

The Success Factors of Technology Transfer and Firm Performance of SMEs in Malaysia

Nurul Nadiah Binti Abdul Rahman, Mohd Khairuddin, Noor Zihan Ahmad Zainuri, Dhea Meilita Zen

Faculty of Management, Universiti Teknologi Malaysia Skudai, 81310 Johor, Malaysia
Corresponding Author's Email: mohdkhairuddin@utm.my

Beni Widarman Yus Kelana

Azman Hashim International Business School, Universiti Teknologi Malaysia Skudai, 81310 Johor, Malaysia

Abstract

Technology Transfer (TT) is a development of innovation, technology application, technology or knowledge developed in another organization. The interaction between universities and enterprises stems from the need of the manufacturing sector to develop new technologies, products or processes or even to transmit from one university to another an adequately mature invention that is one way of interacting. The purpose of carrying out this research is to identify success factors for University – SMEs TT that influence sustainable performance of SMEs; to study the relationship of promotions, relationship, protection and prior experience of University – SMEs and their SMEs sustainable performance, and to develop the conceptual framework for the research efforts.

Introduction

Technology transfer means the conversion from scientific research to innovative applications of advanced technologies, methods and procedures (Stanciu, Zlati, Antohi, & Bichescu, 2019). The main goal is to transfer promising knowledge and skills effectively through cooperation to new market opportunities (Assante, Castro, Hamburg, & Martin, 2016). Universities can apply the TT mechanisms to transfer the knowledge and technologies that have already been created to industry. This process was usually considered as the TT (U-TT) university industry.

Research Gap

This study addresses several gaps in the past literature or studies regarding technology transfer efforts between universities and SMEs in Malaysia, such as in the best technology transfer practices, which is unclear, as well as the role of the government as the enabler of the TT efforts between the triple helix ecosystem (Filippetti & Savona, 2017; Sarpong et al., 2017).

The Objectives of the Research

- To identify the success factor component for technology transfer efforts between SMEs and Universities in Malaysia.
- To develop the conceptual framework comprises of the technology transfer factor, government support and firm performance of SMEs.

Literature Review

Small and Medium Enterprises (SMEs) Overview

SME term used for articulated enterprises and other companies which, but are larger businesses, are between "small office-home office" the term SME varies between countries (Kamanzi, 2019). This description and classification of companies are based on quantifiable properties such as the total number of staff, revenue turnover or asset value (Soomro & Aziz, 2015).

SME's Overview and It's Context in the Technology Transfer and Commercialization of Malaysia

After independence in 1957 until the 2000s, the economy of the country remained commodity-based (Lebdioui, 2022). At that time, small and medium- sized Malaysia's enterprises, like wholesale, retail and restaurant, were largely involved in agricultural and small services (Ahmad, 2012). SMEs have less than 200 employees and fixed assets below RM2.5 million (Asri, 2002). Up to now, small and medium-sized companies have grown considerably, covering a range of activities, with support from the Malaysian Government (Mustapa & Mohamad, 2021).

The Concept of University Technology Transfer (UTT)

Analysis by Drucker and Goldstein (2007) added research that assesses UTT 's effect on regional economic development. Kim, Anderson, and Daim (2008) identified researchers who seek to determine the efficacy and efficiency of the transfer of university technology and those who examine processes for the transfer of UTT. The major contribution of technology transfer in transferring knowledge from universities to industry, where it boosts competitiveness and fosters social and economic growth is an area that has been addressed and improved upon in recent years (Yazdani, Ramliy, Ismail, & Omar, 2016).

Prior Experience

SMEs benefit from previous experience which leads to continuous improvement of communication and socialization between the two parties (O'Reilly & Cunningham, 2017). Managers' collaboration phase creates fertile ground for trust to grow (Burger & Roijackers, 2021). Tartari et al (2012) supported this, which said that trust among the partner depends on their communicating and sharing. Thune (2011) has also defined the knowledge between partners and helps to enhance their knowledge of collaborative partners through their experience. Furthermore, this will enhance the chances of both partners to work together smoothly to transfer technology (Nokkala et al., 2008) and increase the chances of successful research projects (Thune, 2011).

Protection

In a study by Nishimura and Okamuro (2011) based on Japanese company, the results of their study shows that IP policy at universities is an important factor in fostering

collaboration between universities and SMEs. Marketing policy launched by MOSTI encourages Malaysian universities to market inventions from their research and also allows the university to acquire these inventions (Ismail, 2008). The importance of an intellectual property system on patents, trademarks and copyrights should also be emphasized in addition to improving access of SMEs to external resources (Olander, Hurmelinna-Laukkanen, & Mahonen, 2009). Intellectual Property Rights aids SMEs to enhance their business performance.

