

Commercialisation Activities in Malaysian Universities: Issues and Challenges

Ahmad Naqiyuddin Bakar^{a,c,e}, Abdul Rahman Omar^{a,b,c}, Abdul Rauf Ambali^{a,c},
Roseleena Jaafar^{b,g}, Mohd Fadzil Mohd Idris^d, Zulkifli Abd Majid^{b,g}, Kamarol Baharen
Mohd Rom^{f,g}

^aFaculty of Administrative Science and Policy Studies, UiTM Shah Alam, 40450, Selangor, Malaysia
^bFaculty of Mechanical Engineering, UiTM Shah Alam, 40450, Selangor, Malaysia
^cCentre for Strategic Planning and Information (CSPI), UiTM Shah Alam, 40450, Selangor, Malaysia
^dHigher Education Leadership Academy (AKEPT), Bandar Enstek, 71760, Malaysia
^eCentre for Biodiversity and Sustainable Development, UiTM, Puncak Alam, Selangor
^fAcademy of Language Studies, UiTM, Shah Alam, 40450, Selangor, Malaysia
^gResearch Innovation Business Unit (RIBU), UiTM, Shah Alam, 40450, Selangor, Malaysia

Abstract

The study aims to examine issues of managing the innovation and commercialization activities in Malaysian Universities. Specifically, the aim of this study is to evaluate the perception of experienced researchers who have successful in their research product, in terms of patent and/or commercialization. Qualitative methods were applied to examine how individual researchers relate their personal experience against impending challenges in their endeavor. Despite remarkable macro level initiatives, the obvious lack of coherence policy instruments across institutional Ministries has dampened the progress. Consequently, the Intellectual Property and Commercialization (IP&C) Centre are operated within a less conducive eco-system within universities' parameter, thereby weakening their functional roles to make an impact externally. At the individual level of researchers, their traditional and structured worldview and philosophy about research undertaking could well be the hindrance. The study has highlights fundamental yet practical knowledge about commercialization issues, thereby supporting Malaysia's aspiration for an innovative economy.

Keywords – *Commercialization; innovation; Malaysian universities; policy; researchers.*

Introduction

Universities has been recognized by the World Bank (2010) in their important role in improving the lives of individuals and society, enabling higher wages and productivity, ultimately driving society's independence and initiative. The publication of the National Higher Education Action Plan, 2007-2010 as well as the National Strategic Higher Education Plan are the two most recent response outlining seven major

areas¹ of Higher Institutions of Learning (HEIs) reform to the changing socio-economic and socio-political circumstances (MoHE, 2010). Similar to developed countries, the marketlike reform strategies are adopted to transform the university governance by allowing institutional autonomy, thereby paving ways for a competitive educational market with the emphasis on the importance of performance and counting outputs and outcomes (Mok, 2010). Universities symbolises the centre of knowledge as they create stock of knowledge and expertise and are equipped with relevant knowledge-generating capabilities, as well as research facilities which allow them to engage in science-based entrepreneurial activities (Rothaermel *et al.*, 2007). With emphasis on fostering an enterprising and entrepreneurial culture within higher education, the term “enterprise university” is preferred term as opposed to “corporate university” – reflecting both economic and academic dimensions and is, as much about generating institutional prestige as about income (Marginson and Considine, 2000). A study Handscombe (2003) by revealed that through the Science Enterprise Challenge few years ago with the formation of 13 Science Enterprise Centre (SECs) across 65 UK universities have helped established links between universities and business and promote a culture of enterprise and facilitate the commercial exploitation of scientific research: 45,000 students educated in enterprise, enhanced skills of 1,800 education professionals and supported 1,000 start-ups. In Malaysia, the Government has recognized the important contribution of higher education sector, particularly the Research Universities (RUs) through collaboration with industries to promote innovation in the form of MoU/MoA in areas of staff mobility, supervision, product development, commercialization and technology transfer at local and international level in promoting ecosystem-based innovation through R&D (Abdullah, 2010).

However, despite various initiatives to accelerate the rate of commercialization, there national progress in intellectual property (IP) and technology commercialization is low. Chandran and Wong (2011) indicates that the current local indigenous innovative capabilities are still weak and require better policy intervention to accelerate the inventive capabilities of Malaysia. Thus, a research study is conducted to examine the perception of experienced researchers on the overall eco-system of innovation and commercialization in Malaysia considering the role of IP&C Centres and/or Office of Technology Transfer (OTT) as well as the attitude of the general researchers in universities.

Malaysia’s Climate for National Innovation System (NIS)

With the intent to enhance the funding cost effectiveness of higher education in Malaysia, the Ministry of Higher Education (MoHE) had taken two prong strategies, first, strengthening industry and research collaboration; second, providing greater autonomy to universities; and, third, strengthening their performance culture in order

¹ The areas are: widening access and enhancing quality; improving the quality of teaching and learning; enhancing research and innovation; strengthening institutions of higher education; intensifying internationalization; enculturation of lifelong learning; and reinforcing the Ministry of Higher Education’s delivery system.

to encourage teaching and research activities (Economic Planning Unit, 2010). It was reported that under the 9th Malaysia plan (2006-2010), a total RM3.101 billion R&D grants has been invested. Next, in the 10th Malaysia Plan (2011-2015), the fund of RM741 million has been allocated for the first two years of the five-year plan. As caretaker for the fund, MoHE announced a set of 4 R&D schemes to utilized the fund (see Table 1 below):

