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Government policies towards Israel's high-tech powerhouse



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ABSTRACT

Israel's Silicon Wadi is second only to US Silicon Valley in terms of business start-ups. The government policies play an important role in promoting innovation and driving the country towards a high-tech powerhouse. In this study the analyses, carried out through the lens of cluster and national innovation system (NIS), have shown that the thriving high-tech clusters are the result of government-led policies in creating the venture capital (VC) industry with the impacts of Yozma program. Importantly, the government financing did not crowd out but crowd in private investments. Israel presents an interesting case of the most successful Silicon Valley-style economy. The lessons of Israel in successfully climbing the technological ladder to become a high-tech powerhouse would be useful for other countries to learn how to promote high-tech clusters.

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1. Introduction

Silicon Valley is characterized as the high-tech region of the United States. Silicon Valley is the world's best known area of electronics and computer-related industries whereby its success is a result of effective linkages and cluster policies (Saxenian, 1990, 1994, 2006; Kaplan, 2000; Rosenberg, 2002). The success of US Silicon Valley has become a technology catching up model for countries around the world to follow. In this study, the term 'Silicon Valley' is based on the scholarly research of Saxenian (1990, 1994, 2006) using such a prevalent term to describe an area of high-tech industries with network-based structure and agglomeration.

The focus of this study is the country case of Israel, one of the most successful countries in replicating the success of US Silicon Valley. The research attempts to understand the government policies contributing to successful start-up nation of Israel. The reason to choose Israel as a case study is because it is the most successful country after the United States in establishing high-tech industries. The creation of Israel's high-tech Silicon Wadi is recognized as the most successful Silicon Valley-style economy outside the United States.

The government policies play an increasing important role in promoting innovation and economic growth. However, there are still considerable knowledge gaps in linking the government policies to innovation financing (Mani, 2004; Hyytinen and Toivanen, 2005). Therefore, this study attempts to fill the gap in the existing research literature. Specifically, the study attempts to answer the main research question – *How could Israel become a high-tech*

powerhouse? The analyses of findings in this study are based on Porter's cluster model (Porter, 1990, 1998, 2001) and the national innovation system (NIS) concept (Lundvall, 1992, 1998, 1999, 2003). This research aims to provide practical contributions as well as reflections on government policies for promoting national innovative capacity and industrial competitiveness. The policy lessons and experiences drawn from the country case of Israel can be applied to other developing economies.

Israel is an innovation driven country having made the successful transition from an underdeveloped economy to a high-tech powerhouse. The country was ranked 24th in the 2014 International Institute for Management Development (IMD) World competitiveness ranking and 27th according to 2014 World Economic Forum (WEF) global competitiveness index. Israel was also ranked 19th in the category of very high human development according to the United Nations Development Program's Human Development Report Index in 2014. Israel was invited as a full member in the Organization for Economic Co-operation and Development (OECD), an economic group of developed countries since 2010. The competitiveness of Israel is a result of its entrepreneurial culture and the government-led technology policies in venture capital (VC) financing.

The structure of this paper is as follows. Following the introductory section, Section 2 provides a literature review on industrial innovation policies to promote entrepreneurial financing, the cluster model and the competitive advantage of nations as well as the national innovation system concept. Section 3 discusses the research design, methodology and provides the background of the study. Section 4 presents analyses of findings with emphasis on the government policies that help transform Israel into a high-tech powerhouse. There are two subsections providing

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analyses of Israeli high-tech industrial clusters based on the cluster model and Israeli innovation system based on the national innovation system (NIS) concept. Section 5 concludes the paper by drawing lessons and policy implications regarding the role of Israeli government in promoting high-tech clusters. The practical lessons and experiences from the case of Israel would be useful for other countries to learn the process of technological and economic catch-ups.

2. Literature review

2.1. Industrial innovation policies to promote entrepreneurial financing

The government policies to promote entrepreneurship are important in the national economic growth. In particular, 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. 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 and Timmons, 1992; Freeman and Soete, 1997; Pissarides, 1999; Wonglimpiyarat, 2007). Therefore, the government policies play an increasing important role in entrepreneurial, venture and economic development (David et al., 2000; Hall and van Reenen, 2000; Hyytinen and Toivanen, 2005).

