



Innovative policies to support technology and ICT development

Jarunee Wonglimpiyarat *

College of Innovation, Thammasat University, Anekprasong 3 Bldg., Prachan Rd., Bangkok 10200, Thailand



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ABSTRACT

This study is concerned with the government policies and programs to support the process of technology and innovation development of Thailand. The paper also discusses the government policies to promote the Information and Communications Technology (ICT) businesses. The comparative case of Taiwan has shown that the strong innovation networks under the management of the Ministry of Economic Affairs (MOEA) enable the successful technology catch-ups. The results show the government interventionist models of Thailand and Taiwan in providing various financing policies and programs to develop high technology-based businesses. The analyses of policy implications and strategic implementation of innovation financing programs provide useful lessons for other developing economies.

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1. Introduction

The paper is concerned with the government policies and programs to support technology and innovation. Given that the financing programs for new businesses have important implications for economic development (Dushnitsky & Lenox, 2005; Global Insight, 2007; Kortum & Lerner, 2000), this study will focus on the aspects of the government innovation financing systems comprising innovative firms, their linkages with government agencies and universities/public research institutes to support technology development. The analysis also includes the government policies to promote the Information and Communications Technology (ICT) businesses in Thailand.

Although there are many studies on the general role of government in economic development (Freeman & Soete, 1997; Schumpeter, 1939, 1967), there is scarce research in the area of financial policies. Therefore, the research in innovation financing policies could help fill the knowledge gaps in this particular domain. This study will focus on the government policies to support innovation financing within the national innovation system (Carlsson, 2006; Fagerberg & Srholec, 2008; Lee & von Tunzelmann, 2005; Lundvall, 1992, 1998, 1999, 2003; Niosi & Bellon, 1995; Patel & Pavitt, 1994). In this study, Thailand is selected as a case study for many reasons. Thailand is one of the Newly Industrialized Economies (NIEs) in Asia. It is a middle-income country with an impressive GDP growth rate of approximately 7% over the past half century, according to a report published by the World Bank. The GDP value of Thailand is roughly equivalent to 0.51% of the world economy. The

Thai government has devised various policies including financing mechanisms to promote innovations.

In knowledge-based economies, economic growth is increasingly dependent upon innovation whereby access to finance is seen as a critical factor in this process (Bygrave & Timmons, 1992; Freeman & Soete, 1997; Pissarides, 1999; Wonglimpiyarat, 2007). Innovative firms and start-ups suffer greater risks than others in traditional industries. In the previous literature, much has discussed the problems regarding the high risk nature and lack of financial resource for technology-based start-ups (Gompers & Lerner, 2001, 2004; Wonglimpiyarat, 2009). However, relatively little research has been done with regard to the policy perspectives in innovation financing (Mani, 2004). This study attempts to answer the research questions of:

- (i) What innovative policies are considered important in supporting the national innovation system?
- (ii) To what extent do the innovative policies enable or constrain the innovation system?

The findings of this research make a contribution to knowledge in the field of innovation systems in terms of offering effective innovation financing policies and recommendations to support the national economic and social development. The proposed policies as a result of this study can be integrated into the national strategies to strengthen the innovation system of Thailand. The comparative study with the advanced economy of Taiwan would provide useful lessons to other developing economies.

The structure of the paper is as follows. Section 1 provides the introduction and rationale of the research. Section 2 presents the theoretical framework on the concepts of the national innovation system (NIS), financial system, and policies for the finance of innovations. Section 3 describes the research methodology and examines the government

* Fax: +66 2 623 5060.

E-mail address: jarunee@tu.ac.th.

financing and programs to support technology and innovation development of Thailand. The case study of Taiwan is also added to compare with the case study of Thailand in order to provide lessons regarding the governmental role and policies in innovation financing. Section 4 discusses the policy challenges for technology development of Taiwan and Thailand as well as analyzes a comparative financial innovation programs to support technology development in these two countries. Section 5 further discusses the innovative policies to support ICT development in Thailand. Section 6 offers policy recommendations to strengthen the capacities and capabilities of the national innovation system.

2. Theoretical framework

2.1. National innovation system and financial system

The national innovation system (NIS) is the interactive system of existing institutions, private and public firms (either large or small), universities and government agencies, aiming at the production, diffusion and exploitation of knowledge within national borders (Lundvall, 1992, 1998, 1999, 2003). In other words, interorganizational interactions among various actors and institutions give rise to the development of innovation system. The emergence of the NIS concept can be traced back to the work of Lundvall and Freeman on the national system of innovation and national policies of innovation in the 1980s (Freeman, 1987; Lundvall, 1992, 1998, 1999, 2003; Nelson, 1988). Table 1 presents various concepts of NIS. The NIS concept is a dynamic tool to investigate, formulate, plan and position the national economic and social development by using technology and innovation as the main driving force.

