

## ***Book Reviews***

**Sectoral Systems of Innovation and Production in Developing Countries: Actors, Structure and Evolution, edited by Franco Malerba and Sunil Mani, Edward Elgar Publishing (2009), 394 pages, ISBN: 978-1848446564**

Sectoral systems of innovation and production have been a growing area of research within industrial economics and economics of innovation. This is because a sectoral system approach tries to answer important questions concerning how industries and technologies evolve by considering a wide range of factors and processes that affect innovation and production at the sectoral levels. As Franco Malerba and Sunil Mani point out in the introductory chapter, a sectoral system approach examines innovation as the result of both firms' specific variables (such as firms' learning and capabilities, R&D and production investments, strategies and organizational structure), and the type of technologies that characterize a sector, the interdependencies with other related sectors, the role of actors (such as competitors, suppliers, users, universities, financial organizations, public agencies and the government), the characteristics of demand and the type of institutions (such as standards, regulations and norms). One of the major conclusions of the sectoral system approach is that all these factors and processes often differ from sector to sector and consequently have to be understood in their effects on innovation.

Up to now, the research on sectoral systems has been skewed toward developed countries. Despite the increasing interest in analysis of sectoral systems of innovation and production in developing countries, relatively few works have concerned themselves primarily with developing countries. This book contributes to the literature by examining in detail

the features and dynamics of sectoral systems of innovation and production in developing countries including Korea, Taiwan, India, Thailand, Vietnam, Brazil, Chile, Uruguay and Tanzania. This book aims to answer the following questions: What are the main characteristics of sectoral systems of innovation and production in developing countries? How do they change and evolve? What are the main policy implications that one can draw from the analysis of sectoral systems?

This book is composed of three parts. Part I is an introduction chapter by Franco Malerba and Sunil Mani. It contains a general discussion of sectoral systems, major themes and points of the book. Some conclusions emerging from the findings of the book are also discussed in this chapter. Part II (Chapters 2, 3, 4, 5 and 6) examines the key actors and main features of sectoral systems and their effects on innovation and developments. Case studies include pharmaceuticals and telecommunication equipment in India, the Brazilian ICT, aeronautical, pulp and paper industries, and software in Uruguay. Part III (Chapters 7, 8, 9, 10 and 11) of the book points to key aspects of the dynamics and evolution of sectoral systems. It deals with the Korean machine tool sector, ICT in Taiwan, motorbike manufacture in Thailand and Vietnam, the biofuels sector in Tanzania, and salmon farming in Chile.

In Chapter 2, "Why is the Indian pharmaceutical industry more innovative than its telecommunications equipment industry? Contrasts between the sectoral systems of innovation of the India pharmaceutical and telecommunications industries", Sunil Mani shows that two sectors, pharmaceutical and telecommunications industry, may have quite a different performance in India because of the characteristics of the specific

sectoral systems. Even though the government has intervened in the establishment of both these industries, the pharmaceutical industry is more innovative: the drug industry has a strong patenting record and has emerged as a net exporter, while the telecommunications industry has increasingly become dependent on imports and MNCs. In pharmaceuticals, the innovation system of the industry has a very proactive government policy regime especially with respect to intellectual property rights, along with strong government research institutes and private sector firms which have invested in innovation. In the telecommunications industry, on the contrary, India followed a very rigid policy of indigenous development of domestic technologies. The domestic enterprises themselves did not have any in-house R&D capability. Thus, most of the enterprises have become mere traders distributing products manufactured elsewhere and the equipment industry has now become dominated by affiliates of MNCs and by imports. This chapter highlights the importance of designing public policy to promote innovations.

Chapter 3 is the article by Fernando Perini. In “From innovation projects to knowledge networks: knowledge as contingency in the sectoral organization of innovation”, he points out that the knowledge base of a sector greatly affects the organization of innovative activity and the type of networks in Brazilian ICT. Three propositions are presented and tested using a longitudinal examination of the boundaries between firms and technological partners in different types of innovation projects, a project-based index of revealed technological advantage (PRTA), and a social network correlation technique (QAP). The first proposition states that the balance between markets and hierarchies in innovative activities is influenced by the knowledge base and the availability of dispersing resources in the knowledge network. This proposition is supported by the empirical results. The second proposition investigates whether different types of knowledge base require specific governance mechanisms resulting in long-term specialization in the knowledge network. The findings show that the different roles of organizations reinforce the importance of diversity of governance structures and the different mechanisms for interaction

between public and private as well as domestic and multinational stakeholders inside the sectoral systems. The third proposition examines whether different types of knowledge base require different types of inter-organizational channels, limiting the possible knowledge flow to specific communities of practice. The author found a low correlation between the networks in different activities. This implies that the different types of knowledge tended to flow in distinct communities of practice, although there are some connections between the types of activities.