Table 1
10th Malaysia Plan Ministry of Higher Education R&D Schemes

No	Scheme	Allocation (2011-2012)
1	Fundamental Research Grant Scheme (FRGS)	300 million
2	a) Exploratory Research Grant Scheme (ERGS) b) Long-Term Research Grant Scheme (LRGS) c) Prototype Research Grant Scheme (PRGS)	300 million
3	Research Incentive	41 million
4	MoHE Special Project	100 million
5	TOTAL	741 million

(Source: EPU, 2010)

Obviously, research communities in universities now have access to three newly added grant scheme – the ERGS, LRGS and PRGS, in addition to the previous FRGS. By intensifying the matching between university R&D activities and the programmes in place towards commercialization and business opportunities, these three additional grant schemes indicating strong commitment by the Government to enhance the research development and commercialization. Particularly in terms of development of commercialization efforts, the strategies have been, first, the establishment of private universities; second, establishment of consultancy centres; third, emphasizing research – identification of research agenda, creation of “Research University” and “Apex University” status for the public universities and the establishment of research management centres; and fourth, emphasizing research commercialization. In this regard, the university R, D & C are one of the critical success factors for an economy-based innovation (Kamarulzaman *et al.*, 2012).

According to the MoHE’s Report on the progress of commercialization activities, the 16 public universities in Malaysia had only manage to commercialise 58 products out of the 313 identified with commercial potential (see Table 2 below):

Table 2
University Research Commercialisation until August 2008

No	Universities	Patent	Trade mark	Total Commercialised Products	Total R&D with Potential for Commercialised Products	Total No. of IP
1	Universiti Teknologi Malaysia (UTM)	9	28	6	110	153
2	Universiti Putra Malaysia (UPM)	12	27	16	15	70
3	Universiti Kebangsaan Malaysia (UKM)	3	20	0	33	56
4	Universiti Malaya (UM)	0	11	3	31	45
5	Universiti Sains Malaysia (USM)	11	4	15	9	39
6	Universiti Teknologi MARA (UiTM)	5	22	8	0	35
7	Universiti Malaysia Pahang (UMP)	0	0	1	29	30
8	Universiti Malaysia Sabah (UMS)	0	0	0	26	26
9	Universiti Utara Malaysia (UUM)	0	0	0	21	21
10	Universiti Tun Hussein Onn Malaysia (UTHM)	0	0	3	16	19
11	Universiti Malaysia Sarawak (UNIMAS)	0	8	0	4	12
12	Universiti Islam Antarabangsa Malaysia (UIAM)	0	2	2	4	8
13	Universiti Pendidikan Sultan Idris (UPSI)	0	0	0	8	8
14	Universiti Malaysia Terengganu (UMT)	0	0	2	4	6
15	Universiti Malaysia Perlis (UniMAP)	0	0	2	3	5
16	Universiti Teknikal Malaysia Melaka (UTEM)	0	0	0	0	0
Total		40	122	58	313	533

(Source: MoHE, 2008)

Researchers have argued that deep and correct understanding of a new product in research and development sector is crucial in order for the product to hit market at the right time (San, *et al.*, 2012, Vigdor *et al.*, 2007). The Technology Transfer Office (TTO) in universities which performs the functions of consultancy service, outright sale of technology, licensing of technology, joint-venture, and start-up ventures is responsible in “enabling better liaison with the private sector and to facilitate business arrangements between the researchers and the private sector” (*ibid*). Regarding this, Vigdor *et al.*, (2000) contended that successful management of university-industry engagement should be backed up by top management and be based on a strategic management approach to make the development of such relations to declare university-wide, long-term development objective. Although it is said to be central to knowledge-driven economy and appears to have a world-class base, Malaysian IHLs were seen to have not been very effective at translating research outputs into business innovation, competitive advantage and social benefits (Raja Suzana, 2011).

Theoretical Framework

The Triple Helix Model

This is the University-Government Industry model established within the perspective of corporate or entrepreneurial university. Etzkowitz (2008) in illustrating the ideal situation for the formation of the Triple Helix proposed an academic with a foot in both camps: one in academe and the other in industry, and firm formation within or linked to universities. At the core, the TTO and research groups interlinked with industry as well as government aims at innovation and entrepreneurship. In other words, this model emphasized the interaction between industry, academia and government. All these elements are embedded in a system of innovation. Mytelka (2000) further explained: “As a conceptual framework it refers to a new understanding of innovation as an interactive process in which enterprises in interaction with each other and supported by institutions and organizations—such as industry associations, R&D, innovation and productivity centers, standard setting bodies, universities and vocational training centers, information gathering and analysis services and banking and other financing mechanisms—play a key role in bringing new products, new processes and new forms of organization into economic use”. Empirically, this can be seen by the implementation of the Second National Science and Technology Policy (STP II) which is centralised by joint venture of government, industry, universities and public research institutions together in a synergistic partnership.

The Quadruplex Helix Model

The Quadruplex Helix Model is an improved version of the Triplex Helix Model, by adding another dimension that is equally important today as the other three – the Rakyat (Quadruplex Helix Way to Innovation, 2012). The Prime Minister Najib stated that Malaysia is the first country to introduce this strategy in its innovation ecosystem. The fourth element – which is the People will be involved in making Malaysia a globally competitive nation. The argument is that the four involving parties – Citizen, Government, Universities and Industry must work and collaborate together to promote innovative valued products with market value to enhance the commercialization state (Agensi Inovasi Malaysia, 2012).

