University and industry collaboration: towards a successful and sustainable partnership

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Abstract

As Malaysia is moving towards advancement of science and technology, forging strong collaboration between the university and the industry is inevitable. In fact, there are increasing pressure felt by the industries to allow higher learning institutions to handle some aspects of training and development. This is because, the costs of operating have escalated and companies can no longer be self sufficient. Literature showed that previous studies have begun to uncover the reasons for as well as the types of collaboration pursued. However, these studies offer limited explanations on some pertinent aspects of the university and industry collaborations. Drawing on a survey of workshop participants at the School of Physics Universiti Sains Malaysia, the current study tries to explain factors that determine successful collaborations, exploring the various aspects that significantly influenced those initiatives. In addition, the study also seeks to identify reasons that will ensure sustainable collaborations between the both sides. Implications of the findings will be used to aim at facilitating greater university and industry collaborations in the future. © 2011 Published by Elsevier Ltd. Selection and/or peer-review under responsibility of Prof. Hüseyin Uzunboylu.

Keywords: collaboration, training, linkages, partnership;

1. Introduction

The strategic linkages forged between university and industry has existed for a long time, in a form of students’ internship or even faculty exchanges (Perkmann & Walsh, 2008). The reasons for these linkages are also diverse and ranging from student practical training to production and commercialization of new products. However, such collaborations have attracted widespread attention among researchers in recent years because the rapidly changing business environment demands industries to continuously enhance their efficiency as well as productivity (Perkmann, King & Pavelin, 2011; Sugandhavanija, Sukchai, Ketjoy, & Klongboonjit, 2010; Thursby, Fuller & Thursby, 2009). The escalating costs of equipping the existing manpower with necessary skill, knowledge and
abilities as well as undertaking research have strategically pushing further the necessity to have strong partnerships between universities and industries. For example, Beckman (1997) stated that in 1995 the Software Engineering Institute (SEI) has started to track the training collaboration between universities and industry in its annual “Directory of Industry and University Collaborations with a Focus on Software Engineering Education and Training”. Such efforts have shown that the cooperation between the two worlds stated to gain bigger momentum and covering wider perspectives. Thus, several other efforts have also been conducted to analyze the education and training collaborations between universities and industry (Beckman, 1997; Motohashi, 2005).

As Malaysia is moving towards advancement of science and technology, the need to have capable and qualified manpower is becoming more prevalent and strongly felt by the industry (Junaini, Fadzir, Sidi, Khiri & Othman, 2008). In response to the situation, the government has allocated RM 500 million for improving the knowledge, skills and abilities of the workers under the 10th Malaysia Plan (2011-2015). This is a timely effort because with a current total workforce of 9.8 million, only 28% of them are suitable and currently employed in high skilled areas (Bernama, 2011). At the same time, it is estimated that 60% of the 3.3 million new jobs created under the Economic Transformation Program require high skilled workforce (The Star, 2010). These workforce need to be trained and they need to be equipped with the relevant knowledge and skills required by the industry and the current efforts implemented by the industry alone may not be able to cater for the needs. Therefore, there is a pressing need to formulate smart partnership between universities and industry that can overcome the potential mismatched of theoretical curricular and practical problems.

2. Survey Methodology

During the year 2010, the School of Physics, Universiti Sains Malaysia has conducted several training with the industry. During the training session, the researchers surveyed the industry representatives participated in the training. All 15 questions in the survey questionnaire requested the representatives to furnish information in four specific areas;
- Demographic information
- Training goals
- Overall training process
- Individual future collaboration intention

A total of 211 industrial representatives responded to the survey. However, only 197 valid responses were used for further analysis as the other 14 responses were incomplete.

3. Summary of the Results

Table 1 depicts the demographic information of the representatives;

| Position     | Multi-National Companies | Local Companies | Total |
|--------------|--------------------------|-----------------|-------|
| Engineer     | 15                       | 80              | 95    |
| Administrator| 1                        | 2               | 3     |
| Technician   | 11                       | 88              | 99    |
| **Total**    | **27**                   | **170**         | **197** |

Data in Table 1 showed that most of the representatives are engineers (95 people) and followed by technicians (99 people). However, further breakdown indicated that the technicians represented the most respondents sent by local companies (51.7%). In addition the data also indicated that administrators were also sent as representatives by both
types of companies, but in smaller numbers. This may be due to the nature of the training provided as well as the job scope of those administrators. Further assessments on the representatives are given in Table 2.

