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Demand-pull Technology Transfer and Needs-Articulation of Users: A Preliminary Study

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Abstract

Technology transfer processes can be technology-push or demand-pull. Whilst technology-push approaches have been dominating the field of study, we pay attention on demand-pull technology transfer. In this study, we review technology transfer literature, and try to explore important factors for demand-pull technology transfer. We argue that firms' capabilities for articulating their technological needs are important for demand-pull technology transfer. For this argument, we carry out a preliminary study to examine the influence of the quality of needs-articulation and some other factors on the success of demand-based technology transfer. We collected 61 cases of demand-led technology transfer from National Tech-Bank(NTB) website. The quality of needs-articulation and other factors were evaluated by experts who actually had processed the technology transfer cases in the NTB's program. Using the data, we performed a logistic regression analysis. The result shows that the quality of needs-articulation has positive influence on successful demand-led technology transfer. It means that firms must clearly know, and must be able to clearly explain what technologies they are in need of. In addition, user's technological capabilities and supplier's openness were also significant factors. High p-value of technological capability is in particular an interesting result. It implies that user firms with high technological capabilities are likely to succeed in demand-pull technology transfer, which is against our prior belief that firms are eager for technology transfer because they are lacking capabilities. We suppose the possibility that user's technological capability may have influence on the quality of needs-articulation, resulting in successful technology transfer. This may imply that high technological capabilities work as absorptive capacity.

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Keywords: Technology Transfer; Needs articulation, Openness, Absorptive Capacity, Demand-pull

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1. Background

During the period of rapid economic development, Korean firms, research organizations, and universities have elevated their technological capabilities with ever-increasing R&D investment. Due to the investment, the overall level of technological capabilities has rapidly improved, and the stock of knowledge and technology has shown a dramatic increase. Gross expenditure on R&D (GERD) of Korea increased from 21.3 billion USD in 2000 to 72.8 billion USD in 2014[†], and the number of patent shows a consistent increase from 132,385 in 2000 to 183,399 in 2013[‡].

However, there are claims that the performance of Korea in terms of technology commercialization has been unsatisfactory considering the massive investment in R&D. Korean public research institutes retained about 190,000 technologies, but 154,000 among them were 'sleeping' without being used[1]. The success ratio of national R&D support programs for SMEs were 96%, but commercialization rate remained at 47.2%[2]. Moreover, Korea has recently seen the economic recession and there are increasing pressures on government budget, and these make policy makers and administrators turn their eyes to efficiency and efficacy of R&D rather than quantitative growth.

In line with the trend, the Korean government has put emphasis on improving technology transfer and commercialization, and researchers and practitioners in the field of technology management have also paid huge attention on the topic. More recently, there are some attempts to promote technology transfer from the demand-pull perspective. Then what are the factors of demand-pull technology transfer, what is more critical? This study aims to examine what influences on the success and failure of demand-pull technology transfer.

2. Technology Transfer

The term technology transfer has been frequently used together with another term technology commercialization, and for this reason the former has sometimes been understood as a sub-part of the latter.

Mitchell and Singh[3] defined technology commercialization as "the process of acquiring ideas, augmenting them with complementary knowledge, developing and manufacturing saleable goods, and selling the goods in market." According to Kumar and Jain[4], technology commercialization involves upscaling and providing technology, designing and fabricating plant and equipment, optimizing products for market needs, and developing markets. In general, commercialization means the activities that bringing ideas, knowledge, or technology into markets, without necessarily specifying who does the activities.

Technology transfer can be defined in a similar but a little different way. Autio and Laamanen[5] define technology transfer as "intentional and goal-oriented interaction between two or more social entities, during which the pool of technological knowledge remains stable or increases through the transfer of one or more components of technology." More specifically, technology transfer is "movement of know-how, skills, technical knowledge or technology from one organizational setting to another."[6] Therefore, the notion of technology transfer involves different entities or organizations, whilst technology commercialization focuses on the process from technology or knowledge to market place without necessarily involving different entities or organizations.

A number of studies have explored the factors influencing the success of technology transfer. Majority of the literature agrees that there are user factors as well as supplier factors, and communication between users

[†] 2010 price and PPP adjusted. OECD data accessed on 15 April 2016.
[‡] Data from www.kipris.or.kr on 15 April 2016.