Researchers, side by side with IP&Cs, stipulate that enterprising and entrepreneurial culture can only be achieved by incorporating the knowledge output of the university into business innovation. Some scholars have even gone further “intrapreneurial process” within the university-setting (Ropke 1998; Kirby, 2006, Etzkowitz, 2003) which leads not only to new venture creation (Chrisman *et al.*, 1995)

and other sources of income (Etzkowitz, 1983) but also to technology transfer activities which include commercialization and commoditization (Jacob *et al.*, 2003) through university-government-industry collaboration and supported by the acquisition of external funding (Subotzky, 1999). Chrisman *et al.*, (1995) viewed academic entrepreneurship as a mechanism of facilitating efficient university-industry technology transfer but narrowed down the meaning of academic entrepreneurship to ‘the creation of new business ventures by any of the university agents’. They used the term ‘faculty entrepreneurship’ to compare and contrast the level of entrepreneurial activities between faculties at the university. Interestingly, they found that academic entrepreneurship occurred not only in the engineering, design, medical faculties but also in humanities and liberal arts faculties. Raja Suzana (2011) argued that research found that “for University Technology Transfer Offices (UTTO) staff, there was a positive relationship between financial motivators and successful entrepreneurial activities”. She further asserted this to general premise of agency theory that individuals will be motivated to pursue and complete entrepreneurial activity due to the motivations of formal incentive schemes, i.e. pay (*ibid*).

In the explanation of this concept, researchers have stated that partnering between public and private sector is one of the efforts taken to commercialize products. It is a pluralistic functions and more specifically consists of research institutions, universities and tertiary institutions that collaborate with private sectors mainly from multinational firms (Nagaretham *et al.*, 2012). Empirical evidence suggests that although the government has increased research funding, the funding changes have also “paradoxically had a negative impact on the number of research grants available to public universities (Abd Rahman *et al.*, 2012).

A study by Nagaretham *et al.*, (2012) found that the national progress in IP and technology commercialization has been very poor particularly in the aspect of patent applications. Much dependency for patent is still relying on public, foreign and large firms R&D activities for patent application and commercialisation. Furthermore, quoting Damadran (2010), they (*ibid*) found the achievement of commercialization is being limited to a few organisations such as Malaysian Palm Oil Board (MPOB), Rubber Research Institute of Malaysia (RRIM), Universiti Putra Malaysia (UPM) and Universiti Sains Malaysia (USM).

Research Methodology

The cases and data collection

The objective of this study is to examine what are the fundamental issues and factors that affect IP&C performance. The research focuses on the innovation system in Malaysia, particularly at the level of national policy, the role of IP&C centre and the

individual researchers. The main contribution is for the qualitative survey on the seasoned researchers, to build their decisions on studied criteria. Moreover, this study focused on exploring these issues in detail through interviewing experts in the IP&C to build a solid base for understanding the issues in Malaysian innovation and commercialization activities.

During the first round of quantitative study the choice of universities, were distinguished by different status parameters: mainly research versus comprehensive or focus universities. Three methods, such as, interviewing, observation and document analysis were used to conduct this paper. Previously used procedures by different innovation centre for assessing project performance were used to frame questions for interviews. At the first round of the study, selected Technology Transfer Office (TTO) or the IP&C Centre in universities were physically observed along with the expected researchers to see their present status of uses. The population of this study comprised researchers from selected IHLs in Malaysia. As indicated above, in 2008, 313 total R&D with potential for commercialized products were identified in Malaysia (MoHE, 2008). They were involved in various R&D fields such as natural sciences, information technologies, engineering, economics, social sciences and humanities. The study used simple random sampling technique (Gay and Airasia, 2000).

The respondents must have at least experience engaging with IP&C at their respective IHL as a researcher. Commercialization process in a research field starts from the recognition of opportunities, then continue with basic and applied research with creativity which leads to innovation. Basically the final stage in commercialization is entrepreneurship and commercialization (Farsi and Talebi, 2009). Consequently, these requirements are to ensure that the respondents have experienced several R&D activities and already have some views about patenting or commercializing their products. Letters were sent to the Deputy Vice Chancellor (Research and Innovation) of the nine identified IHLs. Subsequently, the selection of the respondents was made randomly by the respective IP&C centres of the IHLs contacted.

A qualitative method has been approached to conduct this paper as the epistemological issue, that is, the perception of researchers to the IP&C issues, which can hardly be exposed by measuring “on a physical scale” (Kaplan and Maxwell, 2005; Schulze, 2003, p. 12). The authors’ current experiences of managing of IP&C have also helped to contact of officials for interviews. The semi-structured questionnaires were used for interviews.

For the qualitative survey, particularly for the semi-structured face-to-face interview, the tape-recorded interviews were transcribed into text manually. The interview texts were then organised under different broad descriptive codes with NVivo software. Once organised, data were further coded into different categories to allow emergence of thematic ideas for necessary analysis. Data from different sources regarding every single question have been taken into account. However, analyses were mostly completed manually to get deep understanding (Welsh, 2002) of research data. Analysed data were then continuously compared and contrasted (Strauss and Corbin, 1998) with the relevant theories to interpret the perceived values for IP&C issues by different researchers in correspondence with their experience in dealing with the IP&C centre.

