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TECHNOLOGY TRANSFER OBSTACLES

Mohd Ghazali Maarof[1], Shahryar Sorooshian[1*], Syed Radzi Rahamaddulla[1], Suhaila Abdul Hamid[2]
[1]Universiti Malaysia Pahang, Malaysia
[2]Universiti Sains Islam Malaysia, Malaysia
Email: sorooshian@gmail.com

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Abstract

This paper identifies the potential barriers that can affect effective collaboration between industry and public universities of Malaysia. Intense global competition has created new requirements to the industry: constant new technological breakthrough, rapid deployment of new technological solutions and shorter product life-cycle. Thus, both the industry and the university need to look into possibilities of sharing knowledge-based capital, technological facilities and access to new scientific development and innovation. Data for this study was obtained through interviews with top management of companies which have experience in collaboration with Malaysian public universities. Later, the data was analyzed using thematic analysis. Among the barriers identified were products are not market driven, bureaucracy, insufficient experience on applied research, lack of proper standard operating procedures, unattractive reward system, lack of information on potential collaboration opportunities and Intellectual Property issues.

Keywords: Collaboration, University, Industry, Barriers, Technology.

1. Short Communication

Globalization has brought about new challenges to the industries worldwide. Globalization is the process by which international businesses become increasingly interconnected. International Monetary Fund (IMF) has identified four basic aspects of globalization: trade and transaction, capital and investment movement, migration and movement of people, and dissemination of knowledge (IMF, 2000). The intense requirement for constant technological advancement is one of the effect of globalization faced by the industries. As a result, firms are forced to come out with new technological breakthrough, rapid deployment of new technological solutions and shorter product life-cycle in order to stay competitive. To enable industries keep up with those challenges, firms have to look for talented workforce and get access to state of the art research infrastructure. Furthermore, intense competition among the

market players and the pressure to reduce cost have caused many companies to exercise downsizing of its operation or even close down their R&D center (Lambert, 2003). These situation have led some companies to look for alternative solution such as to conduct research joint ventures with the universities. As new technologies are becoming more complex, firms are facing difficulties to stand alone to manage the required resources and capabilities simultaneously in developing new technology and commercializing it (Woo, 2003). Universities are often regarded as a vital source for new knowledge. This is because university has the advantage to supply highly skilled graduates and researchers needed as well as to provide research infrastructure needed for the research works. Mansfield and Lee (1996) pointed out that the universities play an important role as a key contributor to wealth generation and economic development. The Triple Helix concept of university-industry-government relations has further strengthen the needs for universities to works together with the industry in the knowledge-based society (Leydesdorff and Meyer, 2006). A study done by Bramwell and Wolfe (2005) found that in the knowledge based economy, university plays an important role in creating innovative culture to the world. However, to make the collaboration effective, an efficient knowledge transfer between universities and industry are needed (Geuna and Muscio, 2009). According to José Guimón (2013) it is important to examine the experience faced by developed countries in order to understand what foster the motivation to form and the barriers to cooperate towards the university-industry collaboration. Furthermore Lawrence et al. (2007) states that an effective collaboration can only be achieved when both parties, the universities and industries, possess synergistic goals to achieve the objectives. Therefore, this paper provides a study which identifies what are the barriers faced by the university-industry to conduct effective collaboration particularly in product commercialization.

Collaboration is defined as "agreement between firms to do business together in ways that go beyond normal company-to-company dealings, but fall short of a merger or a full partnership" (Wheelan and Hungar, 2000). Peter Drucker (1996) states that partnership is the best way to accelerate changes in corporate culture and the way business is conducted. Governments have played important role to encourage a close partnership between the university and industry as a way to foster innovation and wealth creation (D'Este and Patel, 2007). Previous studies show that the university and industry collaboration can take place in various mechanism such as industrial training for both graduates and faculty staffs, joint collaboration in applied R&D agreement, consultancy and technical services, and setting up of new research centers and spin-off companies.