Activities

R&D partnerships with other companies, universities and public research institutes are important in terms of innovative resource-constrained SMEs because they are able to share with their partners the costs and risk of R&D activities and acquire valuable resources, such as advanced knowledge (Chakravarty, 2022) increased success of R&D cooperation (Fiaz et al., 2011) and new knowledge through collaboration in research (Nokkala et al., 2008). Company prefers the most important factors to develop successful cooperation, such as commitment and cooperation (Müller, Maier, Veile, & Voigt, 2017). In order to establish a good relationship between universities as transfers and SMEs as transfers, communication is extremely important (O'Reilly & Cunningham, 2017).

Government Support For Technology Transfer

Entrepreneurship in nurturing startups and SMEs, the government plays an important role in developing new activities and encouraging sustainable job creation due to the high risk of discouraging new enterprises and the high failure rate once these firms are set (Ushada et al., 2018). Governments worldwide are expanding and strengthening their support for private and economic innovation in general (Ikenberry, 2019). Government support, such as tax, legal and fiscal, is key to encouraging the innovation process in the private sector (Hepburn et al., 2020). The new initiatives set forth in the New Economic Model (NEM), launched at the beginning of 2010, reveal further recognition for SMEs as the backbone of the Malaysian economy (Chin & Lim, 2018). The government has recognized the need for clusters and critical masses of SMEs as a consequence of the growth of large companies and global giants (Chin & Lim, 2018).

Conceptual Framework

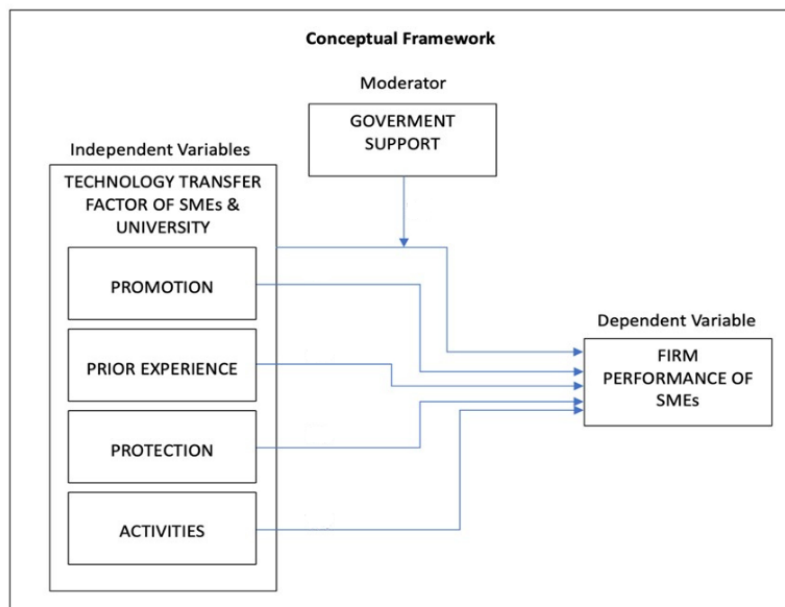


Figure 1.1 represents conceptual model to be investigated in this research.

The framework is divided into three parts which consists of three variables; the independent variables, moderator and dependent variables. The first part of the model is composed of successful factors, which act as the independent variables of SMEs. In this study, the researcher chooses the elements of successful factors that have been postulated three variables namely promotion, prior experience, protection and activities. The second part of the model postulates that government support functions to moderate the relationship between of open innovation activities firm's innovation performance of manufacturing SME. Government support will be obtained through many incentives such as technical support, tax reduction, R&D grant, innovation grant and others to help the firms become more innovative, internally.

Motivation and Contribution

The motivation to conduct this study is based on the current norm of technological advancement in developed countries and how they managed to harness the benefit of intangible capital using IPR. The combination of universities and SMEs plays a significant role in modern countries and is thus to be explored in Malaysia's context. In terms of contribution, the research will lead to a greater understanding of the technology transfer elements between universities and SMEs and how it will affect the SMEs' performance. As for the knowledge contribution, this study will shed light on the Malaysian context of TT success factors between universities and SMEs and strengthen the theoretical gaps – identifying the TT elements and their impact on firm performance. On the other hand, the contribution is also on the practical side, which enables the firms to find the best practice based on this research findings.

Conclusion

In developing TT collaboration between universities and SMEs particularly during development research stage, there are four types of barriers namely orientation, IP, operational and time related barriers that lead to the difficulties for the researchers to develop successful collaboration at these stages. Previous researchers have defined several

best practices for solving these problems, including the development of effective communications, expertise, management, clear and flexible IP policy, effective promotion or award and financial support. These factors are projected to reduce the obstacles to development research in both partners, thereby enabling effective R&D cooperation to be developed. The successful partnership in this study is based on the degree of performance the researchers indicate. A new model has been suggested at the end of this chapter for developing effective R&D collaboration between universities and industries, especially in the research development phase.