Data collection and sample

The researchers sent a request letter to each of the researchers identified individuals to obtain permission to setup an in-depth interview with them, while assuring respondents anonymity and information confidentiality. Only four agreed to participate in the study, which are reasonably sufficient. Creswell (2005) argues the importance of locating other people to the study through snowball sampling where those participants answered a set of questions, during interview or through informal conversations, to recommend some other suitable individuals for conducting interviews. Moreover, we interviewed only four successful researchers agreed to participate. All of them request to be anonymous.

According to Creswell (2005), the accurate number of participants is less important in qualitative assessments. Besides, the researchers' ability to study the research topic in more detail decreases as the sampling size increases (Kalof et. al, 2008; Creswell, 2005; Ritchie *et al.*, 2003). Johnson and Harris (2002) argue that mailed questionnaires to 700 people in a quantitative research might only be targeting 30 informants. This argument shows that in qualitative researches, researchers use smaller numbers to understand the phenomena in greater detail.

This research involved a sequence of personal interviews between the researcher and successful participants in their business field. Through a personal one-on-one interview, we gathered the required information by asking the participant a set of questions. Interviews enable the capturing of diverse views about a theme from various research viewpoints. This is one of the reasons for using an interview approach in research (Kvale, 1996). In addition, during the conversation, the researcher can evaluate the participant directly by observation of the live experience (Cassell and Symon, 2004).

The researchers divided data collection strategy into a two-part approach. In part one; we collected general information to aid in the appropriate selection of participants. This information included personal information, work history, existing research type, specific environmental discipline, date of starting the research, position within the university, and other personal information.

In part two, the data collection strategy involved conducting personal one-to-one interviews. Researchers obtained qualitative data about improving the start-up performance through related later stages factors of accelerating the IP&C initiatives during on-site interviews using a list of interview questions. The researchers asked every participant a series of open-ended interview questions over a period of one to two hours to relate his or her experience with IP&C, policy issues, and the later factors that can have an impact on improving the performance of IP&C. The tape-recorded data was then transcribed as narrative data. In addition to the data gathered from interviews, we also reviewed the relevant documents to support and/or verify the information gathered from interviewees. The researchers carried out this research during the second quarter of 2013, from August to Oct. The data obtained refers to that particular moment in time, given the fact that changes may occur at any time during the course of the study.

Data analysis

The information collected from interviews and analysis of documents was organized and rigorously interpreted to extract the key findings using the content analysis method. The analysed the information using spiral steps for data analysis as proposed by Creswell (2009). First, we organized the collected data into several forms (i.e. database, sentences, or individual word). Second, we scrutinized the collected data sets several times to obtain a complete picture or overview of what it contains as a whole by taking notes and summarizing the key points that suggested categories or themes related to the research. Third, the researchers identified and classified the general categories or themes accordingly. The themes that are applicable to this study are procedures, researchers' experience, policy issues, critical success factors, communication flow, and knowledge management, among others. Finally, the data to describe the relationship between the categories or themes were integrated and summarised.

Findings: Perception of Issues and Challenges of IP&C in Malaysia

The findings about the perceptions of issues and challenges have been categorized into the following three sections:

Policy Drive for R&D Ecosystem

The respondents raised concern about the current policy framework which according to them is not well coordinated across Ministries:

“Basically the government must be put in place STI infrastructure. The Science act must be come out. The policy of R&D is not there. The policy of innovation also is not there in the country so how can we move. This is where many the head against the wall. University is just a small pot so for the university to flourish in the R&D and right now without the policy that I just stated the university cannot basically can stand on its feet by just commercialization of R&D. that was very naïve that the KPI is set to the vice chancellor. The other important thing is that the KPT and MOSTI has to talk because they are funding two different funders. And probably funding on the same thing and the mechanism has to be the same. Unless we do it because we are the small country”.

Incoherence of policy will affect the implementation as argued by one of the respondents:

“So the concept is not there anymore. The idea is good but implementation is always problems. Our blueprint is fantastic but implementation is not so good because when it comes to many officers, they have different interpretation as they goes down the line, it is difficult. This is nothing new. Bottom line is that we couldn't get enough venture cap come in and evaluate”

The respondent further asserted that the policy currently seemed to favour the foreign investors rather than local ones. She relates her personal experience:

“When the policy of the country create the flavor of the innovation ecosystem then the university can play their role and every part of our country will growth. When you form a company, policy and everything will make the company fly. But the policy of the country does not make anyone fly. The policy of the country is meant for investor but they don't think about us as us are the business. All this while, our business

is bringing outside people in so we facilitate to make Malaysia as their second home. What we forget when we do that, we still in the industrialization mode...We are now in innovation k-economy. K-economy means our people must be the business. It is two different things”.

Counting her own personal experience, she obviously was frustrated with the scenario:

“I got vision, I got R&D to back up all the kits we have so we are ready but once the company start to growth, they cannot growth because innovation policy did not facilitate in the sense that do we get a break from Ministry Of Health? In Cuba, the innovation policy such that when the lecturer get a grant to produce vaccine, the vaccine must be used in Ministry Of Health in Cuba so people in Cuba can get benefit from the R&D of the university but not in Malaysia. All my kits go to 18 countries in the world but how many of that in Malaysia? Malaysian don't buy Malaysian kits.”

The Role of IP&C Centre or the OTT

When asked about the challenges faced by the IP&C Centre or OTT, respondents were quick to highlight few pertinent issues, one of which is communication:

“It's the problem of communication because the researcher is talking science to the businessman. The researcher who has PhD should know better. The businessman doesn't have the PhD and he does not interested in science. He interested on money. Can this make money or not?”

