University-Industry Collaborations: Comparative Strategic Collaborative Management Practices

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Abstract

The global structural transformation is changing the conditions that govern the work of universities in various ways and giving rise to new challenges. In addition to those challenges, research funding directly available to universities has gradually declined and there is thus a greater need for external funding, placing more focus on research environment and greater emphasis on the importance of academic excellence. To diversify income streams and better justify their role in society, universities increasing seek collaborations with industry for research funding, ideas generation and R&D commercialisation is much sought after. This study identifies and compares the various collaborative models, best practices and framework implemented among universities and their collaborators by employing mixed-method research strategy with dyadic approach. The primary data collected via face-to-face semi-structured interviews, while the collection of secondary data obtained from observation and examination of documents, websites, policies and reports. Collaborative projects that have R&D and/or commercialisation elements with university and industry partners are included in this study as research subjects. 153 face-to-face semi-structured interviews with the key respondents from both the universities and their collaborative counterparts in the industries using protocol and interview questions developed were undertaken. Hence, strategic collaborative management practices for the university-industry collaboration environment are put forth in this paper.
Introduction

The accelerated growth of global production of goods and services has brought structural transformation globally where economic entities are driven to specialise in their comparative strengths and advantages. The advance of production economy also increases the expenditure on education, infrastructure and social services, which in turn increases labour costs (VINNOVA, 2006). As a result, countries with labour-intensive industrial strategies need to consider moving to knowledge-intensive and innovation-driven economies in order to sustain their place in the global market. The global structural transformation is changing the conditions that govern the work of universities in various ways and giving rise to new challenges as advocated below:

“The focus on academic independence has been challenged by the tradition in the technical universities where there are external demands that academic resources should be used for the benefit of society at large and that they should contribute, for example, to the development of knowledge in the industrial and commercial sectors. Society has formulated these demands in the form of the so-called "third assignment" which stipulates that the academic sector, apart from education and research, should co-operate with the society of which it is a part (VINNOVA, 2006).”

In addition to these challenges, research funding directly available to universities has gradually declined and there is thus a greater need for external funding, placing more focus on research environment and greater emphasis on the importance of academic excellence (VINNOVA, 2006). As a result, collaboration with industry for research funding, ideas generation and R&D commercialisation is much sought after. This study identifies and compares the various collaborative models, best practices and framework implemented in the context of university-industry collaboration (UIC).

Methodology

In this study, the researchers used mixed-method research strategy with dyadic approach through collection of data via secondary manner, namely: (1) documents, websites, policies, reports; and (2) face-to-face semi-structured interviews. This research strategy consumed tremendous time and effort
from data collection to analysing phase due to busy schedules of respondents. However, this research strategy was able to describe and explain the patterns of relationship and interactions by having individuals participating in the research work (Miles & Huberman, 1994). Furthermore, the researchers used rich data which were systematically collected to add rigour to the whole research process and help reduce the potential biases of the researchers.

Collaborative projects that have R&D and/or commercialisation elements with both university and industry partners are included in this study as research subjects. The researchers carried out 153 face-to-face semi-structured interviews with key respondents from both the universities and the industries (dyadic approach) using the protocol and interview questions developed. The researchers interviewed respondents in Malaysia, Singapore and Thailand. The respondents were of leadership role which were either the management personnel and/ or project leaders of the universities or collaborative counterparts in the industries. The interviews were audio-taped, transcribed and analysed using thematic coding (Lincoln & Guba, 1985; Miles & Huberman, 1994; Yin, 2003). The key respondents voluntarily participated in the interviews. The following section puts forth the results and discussions of this study.

**Results and Discussions**

**Models of Successful Collaboration between University and Industry**

Researchers have the opportunity to share the experience and insights of various models of successful UIC implemented in different universities in Asia in its context and environment (refer to Table 1). Singapore universities established a liaison office to be the one-stop centre for industry linkages (Centralised Model). The liaison office varied from one university to another in terms of its function and job scope. Some liaison offices handled the intellectual property matters ranging from application to issuance of licenses while some were merely the match-maker and found expertise within the institution by understanding the needs of the industry. Despite having a centralised structure, there is another loosely or fragmented structure (Fragmented Model) practised in Thailand where the
academicians approach the companies through their own initiatives and network. These collaborative efforts are channelled either through faculty, specific research centre or research institutes. All the universities are involved in contract research and provide consultation to companies based on their expertise.

