Chapter 14
The Competitive and Comparative Advantages Effectively Fostered by National Innovation Systems: An Exploratory Study

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ABSTRACT

The concept of National Innovation Systems (NIS) has extensively been applied to biotechnology and shaped the industry. This chapter aims to analyze and discuss the concept, its structure, configuration and prescriptive character, as well as the underlying competitive and comparative advantage assumptions. Its purpose is to provide a factual account of deployment efforts, and to highlight the challenges encountered with its implementation. To this end, an in-depth exploratory study of the berries sector in the Maule Region has been performed. Data were collected from NIS actors (academia, industry and government), inputs (funding R&D projects),

DOI: 10.4018/978-1-5225-1040-6.ch014

outcomes of innovation activities (academic publications) and exports. The open source software VOSviewer version 1.5.4 was used to extract and analyze scientific publications on berries from Web of Science®. The relevance of links, interactions and implications are highlighted. Also, theoretical and prescriptive approaches to NIS implementation and deployment are bridged.

INTRODUCTION

The concept of National Innovation System (NIS) – developed, diffused and largely adopted by developed countries (Lundvall, 2007; Niosi, 2002; Nelson & Rosenberg, 1993) –, plays a key role in the business and economic analysis of cities, regions and countries pursuing innovation strategies. Regarded "as a tool for analyzing economic development and economic growth" (Lundvall, 1998, p. 415), the NIS concept has extensively been applied to biotechnology and shaped the industry (Niosi, 2011; Sasson, 2005). Chile's biotech is no exception.

During the last decades, Chile has made significant progress in developing its economy base and building innovation capabilities. According to the 2012-2013 Global Competitiveness Index published by the World Economic Forum (WEF), Chile is far from being a factor-driven economy but a country in a transitional stage of development from an efficiency-driven to an innovation-driven economy characteristic of developed countries such as Japan, France and Germany. The 2015-2016 WEF Report recently highlighted Chile's solid institutions, its stable macroeconomic environment and well-functioning financial markets as well as its high technology readiness and widespread uptake of ICTs. Although the Report argues that Chile "must do more to improve its capacity to innovate", it concludes that the country "remains the most competitive country in Latin America and the Caribbean" (World Economic Forum, 2015).

The utility of the WEF index has been criticized (Önsel et al., 2008; Lall, 2001), and efforts to measure competitiveness, innovation and knowledge have proliferated (Huggings & Izushi, 2008; Kao et al., 2008; Önsel et al., 2008; Fagerberg et al., 2007; Lall, 2001). Yet the 2000 Chilean WEF index and the 2000 Chilean IMD Competitive index published by the International Institute for Management Development (IMD) both rank the country at number 26 among the leading 30 competitive nations (Lall, 2001). In turn, the 2004 Chilean WEF index and the Chilean aggregated index proposed by Önsel et al. (2008) – comprising 178 weighted criteria –, both sustain the country's competitiveness and rank Chile at number 28 out of 103 countries around the world. Moreover, the 2015 Global Innovation Index (GII) – co-published by Cornell University, INSEAD and WIPO –, ranks Chile as the most innovative Latin American country (1st place) and at number 42 out of 141 countries around