Communication barrier within university prevails, as noted by the interviewee:

“You need to understand the governance of the university. One, the university side. The other is the commercial side. This is still negotiating on the behalf the university. Unfortunately you always argue between the two..”

Regarding the role of the mentorship, obviously it is important but constrained by a very limited numbers that be performing this task:

“Mentorship is very important. If 3% of Malaysian is capable to R&D commercialization, how many people are left to be mentor? Not enough for us to go around”.

However, at the least, the role of the mentor should be replaced by someone who is having a strong entrepreneurial spirit, particularly universities’ leadership:

“Loose because the mentor should not be in the center. The mentor should be loose but you must have proper mentor. You get the wrong mentor, you get the wrong thing. That is you touching based on R&D. Mentor is on the R&D side. Mentor can be at the R part and at the D part but for commercialization, there is no mentor here. Now it needs leaders with the business mindset or TNCs or vice chancellor with the mindset and able the university now move.”

On the aspect of who should manage the IP&C Centre, there were few opinions:

“The person must have certificate as a patent agent. And the certificate of patent agent is given to whom; a lawyer, or a scientist, or any technical person. Not ordinary researcher. That researcher must be one of this...A lawyer, engineer, scientist... Because the lawyer they know the rule and everything and all the scientist know all the biotech and pick up more easier and the technicality.”

“Of course. 80 failure because now the professor is the CEO of the company. All professor are not business savvy. They will not invest unless they sure back and that make them ridiculous.. But what he has is that as some input as a researcher, he could appreciate the research and the other one he could also know a bit about business. There will be people around him to help him to negotiate and so forth.”

“So the reason why I not happy with them is they are not proper businessman and they are not good enough to convince us to allow the product because at the other hand now I acting as I need to protect the IT, the interest of our studies and university. Nevertheless there are some of the big company can win. That’s one big case whereby we slow in acting, the company was every week, keep on sending. We are slow. There was one to me biggest failure”.

“They don’t want to be risky so everybody did not have business so you have no business what I think is you should hire somebody that is right. The right person. We interviewed actually people to do it. So in fact not only the academic qualification, its more about the personality. Means the desire, the passion even though we are in agriculture. If you are having these passion of commercialization, I think you can take.”

“You should have somebody to have the background to do their work and I do my work. Simple as that. Rather you expect the researcher even me also cannot do. Our company can hire and fire. Before this we have workers for hired. We are paying them, not the university, not the government. If they are not doing well, we fired..”

Pertaining to the willingness to take a risk for business venture, respondents raised their concern on the common attitude of universities’ leadership:

“Number one is both side industry in Malaysia are still worried or afraid or not ready enough to put in some investment.”

“The person can come and use or you can engage somebody to help the researcher because the return is not tomorrow. It maybe one year, two years, maybe double, triple, you don’t know. That’s what the system done in all Malaysia and we are afraid to do that because we always short term thinking. ...They need to be commercialized then I want to see the money tomorrow.”

“That’s is why this lecturer should not be in this company because they were making money for other lecturer and work very hard to make other lecturer rich but they are not rich. And then they work very hard to make this and then they forgot to make R&D, they don’t do the research. They don’t get the promotion but they are working to make this people rich. They get very angry and frustrated.”

One respondent relates his experience in which he was not had an access to the management committee to defend his research proposal:

“In fact last time I was here, let me go in and defend because the person who goes and defend also you cannot let say for example he cannot defend for you because you know your product better than he is

and it is unfair to him to do that. He has lots of other things to do. So that's why I said, let me go in."

Another respondent has unpleasant experience with his patent agent:

"We hired a lawyer but unfortunately, the lawyer was not so helpful. I mean you can pay her but she didn't communicate with me. It always through email and she never emailed me. And then not even remember my name. She should engage with me and she's paid. So I told my boss that I don't think I can work with her. So I went directly to the department of agriculture and then one of the HR officer said that you can do it yourself. I fill the form, I paid hundred dollars or hundred ringgit to writers, two hundred ringgit, I paid my own. About few weeks, we got already IP".

On what could be the best case scenario to facilitate the growth and proper functioning of IP&C, one of the respondent suggest the following:

"If they think like that they would understand that the CEO of the company don't get paid as same as the lecturers but you must remember that CEO of the company do not have any pension scheme, doesn't have health scheme. We just give them the money and the car and deliver for us to get the profit and they have to do everything else. Obviously the salary should be more because they got paid by that but no the answer were same most are chances are c. but you have to know that the CEO of your company is responsible to you. You don't like him, you can fire him. As I say now vice chancellor of the university should not get involved because they tend to control the business. They don't want to take risk and tend to control the business but business must take risk. It a huge difference. We are talking about two opposite pose of thinking and you have this thinking controlling the University Company and Insha'Allah, you will not get commercialization".

Researchers' drive for research and commercialization

All researchers interviewed believe that they managed to achieve the level of success in their research work due to the right paradigm of thinking from the start about how to approach their work. Our fieldwork provided some evidence that at the core, noble intention should drive researchers' decision to innovate and commercialise.

“If you start up what you have done, that will be difficult but you need to ask a question if I want to go for commercialization, what kind of research and what kind of research methodology should I approach because of the current way of doing research from a to z were not delivered the commercialization and that is what the three million are what the researcher doing in Malaysia. It will not work. That’s why you suppose to work from z to a and that is the only successful way. So if you say please describe what kind of work, then you just go from a to z again”.

