

An Introduction to National Innovation Systems

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Received 04/05/09, accepted 27/05/09

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Abstract

This paper examines the national innovation systems concept with reference to the models of Porter & Stern (2001) and the work of Lundvall (1992), Nelson (1992) and Smith (2000). It also builds up a profile of various countries with use made of OECD statistics to demonstrate comparisons across national indicators of innovation, as well as reference to such benchmarks as the EU CIS survey data or that of the ABS (2005).

The National Innovation Systems (NIS) Framework

Definition, background and implications of the NIS concept

A NIS may be defined as:

"...that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies." (Metcalfe, 1995).

Schienstock and Hämäläinen (2001), report that the concept was introduced by (Lundvall 1985), but only widely diffused by Freeman's (1987) analysis of Japan's outstanding economic performance and technology policy. Freeman (1988) Lundvall (1992), Nelson (1993), and Edquist (1997) later further developed the concept.

Academic study of National Innovation System (NIS) by various innovation and institution scholars (e.g. Porter & Stern (2001), Lundvall (1992), Nelson (1992 and 1993), Smith (2000); Edquist (1997), Amable (2002) can be seen as part of a neo-Schumpeterian and institutional challenge to neo-classical economics, underlining the importance of specifying contexts in terms of time and space and arguing that institutional differences are likely to have major influence on the rate and direction of innovative activity (Lundvall, 1998). Balzat and Hanusch (2004) in particular describe a NIS as:

"... a historically grown subsystem of the national economy in which various organizations and institutions interact with and influence one another in the carrying out of innovative activity."

In this sense the NIS framework makes it possible to develop a systemic approach to innovation in which the interaction between technology, institutions, and organizations is central. The focus of an NIS should therefore not only be on high technology, but on the application of technology and innovation across all industry sectors, with particular focus on inter-sectoral knowledge flows, and the role of the national education system to supply skilled labour (Lundvall, 2007).

Interestingly, the concept was almost co-elaborated by economists and public institutions (Lévesque, 2005). It seems that the latter were highly interested in this new approach when theories that had been used before had proven unable to give expected results and deal with heterogeneous economic and social development. Until the 1980s, traditional measurements of innovation within a country as a matter of fact focused on inputs such as expenditure on research and development or the number of research scientists employed, while outputs were assessed by such indicators as the number of patents generated (OECD, 2001).