Firms during the early twentieth century was mainly centered towards closed innovation model where firms adopt trade secrets and most of the R&D works were done internally. The universities, on the other hand, was largely funded by the government and focused on fundamental research and findings were not shared effectively to the outside world. However, the shrinking funding from the government has led to increase requirement for partnership between the universities and industry. In addition, the collaboration with the industries has enabled the universities to gain useful research data which are more applicable to solve current industrial problem (Lee, 2000). The commercialization of intellectual property for the research done by the universities as part of the technology transfer program has been one of the engines of economic growth (Siegel and Phan, 2005). Among the main commercialization activities concerning the university-industry collaboration are licensing agreement, research joint ventures and university-based startups. However, issues related to patenting (Sellenthin, 2009; Baldini, 2010) and licensing (Shane, 2002) were among the challenges faced during the collaboration process. Carayannis et al. (2014) also found that conflict over the transfer of ownership of intellectual property rights was found to be one of the impeding factor in the university-industry collaboration. Thus, one of the efforts done by the universities to assist researcher to issues related to patenting, licensing and royalties is to establish a technology transfer offices at the university (Correa and Zuñiga 2013).

A study done by Patchell and Eastham (2003) found that the incentives received by the researchers can influence the success of the collaboration between university and industry. In addition, Clarlsson and Fridh (2002) also found that the culture, organization and incentives structures plays an important roles to the success of the technology transfer process. Some university researchers lack the awareness to transform new knowledge into applications that is applicable to the local industries' need. Communications problems and different expectations are some of the gaps being identified for the university and industry collaboration (Feldman and Desrochers, 2003). University and industry operates on different timescales and adopt different value system with different objectives, thus, satisfying both parties could be a big challenge (Elmuti et al., 2005). Academia might be interested to publish their research output, whereas, industry would like to maintain the research as a secret in order to maintain their competitive advantage. This paper presents an exploratory study using qualitative approach to collect the main barriers of university-industry collaboration for case of Malaysia. The use of interview allows the researcher to obtain deep understanding into the issues. Four established university-industry collaborations in Malaysia have been used for this interview. Four in-depth semi-structured approach interviews were conducted in November 2015. The interview

sessions have been audio-recorded and later transcribed in order to generate a written interview report. To ensure accuracy of the transcription, other members in the research group have been asked to check on the findings. The interviews were carried out on a face to face approach and each interview lasted for about 50 minutes. The questions asked were formed based on the research questions, categorized and coded using thematic analysis as proposed by Braun and Clarke (2006). Thematic analysis is the foundation method for qualitative analysis which involves finding repeated patterns of meaning from the data. The organizations selected for this interview were involved in providing technical training, agriculture and solar energy, fund management and manufacturing.

The interviews indicated that a few factors could possibly become the barriers in ensuring a successful collaboration in commercializing research products between university and industry. Products of research that are not market driven, bureaucracy, insufficient experience on applied research, lack of proper Standard operation standard, unattractive reward system, lack of information on potential collaboration opportunities and Intellectual Property issues were highlighted during the interviews as possible barriers.

Some possible factors were also mentioned during the interviews of why products offered by university researchers are not market driven such as lack of market research prior to develop the product, researchers do not understand their target market, lack of knowledge to conduct applied research and sometimes the technology used is not applicable in the industry. Due to these, the products developed by researchers are not suitable, might not provide complete solutions or need to be modified before they can be used by the industry. This is because researchers are more interested in answering their research questions and publish their work rather than to produce a product that is ready to be marketed. However, the industry on the other hand is not willing to wait and prefers to launch immediately the product that is readily marketable. The mismatch of expectations and interests between the university and industry results in products being developed are lacking in their market competitiveness and sometimes are only practical for lab use. To ensure successful product commercialization in university-industry collaboration, some recommendations are stated here. First, the presence of a one stop center which acts as a liaison to link the university with the potential industry partner might help to assist university-industry collaboration. The one stop center should build strong relationship with the industry players and able to understand the market demand. It should also make available a database system that can track all the research works done in the university.

A cross-functional research work can be used to work on a particular works. For instance, the business school can be assigned the task to conduct a market study. This might help to understand about the market needs and competitors

analysis. In addition to that, the university should take steps to review rewards given to the researchers as motivations for them to conduct applied based research which could be useful to the industry. The university should also look into their policies such as providing a clear standard operation procedure to ensure smooth process in obtaining approval and thus less time taken in the process.

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