She further explained:

“So to do different you have to go from z to a. I didn’t start by saying, “what kind of research that I do? What is the work that I am going to do?”. No. I start by say, what is it I want to do for whom?”. Who is my target audience that would one now that I would deliver? And then I worked backwards.”

The other interviewee further pointed out that he was more concerned about inventing something that is in particular need of the most needy:

“my first thought when I did the research is to help poor farmers. It is not for commercialized because these poor farmers who plant chilies, they are very poor. I want them to have some verity that good for them. What I feel is the fund is given by the government. It should be given to the needed”

Moreover, the impetus of research was normally originated from the real issue that hits the society at large. This is perhaps one single drive that really push the research towards its completion. According to another interviewee:

“What I have to say is you must got the confidence in your scientific discovery and you have to have confidence in yourself.”

According to the views, most researchers are too eager in deciding what to research, are either overlooked the impact it could bring or less interested in a noble purpose – that is to produce something for the benefit of the critical mass. For instance, one interviewee asserted that:

“Syndrome whereby a patient who have this toxic effect will all the skin just peel off so there’s no skin at all and it could lead to infertility and every year it is said that about 7 000 new takers of this. And in initial study that we have found that in Malaysia the percentage of patient the frequency of people is 45% that mean in every 14 or 15 people in the population of 100 have it and it a bit low. In this part of the world population, it’s very high.”

In this regard, one of the respondents proposed researchers should be thinking differently. The concept of blue ocean strategy should be considered, as noted by the interviewee:

“So the blue ocean first, what is it you are going to do when no man has gone before, they were then decide on first of all whatever that you want to produce you need you have impact. Second, does it have the sales volume, If it doesn’t have the sales volume nobody will buy.. And the third is does it have the sales volume? But if it have impact but no sales volume nobody will commercialized it. This are the things that the people did not think.. When they want to pump the money, they have to make the money, they have to exist it in less than five years.”

In fact, the respondent went further to argue that the failure of some funding scheme, Prototype Research Grant Scheme (PRGS) is due to failure to see the big picture:

“PRGS ask you z to a. if you don’t do z to a, you won’t get PRGS. But there was the in thinking and design the PRGS. They end up to do academically a to z because they couldn’t get the venture cap to come in, they couldn’t get the business people that actually do the evaluation because the science is over. PRGS is no longer about the science. The science is over, now is the product”.

Discussion on Issues and Challenges

The analysed data revealed that there are three most pertinent issue that have been raised –the policy framework, the institutional governance of the IP&C Centre or the TTO and the researchers’ mindset, The Government never fall short of new initiatives, but seemed to been lacking in terms of coherence policy. The Centre or TTO is weak in terms of CSFs particularly in terms of the competent staff and strong support from university’s management. On the other hand, the researchers are generally

are holding a structured mindset about the way how to approach the research and innovation.

In Malaysia, the Government work closely with the universities through the Ministry of Education to create the ecosystem for R&D and business creation. The following initiatives are currently pursued (Kamarulzaman et al, 2012):

- Infrastructure and infostructure for R&D activities (e.g.: library, databases, laboratories, equipment, etc.)
- Organizational structure
- R&D Management (e.g.: Research Management Centre)
- Commercialization Management (e.g.: Business Unit, Commercialization Centre, Technology Licensing Office (TLO), Innovation Centre, Technology Transfer Office (TTO), Training and Consulting Unit, Business Creation Office, Incubator, etc.)
- Human capital
- Policies (e.g.: R, D & C Roadmap, training and development programmes, incentives, KPIs, funding, etc.)

There are a number of funds, grants and incentives made available by the government to enable innovation and business creation among the universities. Following are some examples of the government initiatives (ibid):

- Cradle Investment Programme (CIP) (www.cradle.com.my) - Seed funding for turning technology oriented ideas into commercial ventures. The programme also includes a sub- programme for university spin-outs and start-ups; University Cradle Investment Programme (U-CIP).
- Demonstrator Application Grant Scheme (DAGS) - managed by the Ministry of Science, Technology and Innovation (MOSTI). It is seed funding for ICT-based community pilot projects.
- eContent Fund - managed by MOSTI. Fund for content creation projects.
- InnoFund - managed by MOSTI. Fund for innovation commercialization projects.
- Multimedia Super Corridor (MSC) Malaysia Intellectual Property (IP) Grant Scheme - managed by Multimedia Development Corporation (MDeC). The scheme provides subsidy up to 70% of IP protection costs. However, this is done in reimbursement basis and application should be made after the process had been done.

- MSC Malaysia R&D Grant Scheme (MGS) - managed by MDeC. The scheme provides grant for R&D activities conducted in Malaysia.
- eScience Fund - managed by MOSTI. The fund for R&D projects in priority areas largely targeted by universities.
- Techno Fund - managed by MOSTI. Fund for pre- commercialization projects and IP acquisition.
- MSC Malaysia Technopreneur Pre-Seed Fund Programme - managed by MDeC till 2009. This was transferred to CIP and rebranded as CIP Catalyst pre-seed fund programme. The fund is for technopreneur start-up creations.

However, as Nagaretham *et al.*, (2012) has found out in their study, despite hundreds of many policies being introduced, there is no standard step to follow; each policy being introduced has different ideas and plans which are not interrelated. They further asserted that “there is a very poor coordination between the research universities, government and industry” (ibid). The researchers interviewed also commonly agreed that there shall be more coordination between the funders agencies particularly the MoSTI and the MoE.

