

Chapter 1

Introduction

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This short book provides a quick introduction to important aspects of contemporary innovation policy. It addresses a non-specialist audience interested in quickly building background knowledge, getting familiar with the terminology, and getting an overview of core concerns and debates in this area of policy. The book has its origins in a much more extensive report to the World Bank prepared to impart background information to middle- and upper-level policy decision-makers and analysts as well as stakeholders from industry and universities from developing countries prior to engaging in intensive “how-to” policy training. Our audience also includes upper-level undergraduate and graduate students embarking on the study of innovation policy.

The book is intended as a practical guide to selected issues in innovation policy as they relate primarily to economic growth and development. In preparing the material we have assumed no particular knowledge of the subject matter by the reader and only elementary understanding of economics. The book sets up the policy context and then deals with some of the most important issues in the innovation policy sphere today. It references critical readings on each topic but deliberately avoids bogging down the reader with long reference lists.

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We do not claim comprehensive coverage of all topics related to innovation policy. Rather than providing a lot of detail, the purpose here is to quickly wrap the reader's mind around basic concepts and quickly enable him/her progress to the topics. For instance, whereas we discuss intellectual property protection and standards, we do not delve into technological paradigms and trajectories and the importance of property rights in these. And, whereas we discuss strategic alliances and high-risk finance, we hardly put the two together to deal with innovative high-risk financing networks. Rather than being comprehensive—an impossible task for a single short book—our aim is to distill and provide adequate information in one place that will prepare a diverse audience to march deeper into more specific topics subsequently.

The more nuanced reader with generalist interest in innovation policy for growth and development will find several other important survey-like books in this field in order to expand beyond the present short book. A partial list would include:

- Jan Fagerberg, David C. Mowery and Richard R. Nelson (eds) (2005) *The Oxford Handbook of Innovation*, Oxford University Press.
- Bronwyn H. Hall and Nathan Rosenberg (eds) (2010) *Handbook of the Economics of Innovation*, Elsevier.
- Chris Freeman and Luc Soete (1997) *The Economics of Industrial Innovation*, 3rd ed., MIT Press.
- Vernon W. Ruttan (2001) *Technology, Growth, and Development*, New York: Oxford University Press.
- Gregory Tasey (2007) *The Technology Imperative*, Edward Elgar.
- Christine Greenhalgh and Mark Rogers (eds) (2010) *Innovation, Intellectual Property and Economic Growth*, Princeton University Press.
- World Bank (2010) *Innovation Policy: A Guidebook for Developing Countries*, Washington DC: The World Bank.

A set of international organizations also produces streams of very relevant reports including among others the Organization for Economic Cooperation and Development (OECD), the World Bank, the United Nations Conference on Trade and Development (UNCTAD) and Industrial Development Organization (UNIDO), and the World Intellectual Property Organization (WIPO).

This book is comprised of six thematic chapters:

Chapter 2: Fundamentals of Innovation Policy for Growth and Development This chapter provides an overview that initiates the reader quickly into the subject of technology and innovation policy. The chapter begins with a short discussion of the models of economic growth to provide a foundation for understanding how economists view, from a macro-economic perspective, the role that technology and innovation play in the economic growth process. It then proceeds to a more micro-level discussion, beginning with the creation of new technologies (invention) and their commercialization (innovation) and spread (diffusion) across the economy. The chapter then returns to the macro-economic level with a discussion of the relationship between technology and international economic competitiveness.

Chapter 3: University Entrepreneurship This chapter deals with a core sector of the Triple Helix: universities. Specifically, it deals with universities through the prism of entrepreneurship and linkages with industry. The creation of new technologies and new industries rests partially on the transfer of new knowledge to industry, through support of academic research and the movement of scientific talent out to the private sector in the form of trained graduates. The discussion addresses the experience of the United States, the country which is still considered by many as the standard bearer in this respect and the example for other countries to emulate. The chapter focuses on major policy actions and related debates during the past three decades or so in order to flesh out the main points of interest in university-industry relations and the role of the government in trying to foster these by incentivizing higher education institutions to become more entrepreneurial.

Chapter 4: Strategic Alliances/Knowledge-Intensive Partnerships This chapter deals with one of the most important developments during the past few decades: the proliferation of strategic partnerships around the world, especially those based on the production, exchange, and/or use of new technical knowledge. There is little doubt of the centrality of such collaborative agreements across all developed countries and the top tier of developing ones (BRICS+). A strong argument can be made that alliances have a critical role to play in the development and market exploitation of new technologies across all industries and especially knowledge-intensive industries such as those for which information and communication technologies, biotechnology and new materials are important. This chapter deals with this very important issue from the point of view of company strategy and consequent policy implications. It provides a practical guide of the issues involved and illustrates through several cases around the globe.

Chapter 5: Clusters/Science Parks/Knowledge Business Incubators This chapter addresses a major strategic topic in the context of innovation policy: clusters and science parks. These two formations can overlap significantly but are still distinct and thus the chapter is divided into two major parts. Part I deals with the broader concept of clusters (geographical agglomerations of industry to exploit specific locational advantages and spillovers). Part II deals with science parks (geographical agglomerations of industry to exploit proximity with universities and major research institutes). The second part also extends to the incubation of small companies. The chapter is sprinkled with many examples of successful and less successful cases from around the world.

Chapter 6: High Risk Finance This chapter focuses on an absolutely critical aspect of innovation: the transfer of an idea from initial concept to prototype and then to the market. A core component of this process is risk financing, that is, the ability to fund emerging business of higher than average risk. Financial systems around the world struggle with this difficult issue which, nevertheless, has been isolated as of critical importance to development and growth. How does a government deal with the lack of “patient” capital? Venture capital? Investment angels? And so forth. The chapter defines the challenge, provides an overview of the various

types of finance for various stages of investment, addresses the important topic of market exit, and then goes into the challenges for emerging markets. The chapter then offers available approaches to supporting high-risk finance by the public sector, offers examples from around the world, and closes with policy recommendations.

Chapter 7: Intellectual Property, Standards This chapter deals with two very important framework conditions of contemporary innovation systems: intellectual property protection and standards. Both these issues—left on the backburner for most of the modern history of industrialization—have been elevated to the forefront due to the arrival of the knowledge-based economy and globalization. Countries that want to be important players in the global economy simply cannot disregard them, even though occasionally they may sound less interesting to some policy decision makers. The chapter summarizes the state-of-the-art in our current understanding of these two topics and relates them to economic development.