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Source: Zakaria, Yee and Chong, 2009

Table 1: Various Models and Strategies Implemented

In China, Tsinghua Holding Co. Ltd. was formed in year 2003 with approval from State Council (formerly Tsinghua University Enterprise Group). The company held shares in 7 listed companies and 30 other companies on behalf of the university (Tsinghua University). For example, Tsinghua University (via Tsinghua Holdings Co. Ltd.) held majority shares of 50.4% in year 2007 in Tsinghua TongFang Co. Ltd. which was listed in Shanghai Stock Exchange since year 1997 (Beijing Tongfang Legend Silicon Tech Co Ltd.). Tsinghua University via Tsinghua TongFang Co. Ltd. had successfully built a niche as one of the four leading digital broadcasting technologies in the world.

Researchers had the opportunity to tap into experiences from three (3) of the respondents on the models adopted by Taiwan, Sweden and Fraunhofer Institute in Germany. A respondent shared the Taiwan experience where the government established the research centres to undertake specific R&D identified and built its expertise in specific fields. The expertise from all universities in Taiwan will collaborate with industry through these research centres. The centres were also equipped with the advanced high-end technology to support research of leading and fore-front innovation. Interview of a respondent in Thailand, who shared the Sweden experience, mentioned that government provides the
funding for the establishment of the Competence Centres with specific area of expertise. These centres will provide a neutral platform for industry, universities and its competitors to sit in round-table to discuss on a common issue identified.

Another respondent shared the Germany experience in which the success story can be seen in establishment of an independent research institute, Fraunhofer Institute. The state provides one-third while two-thirds of the funding are earned through contract work either from government sponsored projects or from industry (Fraunhofer-Gesellschaft). The personnel are paid by the institute, carried out research and taught in university identified. The personnel need to be attached to the university to gain their academic status.

Malaysian universities cover a vast continuum of life-cycle and different models are implemented by universities at different stages (refer to Figure 1). There is no one best model that can be standardised or generalised across universities. The model evolves over time as the environment and external impact changes. Each model discussed has its advantages and disadvantages and it is best fitted given the environment that it exists. For example, Fragmented Model works well in community-centric environment, Centralised Model in limited resources environment, Commercial-Driven Model in business-minded environment and the Centralised-Consortium Model in highly-innovative environment. However, each model focuses in its priorities given the realisation of limited resources (funding, time and human resources) available.
Best Practices Revealed

University and industry respondents shared on best practices undertaken while highlighting the challenges at the same time. All respondents advocated that trust is crucial and needs to be developed to ensure sustainability of a collaborative relationship. Some collaborative relationships started from an informal basis i.e. from friendship and exploring opportunity to work together in small projects initially before continuing to collaborate on a strategic basis. Some respondents indicated that the relationship started from lecturer-student relationship initially before the UIC relationship flourishes. There are also initiatives from universities to locate their industry in related fields to get practical input and market assistance (market surveys, analysis, marketing of scientific outcomes, etc) from company experts. On the contrary, there are also company initiated relationships where the company identified the universities that had the expertise in the related field and initiated the collaboration. Besides that, there was also a forced relationship for parent company to collaborate with its “sister company” (which normally is a university) in R&D activities and in this case, trust needs to be built.
Interview findings revealed that certain universities in Singapore and Taiwan carry out human capital stock-take on periodical basis. Then, based on the stock-take, the university then align their focus whether to be commercially, commercial-driven research, community-serving research, academic excellence or teaching excellence in serving the different needs of society at large. In the same context that “if all wants to be the eye, who will be the hands and other part of the body”. The existence of the universities with different role gives balance to the education ecosystem and serving the different needs of different stakeholders. Alignment of priorities will allow effective and efficient allocation of resources (as supported in resource-based theory).