Reference

- Ahmad, K. (2012). The use of management accounting practices in Malaysian SMEs.
- Asri, M. (2002). Contribution of SMEs in Malaysia. *The role of SMEs in national economies in East Asia*, 2, 181.
- Assante, D., Castro, M., Hamburg, I., & Martin, S. (2016). The use of cloud computing in SMEs. *Procedia computer science*, 83, 1207-1212.
- Burger, R. E., & Roijackers, N. (2021). Developing trust between partners in collaborative R&D projects. In *Managing Collaborative R&D Projects* (pp. 271-284): Springer.
- Chakravarty, S. (2022). Resource constrained innovation in a technology intensive sector: Frugal medical devices from manufacturing firms in South Africa. *Technovation*, 112, 102397.
- Chin, Y.-W., & Lim, E.-S. (2018). SME policies and performance in Malaysia.
- Drucker, J., & Goldstein, H. (2007). Assessing the regional economic development impacts of universities: A review of current approaches. *International regional science review*, 30(1), 20-46.
- Fiaz, M., Naiding, Y., & Rizwan, M. (2011). *An insight into R&D collaborations*. Paper presented at the First International Technology Management Conference.
- Filippetti, A., & Savona, M. (2017). University–industry linkages and academic engagements: individual behaviours and firms’ barriers. Introduction to the special section. *The Journal of Technology Transfer*, 42(4), 719-729.
- Hepburn, C., Pless, J., & Popp, D. (2020). Policy brief—encouraging innovation that protects environmental systems: five policy proposals. *Review of Environmental Economics and Policy*.
- Ikenberry, G. J. (2019). The International Spread of Privatization Policies: Inducements, Learning, and "Policy Bandwagoning". In *The political economy of public sector reform and privatization* (pp. 88-110): Routledge.
- Ismail, K. (2008). Issues in commercialisation and management. *Universiti Teknologi Malaysia Press*.
- Kamanzi, J. (2019). *Influence of Entrepreneurial Dimensions on Growth of Women Micro Businesses in Rwanda*. JKUAT-COHRED,
- Kim, J., Anderson, T., & Daim, T. (2008). Assessing university technology transfer: A measure of efficiency patterns. *International Journal of Innovation and Technology Management*, 5(04), 495-526.
- Lebdioui, A. (2022). The political economy of moving up in global value chains: How Malaysia added value to its natural resources through industrial policy. *Review of International Political Economy*, 29(3), 870-903.
- Müller, J., Maier, L., Veile, J., & Voigt, K.-I. (2017). *Cooperation strategies among SMEs for implementing industry 4.0*. Paper presented at the Digitalization in Supply Chain

- Management and Logistics: Smart and Digital Solutions for an Industry 4.0 Environment. Proceedings of the Hamburg International Conference of Logistics (HICL), Vol. 23.
- Mustapa, A. N., & Mohamad, A. (2021). Malaysian government business support and assistance for small and medium enterprises: a case of COVID-19 pandemic crisis. In *Modeling Economic Growth in Contemporary Malaysia*: Emerald Publishing Limited.
- Nishimura, J., & Okamuro, H. (2011). R&D productivity and the organization of cluster policy: An empirical evaluation of the Industrial Cluster Project in Japan. *The Journal of Technology Transfer*, 36(2), 117-144.
- Nokkala, T., Heller-Schuh, B., Paier, M., & Wagner-Luptacik, P. (2008). Internal integration and collaboration in European R&D projects.
- O'Reilly, P., & Cunningham, J. A. (2017). Enablers and barriers to university technology transfer engagements with small-and medium-sized enterprises: Perspectives of principal investigators. *Small Enterprise Research*, 24(3), 274-289.
- Olander, H., Hurmelinna-Laukkanen, P., & Mahonen, J. (2009). What's small size got to do with it? Protection of intellectual assets in SMEs. *International Journal of Innovation Management*, 13, 349-370.
- Sarpong, D., AbdRazak, A., Alexander, E., & Meissner, D. (2017). Organizing practices of university, industry and government that facilitate (or impede) the transition to a hybrid triple helix model of innovation. *Technological Forecasting and Social Change*, 123, 142-152.
- Soomro, R. H., & Aziz, F. (2015). Determining the size of thresholds of Small and Medium Enterprises definition. *International Journal of Management, IT and Engineering*, 5(1), 63-71.
- Stanciu, S., Zlati, M. L., Antohi, V. M., & Bichescu, C. I. (2019). The Development Analysis of the Romanian Traditional Product Market Based on the Performance Model for Sustainable Economic Development. *Sustainability*, 11(4), 1123.
- Tartari, V., Salter, A., & D'Este, P. (2012). Crossing the Rubicon: exploring the factors that shape academics' perceptions of the barriers to working with industry *Cambridge Journal of Economics*, 36(3), 655-677.
- Thune, T. (2011). Success Factors in Higher Education–Industry Collaboration: A case study of collaboration in the engineering field. *Tertiary Education and Management*, 17, 31-50.
- Ushada, M., Aji, G. K., Okayama, T., & Khidir, M. (2018). *SME Worker Affective (SWA) index based on environmental ergonomics*. Paper presented at the IOP Conference Series: Materials Science and Engineering.
- Yazdani, K., Ramliy, M. K., Ismail, K., & Omar, W. Z. W. (2016). The Impact of Privatization in Technology Transfer Offices on University-Industry Connection.