University technology transfer is a step-by step process of commercializing university-developed technology and invention whose success is dependent on the role played by the creator of the intellectual property, the individual scientist or engineer (Wright *et al.* 2004). However, when academic entrepreneurship is interpreted as encompassing not only organizational creation but also strategic renewal, transformation and innovation within the university systems (Brennan *et al.*, 2005; Brennan and McGowan 2006), then there exist a boundary between academic entrepreneurship and university technology transfer.

Today, the competitive environment for most universities, irrespective of size and age, bares little difference when it comes to commercialization and innovation. The capacity to learn and unlearn for most universities is depending upon the knowledge base (competencies), customs and practices of the academic communities and institutional governance within which the IP&C Centre or OTT is embedded. What prevails is that, in most TTO or IP&C Centres, an issue of lack of trained or experienced staff with specialized or in-depth knowledge are common. As observed by San *et al.*(2012), “there are lack of the expertise needed to scientific creations of the researchers (Chandran, 2010; Innovating Malaysia, n.d.); not able to understand the mechanism of the product affects time lines and outcome of commercialization activity. R&D sector in Malaysia is still focus at the first generation stage where performing the experiments at laboratory level is given the top priority (Chandran, 2010). At first generation stage in research, most of the time, funding and knowledge are drifted into the laboratory methodologies. Priority is given to produce the best product which can perform well at laboratory level but not commercially”.

Local researchers in general have a traditional and structured mindset about research study leading towards patent and commercialization. Most of them believe and follow the linear progression of the research work. While pursuing for patenting their product, they seem to overlook the fact that their products have no commercial viability. To be sure, due to a very poor patent application, Malaysia is still relying on public, foreign and large firms R&D activities for patent application and commercialization (Nagaretham *et al.*, 2012).

Thus, the above analysis indicates that all the researchers interviewed share the views that the role of national innovation system needs to be revisited. The IP&C Centres and TTO is not forceful enough to make a remarkable impact despite a wide range of initiatives and intervention strategies have been implemented. The local researchers' mindset before embarking any innovative project also needs to be right the first time as a prerequisite for a lasting impact of the research work to pursue.

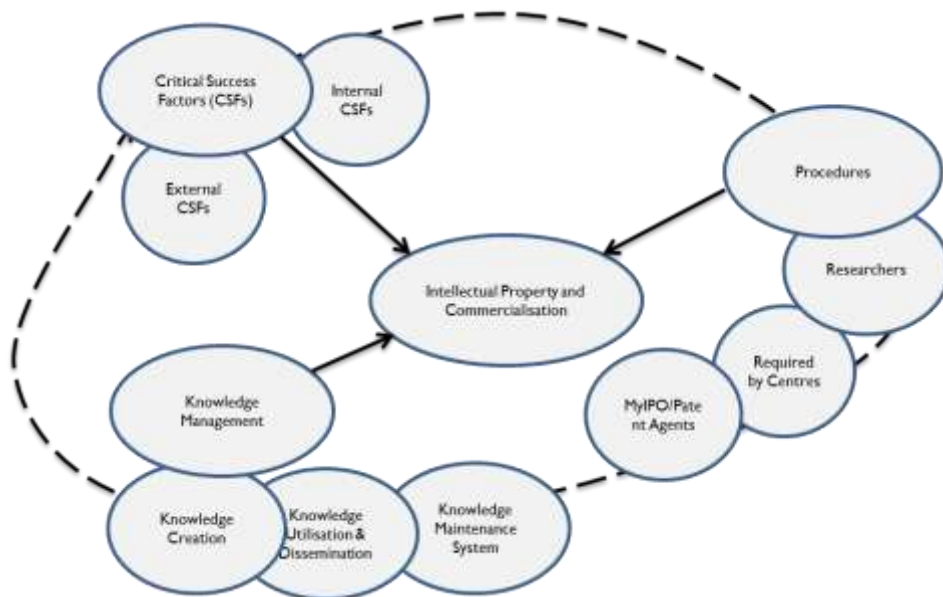


Figure 1:

Conception Matrix for Issues Affecting Intellectual Property and Commercialisation

In Figure 1 above, straight and continuous lines indicate the interrelationships of issues that effect the IP&C. The broken lines represent the indirect impact the

different issues can bring to the intensity of IP&C. This figure, nevertheless indicate that the issues are cross-cutting and have direct or indirect effect on IP&C.

Research Synthesis: Impact of Issues and Challenges of IP&C in Malaysia

In a 2010 study on the public funding of innovation entitled “Optimising Fund Disbursement in the Public Innovation Funding Landscape”, commissioned by Unit Inovasi Khas (UNIK) to identify alternative models to disburse public funding in a more efficient manner, the Boston Consulting Group (BCG) has outlined six enablers in accelerating the country’s innovation strategy. These six enablers include: having a national innovation strategy tailored to local context, pro-market policies, effective funding of innovation, streamlined public organisational structure, world-class infrastructure and talented human capital to power innovation. At the same breadth, they proposed what seemed to be the root causes to Malaysia’s innovation paradox as follows (ibid):

- Absence of cohesive national innovation strategy
- Lack of market driven policies to enable innovation
- Blunt funding instruments for supporting innovation initiatives
- Multiple public agencies working in silos on innovation initiatives
- Broken linkages across industry and public research institutes
- Lack of vibrant innovation culture and human capital

Pertaining to this issue, most researchers joint chorus of the idea of the understanding the linkages among the innovative actors, i.e. private enterprises, universities, public research institutes, researchers, who involve in producing, distributing and applying various kinds of knowledge and resources aims at innovation and technical progress (see Algahtani and Md. Razib, 2012; Yim, 2006; Kayal, 2008). Interestingly, what is less focused on getting the views of experienced researcher who have indulged extensively in their research and commercialization endeavour. While numerous studies revolved around the need to understand the nature and impact of industry-university engagement, what are their views about the current climate for innovation. The value of personal experience of the experienced researchers bears strong value due the fact that some of these researchers have not only made it in the local market, but also to the global stage.