The promotional criteria of academic staff in Malaysian universities include multiple responsibilities i.e. teaching, research, administrative, publication and community service. Time spent on the collaborative projects was limited by the multiple responsibilities that an academician was being measured for their performance. Two respondents commented that Singapore universities implemented 2-tier or 3-tier promotional pathway for academics and thus, each academician can choose his/her career pathway to focus either on teaching, fundamental research or commercial-driven R&D. Hence, the dysfunctional behaviour from performance measures will either enhance or deteriorate a successful collaborative relationship.

Protection of intellectual property (IP) is a double-edge sword where the intention is to protect scientists on their innovative creation but yet difficult for industry to commercialise the R&D output. Approximately 95% of total company establishments in Malaysia are small and medium size enterprises (SMEs) with resource constraints. Thus, governmental support through tax incentive and concerted efforts in promoting innovative culture is much needed.

Industry respondents revealed that universities normally do not undertake market research before embarking on a research project as compared to industry-driven R&D projects. Respondents also shared that they faced difficulties in locating the right department, unit, centre or person who had the knowledge of the human capital and expertise of the particular university as a whole. In other words,
industry personnel were referred from one department/unit to another. Thus, a “one-stop customer service oriented help-desk” where industry can walk-in and seek assistance is crucial. Respondents added on by commenting universities need to have a professional team with persons of high interpersonal skills and good customer services, to be the mediator at the “help-desk” or linkage office. The mediator needs to be empowered with certain decision-making autonomy to allow smooth discussion without waste of time of both parties and to avoid frustration. Thus, having the ‘right person but in wrong position’ will not be able to facilitate the meeting of the two parties (university and industry) effectively. Furthermore, all industry personnel commented that at many times, meetings were attended by university personnel who were not empowered with decision-making autonomy while their industry counterpart was represented by a decision maker. Bureaucracy was another challenge that industry personnel faced when the time taken for a decision or contract to be agreed and signed took 3-6 months. Every minute is a cost to industry and every minute is a “time-bomb” in a competitive environment where the window of opportunity for an innovative product to remain in the market is short.

**Governance Framework**

Governance framework is important as collaboration matures to ensure transparency and function as advisory to the Ministry of Higher Education, Council of Vice Chancellors, Presidents and Industry. For example, the Council for Industry and Higher Education (CIHE) is a unique high-level partnership of leaders and was founded in 1986 in United Kingdom (UK) to carry out or sponsor research on UIC and makes related policy submission to government. CIHE aims to foster close working and understanding between business and higher education to improve international competitiveness of both sectors. CIHE receives funding from various parties inclusive of universities, other organisations and companies. The governance structure implemented by CIHE is shown in Figure 2.
The Board of Trustees is represented by 7 appointees from universities and industry personnel to govern the financial spending and matters. The Chief Executive and its team will carry out the operation and receive advices from the council members and board of trustees. Interview of a representative of CIHE during a workshop attendance revealed that such governance process is needed to provide a neutral platform for industry and university personnel to collaborate and to focus on solving common issues together in round table. CIHE acts as the mediator for major industry player and university leaders as well as setting the objectives of collaboration. CIHE will also channel feedback on challenges and constructive suggestions from round table discussions to Government of United Kingdom (GOUK) for policy implementation. CIHE uses suitable and measurable tangible and intangible elements as performance measurement matrix.

In Singapore universities, an advisory board was formed and chaired by the major stakeholder. The duty of the advisory board is to conduct meetings 3 to 4 times a year to decide on major issues in
the area of appointment of collaborative team members, setting of objectives and approval of research projects. The advisory board receives update on collaborative efforts on a monthly basis. Some UIC was being managed by focusing on exception report only whereas two respondents revealed that universities had centralised system of monitoring. However, there is lack of systematic governance structure and process in Thailand and Malaysian environment.