The NIS studies explore the interrelations between technological development and the institutional embeddedness of innovative organizations (Freeman, 1987, 1992; Freeman, 1988; Lundvall, 1992, 1998, 1999, 2003; Lundvall, 1993; Nelson, 1988, 1993, among others). Innovation system concept shares the cultural and institutional dimensions which are an unorthodox perspective in the mainstream economic belief. Cross cultural and institutional interactions stressing knowledge and learning constitute a shift of perspective and a new focus. The new focus, which is the core of an innovation system, commences from the allocation of given and scarce resources to the creation, distribution and use of new resources (Carlsson, 2006; Fagerberg & Srholec, 2008; Lundvall, Johnson, Andersen, & Dalum, 2002). The financial system is argued to have an impact on economic performance through the differing abilities to promote sector-specific types of innovative activities. The national financial system therefore provides necessary resources required for financing enterprises to enhance economic performance within the national innovation system (Hyytinen & Toivanen, 2005; Mani, 2004).

Table 1

Concepts of the national innovation system.

"A system of innovation is constituted by elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge." Lundvall (1992)
"A national innovation system is the national institutions, their incentive structures and their competencies, that determine the rate of direction of technological learning (or the volume and composition of change-generating activities) in a country." Patel and Pavitt (1994)
"A national system of innovation is the system of interacting private and public firms (either large or small), universities and government agencies, aiming at the production of Science and Technology within national orders. Interaction among these units may be technical, commercial, legal, social and financial in as much as the goal of the interaction is the development, protection, financing or regulation of new Science and Technology." Niosi and Bellon (1995)

2.2. Policies for the finance of innovations

Financial and investment policies play an increasing important role in entrepreneurial, venture and economic development (David, Hall, & Toole, 2000; Hall & van Reenen, 2000; Hyytinen & Toivanen, 2005). The financial and investment policies are among the key operational priorities in developing countries to support investment by local firms, especially small and medium-sized enterprises (SMEs), and transnational corporations investing in these countries.

A close review of the studies on the financial system for supporting innovation reveals that the difficulties of firms lie in their early stages of business development and innovation process (Gompers & Lerner, 2001, 2004; Wonglimpiyarat, 2009). In developing countries, the government financing mechanism plays an important role in innovation system (Mani, 2004). The set of institutions and financial policies is used to support technology and innovation development so that the efforts of research and development (R&D) institutions and industries can lead to effective technology commercialization, bringing about business creation and economic growth. In other words, the governmental financing mechanisms provide the much-needed support to nurture the development of technology and assist the process of commercializing innovations.

Equity financing is the process of raising money for company activities by selling common stocks or preferred stocks to individual or institutional investors. Venture capital (VC) is one form of equity financing (financing companies through equity participation) used to fund high-risk promising operating companies, often high-technology firms with high growth and exit potential (European Private Equity and Venture Capital Association, 2005). Private equity is an asset class providing finance to invest in turnaround companies and leveraged buyouts (LBOs) (AVCJ, 2006; Cuny & Talmor, 2007; Fenn, Liang, & Prowse, 1995; Groh, von Liechtenstein, & Lieser, 2010). VC and private equity share the characteristic of providing finance to corporate investments with high growth prospects (Alperovych & Hubner, 2011; Gompers & Lerner, 2001, 2004).

Venture capital (VC) financing plays a leading role in the early stages of innovation development. The VC funding becomes part of the national innovation system in which the government actively uses VC as a method for commercializing innovations. VC is regarded as the high-profile way of injecting capital to transform the economy. It is a high-risk financing investment which venture capitalists expect high returns in the form of capital gains and dividends (Dixon, 1990; European Private Equity and Venture Capital Association, 2005; Pandey & Jang, 1996). Currently, a number of developing countries have introduced venture capital as an economic development tool whereby the government of these countries takes an operational role in the development of VC industry (Lasserre & Schutte, 1995; Naqi & Hettihewa, 2007; Tsai, Hsieh, Fang, & Lin, 2009). The main focus of venture capital in these countries is similar, i.e. to provide seed capital and financing for technology development. Nevertheless, the structure of VC financing differs among countries due to different set of interacting institutions and structures of the national innovation system.

VC represents a practical means of linking research to marketable innovations. The whole investment process from start-ups to the ultimate initial public offering (IPO) needs technology and financial support. The establishment of financial innovation system is in line with the NIS framework emphasizing the interactive system of institutions, private and public firms, universities and government agencies in support of the production, diffusion and exploitation of knowledge and innovations (Lundvall, 1992; Nelson, 1993; Viotti, 2002).

3. Research methodology and analysis of innovative policies and programs to support technology development

This study employs a case study methodology (Eisenhardt, 1989; Yin, 2003, 2013) to investigate the innovative policies and programs

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