This research study has revealed that the presence of only few champions does not envisage tremendous growth of the entrepreneurial spirit of the universities, as the overall progress to commercialization is still not impressive. The assessment of “producing, distributing and applying” is found to be weak in most universities. The

important stimulant impacted by these elements are not rigorously investigated, thereby weakened the end output for commercialisation.

It is argued that the current strategies do not necessarily lead to a conducive eco-system or to a heightened innovation and commercialization. Government should avoid working in silos; instead to adopt a more unifying approach to policy matters. Through this, the climate for growth can be materialized and thereby achieving the goals for more commercialization. In Malaysia, what is common to see is that while aggressively pursuing many policy instruments to enhance research, following the practice in the developed countries, the reality on the ground is significantly different. The fact prevails is that some policies are not well coordinated across institutional Ministries and funding agencies. If anything, universities are working in silos, i.e. the concept of commonly shared facilities for research is not happening, Ministries do not effectively communicate.

For most IP&C Centre or the TTO in universities, they are not well equipped with an adequate resources such as the staff with professional qualifications and facilities. Situations get even unfavourable to the Centres when some of them operated at arm's length with the management. The effective mechanisms should be in place to ensure the Centres are operating at the optimum level. The TTO of the IP&C Centre need to be provided with all the support in terms of the right human capital, financial support, facilities as well as management support.

There is also the issue of lack of well trained and experienced patent examiners in Malaysia Intellectual Property Corporation (MyIPO). As the drafting of IP documents is a specialized skill, the continuous up skilling of IP Agents in Malaysia through a special institute is necessary (San *et al.*, 2012).

Inconsistencies of a system's objectives with the functions of its supporting agencies can lead to the system's objectives being not fully achievable or its performance might not reach the expected targets (Khairul Akmaliah *et al.*, 2012).

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Finally, an effective mentoring system is necessary to stimulate further growth of successful researchers. Findings of this research study could be considered by relevant parties, particularly the policy makers that only top-down approach to national initiatives will not be the best mechanisms to address the issue. Despite limited in numbers, the experienced and successful researchers should be mobilized extensively to groom more talents in the field of innovation and commercialization.

Conclusion

The Government of Malaysia, through the Education Ministry has put up unrelenting effort in terms of driving R&D activities among the universities. It had changed from the establishment of a research culture (2006-2008), into driving a quality research (2008-2010), and most recently in promoting the research excellence by producing innovation and its commercialization methods (2011-2012) (Nagaretham *et al.*, 2012). Accordingly, universities initiatives have also shifted in their mindset and action - all these are with one aim in mind – that is to be more entrepreneurial and ultimately to strive for greater innovation and commercialization and eventually income generation. At individual university, most initiatives are centred on the IP&C centre or the TTO, through varying degrees of reform and/or decentralization. But, evidences show that the intensity of commercialization is not happening in desired pace.

This study was therefore was conducted to explore the issues and challenges to IP&C in general. Researchers argued that the climate for innovative change must be in place before any real impact can be brought about by the IP&C centre or the TTO. At the national level, an absence of a coherent national innovation policy has weaken the local systems of innovation, as well as the lack of a constructive relationships between Ministries, in particular the MOSTI and the MoE has render the effort for commercialization less effective. At the IP&C Centre or the TTO, the governance issues are mostly concerned with too much controlling by the University's management and lack of business risk readiness. On one hand, the University's companies are having poor communication with the IP&C Centre. On the other hand, the IP&C itself are comprising staff who are not having an adequate skills and experience to carry out the business mission. To make situation worse, there is always communication breakdown between the Centre with the University's management, and the Centre also caught in between with the researchers.

At some universities, lacking of top management support including necessary resources, i.e. financial, staff etc. makes it difficult for these centres to move on. At individual researchers, the conventional and structured thinking to start-up innovative research has dampen the stimulus for learning and the rigour of the research study. Thus, it can be said that in Malaysia, one of the major barriers to achieving greater innovation and commercialization is lack of conducive policy or rather coherence policy framework on the top, whilst, at the individual universities, there appear to be internal politics that need to be addressed. Greater innovation and commercialization cannot be realized until the coherence policy framework be established firstly, and the changes of mindset among University management to be more robust towards business goals. without the top down and bottom up approach strategies, only sporadic and standalone initiatives are not adequate to ensure effectiveness of the grand strategy of innovation and commercialization in the country. At the grass root level, the right attitude to jumpstart on the research quest is equally important to make a lasting impact, not only for commercialization purpose, but ultimately for the benefit of mankind.

Disclaimer

This paper has not been formally edited. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the AKEPT or Ministry of Education or UiTM.

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