborative activities
• Building database and nurturing alumni relations strategically.
• Encourage consortium-based R & D collaborations with industries.
• Continuity in the vision and strategic directions of the university’s leaders.
• Proper evaluation and monitoring procedures to ensure success and sustainability of collaboration.
• Increasing the ‘spin-off/joint venture and out-sourcing companies.

f. Support the work internally both during the contract and after, until the
research/project can be exploited

- Provide appropriate internal support for technical and management oversight.
- Include accountability for university uptake of research results as part of the researcher/university expert role.


13.3 RESPONSIBILITIES OF INDUSTRIES

a. Define the project’s strategic context as part of the selection process
   - Use the company’s research portfolio to determine collaboration opportunities.
   - Define specific collaboration outputs that could provide value to the company.
   - Identify internal users of this output at the working level; executive champions are not a substitute for this requirement.

b. Select boundary-spanning project managers with three key attributes:
   - In-depth knowledge of the technology needs in the field.
   - The inclination to network across functional and organizational boundaries.
   - The ability to make connections between research and opportunities for product applications.

c. Share with the university team the vision of how the collaboration can help the company
   - Select researchers who will understand company practices and technology goals.
   - Ensure that the university team appreciates the project’s strategic context.

d. Invest in long-term relationships
   - Plan multiyear collaboration time frames.
   - Cultivate relationships with target university researchers, even if research is not directly supported.

e. Establish strong communication linkage with the university team
   - Conduct face-to-face meetings on a regular basis.
   - Develop an overall communication routine to supplement the meetings.
   - Encourage extended personnel exchange, both company to university and university to company.

f. Build broad awareness of the project within the company
• Promote university team interactions with different functional areas within the company.
• Promote feedback to the university team on project alignment with company needs.

g. Support the work internally both during the contract and after, until the research/project can be exploited.
• Provide appropriate internal support for technical and management oversight.
• Include accountability for company uptake of research results as part of the project manager role.

(Reference: MIT Sloan Management Review: Best practices for Industry-University collaboration)

14. CONCLUSION

This document specifies the university’s policy and guidelines on academia – industry collaborations. Based on several models and framework such as The Lambert Review, Quadruple Helix Model, The Four Action Frameworks and The Four Models of academia-industry collaborations, the policy and guidelines were drafted. References were also made with Industry Relation Division, Ministry of Higher Education in order to ensure the policy and guidelines prepared support the aspiration of the Ministry and the national agenda at large.

Despite the standard policy and guidelines prepared, the individual faculty and campus in UiTM could find flexibility in adopting the policy and guidelines to tailor-suit their respective approach in academia-industry collaborations. The policy and guidelines were prepared to assist the faculty and campus to spearhead initiatives in collaborating with the industry. This document serves as one of the main references besides other documents prepared by ICAN Office and the Ministry of Higher Education. Other relevant policies and guidelines from relevant offices in UiTM namely; Academic Affairs, Student Affairs, Research Management, Registrar and Bursar should also be referred to complement the policy and guidelines on academia-industry collaborations.

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