Auditing Process of UIC

Auditing process is required to systematically monitor the progress of UIC in an innovation advanced environment. The auditing process is not meant to penalise the UIC collaborators but to ensure achievement of outcomes or outputs as agreed. The concepts and intentions should be of performance-based rather than process-based management. Research findings revealed that there was no systematic auditing and monitoring process implemented in Singapore, Thailand and Malaysia to monitor the success, sustainability and progress of the relationship between universities and its industry counterpart. Generally, many respondents viewed that there was no such need to systematically audit and monitor the successfulness or sustainability of UIC because most of the collaborative initiatives were project-based, short-term (projects duration not more than 5 years in total) and not of strategic level (mainly problem-based solving collaborative projects). However, there were two companies that implement systematic monitoring process on UIC projects.

In Singapore, the auditing process was conducted by each organisation in isolation with UIC. This was a continuous process of the control framework adopted by each organisation i.e. standardised legal documentation and follow up procedures. Another respondent revealed that the company will monitor the progress of UIC projects on a quarterly basis where the university collaborator will present the progress of the project and whether they expect to achieve the agreed outcomes and potential commercialisation of the scientific outcome to the joint committee established.
A similar trend was revealed from interviews with Thai respondents where universities did not see the purpose of carrying out auditing process on UIC initiatives because the intention was concentrated on serving the community at large. Arguably, collaborative relationship was based on trust and there was no systematic monitoring process. However, a respondent from industry (Thai) indicated that the company implemented proper monitoring process on the progress of collaboration with university. There were various evaluation carried out and reported at various stages of collaboration. Evaluation of university collaborator was carried out at the initial stage of collaboration using SWOT analysis. As the collaboration proceeded after initial evaluation, KPIs, outcomes and objectives agreed were monitored throughout the collaboration process.

Interview findings from all respondents in Malaysia revealed that there was lack of systematic approaches in auditing and monitoring of UIC projects except for an industry respondent who shared that the company had implemented structured monitoring system to ensure achieving of outcomes and objectives agreed. There was also periodic reporting structure and recognition of the importance of constant communication between the two parties to ensure success of the UIC project and potential collaborative of future projects together. The respondent also shared that they will set and then monitor the objectives of UIC projects based on needs and direction of the company. In summary, the lack of a structured and systematic auditing process to monitor the success and sustainability of UIC initiatives was due to a lack of need to do so.

**Conclusion and Recommendations**

In conclusion, there is no one model that can be standardised across countries and UIC environment while the best practices and framework implemented are best suited in its UIC environment. The models, best practices and framework put forth in this paper can be used as guidelines where each UIC projects, universities and companies involved will need to decide based on practicality.
Besides undertaking certain models, best practices and frameworks in UIC environment, universities and companies need to realise that there are many factors to a successful collaboration and sustainable relationship. The factors such as mutual trust, flexibility in structure (less bureaucracy), commitment and leadership skill of leaders, identification of the core competencies of each party, rewards and benefits, constant communication and existence of collaborative performance measurement system (Yee, Zakaria, & Chong, 2009) need to be considered. Leaders of universities and companies need to realise that it is people that make collaboration works and having the “right person” is crucial. Maister (2003) supported by saying “it is people that makes it works and not organisation and starts from small projects”. In addition, each university should make a difference in identifying its niche and expertise and further develop their strategic direction instead of following the crowd. The underlying concerns of the various stakeholders (universities, industry, personnel) also need to be evaluated. Industry personnel were concerned with the scientists’ competency as well as quality and delivery of the work promised or agreed while universities professors are concern of their publication as part of the promotion performance measurement. Universities and industry were concerned with the intellectual property protection issues. Implementation of strategic collaboration requires consideration of the fundamental issue which is identifying the customer and understanding needs of the customers. SWOT analysis, Life-Cycle and Stakeholders Analysis can be used by identifying the strengths, weaknesses, opportunities and threats of each party involved, in collaboration relationship and various stakeholders’ needs.

Acknowledgement

This study is funded by Ministry of Higher Education, Malaysia and researchers also would like to acknowledge Sayed Nader Azam-Ali for his contribution.
Bibliography