Venture capital (VC) plays an important role in supporting entrepreneurial development. VC is a high-risk, potentially high-return investment to support business creation and growth. In other words, VC provides the opportunity for entrepreneurs to exploit technology and turn it into commercialized innovations. According to the study by Hellmann and Puri (2000), VC financing is related to the growth of start-ups. The importance of VC financing in the configuration of a geographical concentration is the regional capacity to engender economic advantages. In other words, the venture capital investment (clustering) plays a vital role in creating phenomenal economic growth.

The small and innovative companies are important to the economy. They have assumed a major influence in the economic development, employment and creation of new innovations (Laranja, 1998; Kingston, 2001; Gray and Gonsalves, 2002; Massa and Testa, 2008; Peters and Coles, 2010). The literature review on entrepreneurship reveals that the difficulties of firms lie in their early stages of business development and innovation process (Gompers and Lerner, 2001, 2004; Wonglimpiyarat, 2007). Many governments have tried to focus on introducing the innovation policies providing early stage financing to help SMEs reduce the risks underlying the process of entrepreneurial development. In developing countries, the government financing mechanisms play an important role in innovation system (Mani, 2004). The sets of institutions and public policies are 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.

One of the important public policies is venture capital (VC) policies to promote innovation and economic growth. Entrepreneurial financing plays a critical role in supporting SMEs, particularly in the early stage of venture development. The VC policies are considered to be instrumental in industrial development. Taking into account previous studies on public policies, Stiglitz and Weiss (1981) and Holmstrom and Tirole (1997) study the role of bank and financial intermediaries in providing finance to ease capital constraints

(scarce capital) of firms in economic contexts of public policy. However, Gompers and Lerner (1998) as well as Da Rin et al. (2006) have focused their studies in the areas of VC financing which help evolve the context of public policy. While Gompers and Lerner (1998) employ multivariate regression analysis to study the impacts of venture variables on the industry fundraising, Da Rin et al. (2006) use the innovation ratios to evaluate the effectiveness of public policies on the development of VC market. Their study shows the three types of policies to enhance VC growth: the corporate capital gains taxation, the opening of new stock markets, and the reduction of barriers to entrepreneurship.

Considering the level of policy research, the studies by Gompers and Lerner (1998) as well as Da Rin et al. (2006) address the macro level policies. However, it is interesting to see that the work by Cullen and Gordon (2002) is devoted to the type of tax policy and its impacts on the demand and supply of venture funds. The studies by Jeng and Wells (2000) and Bottazzi et al. (2008) are focused on the determinants of VC. The results of their studies have shown the importance of initial public offerings (IPOs), institutional and legal environment, tax policy as well as human capital in driving the VC industry. More recently, Yu (2013) and Hsu et al. (2015) have extended their studies by integrating VC policies in a broader context of mechanisms for promoting the process of technology commercialization. Their studies also take into account the limitations of institutional/cultural differences of the VC industry.

2.2. Cluster model and the competitive advantage of nations

The literature on industrial clusters popularized during the 1990s. Porter (1990, 1998, 2001)'s Diamond model provides a framework of the industrial competitiveness in the form of clusters (Fig. 1). By definition, the cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities (Porter, 1990, 1998, 2001). Porter (1990) has developed a Diamond Model framework to analyze the industrial competitiveness in the form of clusters. Within an industrial cluster, the social community and the economic agents work together to drive product/process innovations to the marketplace (Gordon and McCann, 2000, Schmitz, 2000).

Porter (1998) argued that the nation's innovative capacity is built on the combined strength of common innovation infrastructure and vitality of the environment for innovation in particular clusters. According to Porter (1990, 1998, 2001), clusters are a source of strategic competitive advantage. The cluster approach provides an understanding of economic development processes. Clusters lead to increased levels of productivity, growth and employment. Within an industrial cluster, the social community and the economic agents work together to drive product/process innovations to the marketplace (Porter, 1990, 1998, 2001; Feldman, 2000; Steiner, 1998).

The cluster model focuses upon the conditions that support firm competitiveness at the national scale. It is an economic development model that promotes collaboration among institutions to facilitate the exchange of information and technology. Policy makers of the government worldwide have been challenged to implement the cluster concept as an economic development model. Industrial clusters are not confined to political boundaries and can be localized (like the clothing and garment industry of New York) or dispersed (like the North American auto industry). Within the context of industrial clusters, the four attributes contributing to the competitive advantage of nations are: (1) factor conditions, (2) demand conditions, (3) context for firm strategy and rivalry, and (4) related and supporting industries (Porter, 1990, 1998, 2001).

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