Table 1. Survey Respondents' Demographic Information

| Position     | Mean Age | Working Experiences (yrs) |
|--------------|----------|---------------------------|
| Engineer     | 35.8     | 9.8                       |
| Administrator| 28.9     | 5.2                       |
| Technician   | 45.3     | 12.7                      |

Table 2 showed that technician has longer working experiences (mean=12.7) as well as much older in age (mean=45.3). Engineers appeared to have slightly lesser working experiences mean and also younger in age. Many of the engineers are fresh graduates and this is their first jobs after graduation whereas some of the technicians have been working for few companies before. Furthermore, many of the technicians also hold lower academic qualifications, but with longer working experiences. However, only a handful of them (40%) stated that they attended the training session even though it is not within their area of expertise after being asked to attend by their respective organizations. Some (15%) even said that they were in the session to replace their colleagues. The remaining 45% of the representatives agreed that the training session was relevant to their field of work and expertise.

4. Discussion

Even though the concept of university-industry collaboration is not new in Malaysia, there are several inherent problems identified from the exploratory study conducted during the training provided by the School of Physics, Universiti Sains Malaysia that need to be addressed, if the university and also the industry want to have successful partnership. Several aspects have been identified and later categorised into the industrial gap as well as the institutional gap. Thus, before a successful partnership can be forged, these gaps need to be examined and perhaps, be addressed properly.

The industrial gaps already identified can be summarized into;
- The industry is reluctant to contribute financially to the preparation of relevant and important training programs
- The industry does not take training provided by the university seriously and not sensitive to the requirements of the training programs. (ie; selection of suitable candidates, qualified and interested candidates)
- The tendency that the industry and its representatives think that they know more and perhaps all of the solution and thus, questioning the training programs formulated by the university

While some of these issues may be accurate, many of the issues exist because these companies are small companies and may not be able to engage the collaboration properly due to their limited financial and manpower resources. These companies may not have proper specializations among their workers and thus multitasking becomes widespread. Thus, it is common phenomenon for the selection of workers sent for training not based on expertise or even job description.

The institutional gaps on the other hand consisted of issues like;
- The trainers may not sensitive to the industrial time constraints in improving manpower expertise
- The university may not be aware of the real problem faced by the industry as it may still confined to its ivory tower characteristics (ie; irrelevant programs)
- The facilities may not be adequate to cater for the needs of the industry
Even though the university engaged primarily in the creation and dissemination of knowledge in the traditional academic manner, this has never been the barriers for the academics as well as the university to generate better understanding of the needs of the industries. In fact, the university has created a separate section within its structure to focus on the community as well as industrial networking. This has facilitated smooth engagement activities between the university and the industry and thus, closing the gap between the two parties. In fact, the section has also promoted better communication and eventually greater understanding on the needs of both parties.

Furthermore, the trainers are also well equipped with the latest know-how in their area of expertise to cater for the industrial needs. Many of the university academics are also having considerable industrial experiences and few are actively producing prototypes and at the same time commercializing their research products. In fact, some of these products are results of the university and industry collaborations. In line with the active researches done by the academics, the university has also provided state of the art facilities for the academics as well as the industry to use. Furthermore, with the government encouragement, several centres of excellence were built within the universities like the Collaborative Microelectronics Design Excellence center (CEDEC) located at the Universiti Sains Malaysia Engineering Campus (“CEDEC and Silterra share expertise”, 2010).

Therefore, the study found that to have a sustainable partnership between university and the industry, both parties need to commit themselves as recommended by the framework in Figure 1. This will be able to close the gaps and eventually improve sustainable partnership.

![Figure 1. Sustainable U-I Partnership](image-url)
5. Conclusion

Even though universities are known to pursue fundamental researches as well as educating the people, they may not provide ready-made workers that are highly competent and capable of performing in any conditions. However, universities do have the capacity and also capabilities to ensure that the workers capabilities are tailored to the needs of the industry. In fact, this is one of the main agenda of the university-industry collaboration, which is to generate successful and sustainable partnership in ensuring highly skilled and competent manpower is supplied to satisfy the industrial needs. This study showed that if both sides are willing to work together and foster better understanding in the future, a more beneficial as well as sustainable partnership can be created.

As a conclusion, the importance of a university and industry collaboration is a known fact for a long time. However, only a proper and sustainable partnership will be able to generate mutual benefits for both sides.

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