Asian Social Science; Vol. 11, No. 13; 2015
ISSN 1911-2017 E-ISSN 1911-2025
Published by Canadian Center of Science and Education

Evaluating National Innovation System of Malaysia Based on University-industry Research Collaboration: A System Thinking Approach

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Received: September 28, 2014 Accepted: February 24, 2015 Online Published: May 16, 2015

doi:10.5539/ass.v11n13p45 URL: http://dx.doi.org/10.5539/ass.v11n13p45

Abstract

National innovation system (NIS) is an essential, effective and dynamic factor for the development of the nation. Despite the enormous research activities on NIS, there have been certain issues still remaining in this domain specially, in developing countries. Several articles have been published to deal with the factors affecting NIS of Malaysia but the role of research collaboration between university and industry (UIRC) on NIS is totally unattended in mainstream literature. Thus, the objective of this study is to determine the influence of UIRC on the NIS of Malaysia. Additionally, this study aims to indicate the current innovation performance and to identify the existing constraints of NIS. For the purpose of system modeling, system thinking approach is used to conceptualize and analyze the effect of UIRC on NIS. The result of this research shows that constraints of UIRC in Malaysia negatively influence on the success of NIS.

Keywords: national innovation system, university-industry research collaboration, evaluation, system thinking, innovation

1. Introduction

The concept of national innovation systems (NIS) has been gaining intellectual and practical coherence over a number of decades, enjoying initial strong adoption by OECD and developed countries, and more recently becoming the focus of increased attention as a means to address some of the more profound issues for developing nations (Castellacci & Natera, 2013). The growing number of studies of innovation systems shows that the creation of innovation-enhancing framework by evaluating the existing conditions of NIS has become a central target of policy makers around the globe (Marxt & Brunner, 2012). Innovations are considered the engine of productivity and competitiveness (Autant-Bernard, Fadairo, & Massard, 2013). Innovation is a complex process that involves not only the innovative firm but also a system of interactions and interdependencies between firm and other organisations and institutions (Metcalfe & Ramlogan, 2008; Saeidi, et al., 2013). In this regard, for the development and improvement of national innovation system capabilities, collaboration between universities and industries is widely recognized as one of the key factors (Jin, 2011; Teirlinck & Spithoven, 2013). Recently, many studies provide pieces of evidence for the strategic importance of the University- Industry research collaboration that produce a very huge impact on national economies (Fiedler & Welpe, 2010; Robin & Schubert, 2013). In the recent era of increasing competition, many nations compete to improve innovative capability with an aim for the growth and economic performance of the economy (Boons et al., 2013; Popescu & Crenicean, 2012). And the university-industry research collaboration is a key evaluating factor that provides possible pathways to accelerate the process of technological catch-up as well as sustain productivity growth and competitiveness (Bayarçelik & Taşel, 2012). Malaysia's innovation performance is in line with that of other middle-income countries in the Southeast Asian region, but shows a significant gap with high income countries. The World Bank's Knowledge Economy Index which captures the ability to generate and diffuse knowledge, ranked Malaysia 48th out of 145 countries (KEI, 2012), that demand serious efforts to enhance the technological innovation and development in Malaysia. Effective technology development in a country depends on the