Chapter 4 is devoted to Hannes Toivanen and Maria Barbosa Lima-Toivanen’s paper, “Learning, innovation and public policy: the emergence of the Brazilian pulp and paper industry”. They argue that private sector enterprises are key actors in a sectoral system of innovation in the pulp and paper industry in Brazil. Public policies did not hinder companies’ competitiveness in the market. Rather, entrepreneurs and managers enjoyed healthy, internationally competitive incentives for the creation and adoption of scientific, technological and business innovations.

In Chapter 5, Marjolein Caniels, Effie Kesidou and Henny Romijn in their chapter on “The software sector in Uruguay: a sectoral system of innovation perspective” examines the important role of local skills, entrepreneurship and clustering of innovative activity in the software sector in Uruguay. The authors point out that advanced human capital, vibrant entrepreneurship and intense spinoffs are at the heart of the clustering of innovative activities in skill-intensive sectors. In the Uruguayan software industry, the sectoral system has developed owing to the presence of skilled workers with a good level of education and has grown over time through intense entrepreneurship, spin-offs and labor mobility. Firms learn through internal efforts such as R&D but also access external knowledge and information through networking. In this sectoral system no major role of policy has been present and direct promotion of the sector through public policies has not played an important role in the emergence of the sector.

In Chapter 6, Rosane Argou Marques and L. Guilherme de Oliveira investigate the geographical boundaries of the Brazilian aeronautical sector in

his article, “Sectoral system of innovation in Brazil: reflections about the accumulation of technological capabilities in the aeronautic sector (1990-2002)”. They show that a sectoral system of innovation has boundaries extending beyond the region and the nation and it very often extends abroad to foreign locations by examining the Brazilian aircraft manufacturing sector. The message that one gets from this chapter is that sectoral systems of innovation need not be confined to national borders, but can be global, and thus the interactions with local actors tend to diminish over time.

Chapter 7 is “China’s threat and opportunity for the Thai and Vietnamese motorcycle industries: a sectoral innovation system analysis” by Patarapong Intarakumnerd and Mai Fujita. They point out that the same sector may evolve quite differently when they are facing similar threats and opportunities. This is demonstrated with an examination of the motorcycle in Thailand and Vietnam. The direction and the pace of evolution depend on existing absorptive capabilities of agents, strength of their linkages and their process of collective learning to endure the threats and exploit the opportunities. Thailand can withstand the threats and competition from China and exploit the opportunities better than Vietnam because its motorcycle sectoral system of innovation and production has relatively more capable agents, a government with more vivid and targeted strategies for the automotive sector, more active support of agencies, universities and research institutes, more sophisticated demand conditions, and relatively more interaction, especially knowledge transfer, among agents.

In Chapter 8, Michiko Lizuka in her chapter on ‘Low-tech’ industry: a new path for development? The case of the salmon farming industry in Chile” illustrates how ‘low tech’ sectors can be highly dynamic in their path to development in Chilean salmon farming. This chapter proves that the so-called low-tech sectors such as food and other natural-resource-based industries can be innovative, and have undergone a major transformation that requires advanced capabilities. As an example, the Chilean salmon farming industry has shown major development and reached world leadership. It evolved over time by

successfully using and combining advanced knowledge and became increasingly knowledge-intensive and innovative.

Chapter 9 discusses the role of interdependencies and demand in a key capital goods industry such as machine tools in Korean. Yoon-Zi Kim and Keun Lee, in “Making a technological catch-up in the capital goods industry: barriers and opportunities in the Korean case”, argue that making a catch-up is hard to accomplish in capital goods industries that are usually led by small or middle-sized companies due to intrinsic difficulties such as vertical interdependencies and local demand. They also note that, despite these difficulties, the Korean economy has achieved a very slow but gradual catch-up in the capital goods industry. This chapter attributes such achievements to several factors, including the strenuous effort of the government, niche markets in general-purpose machine tools and emerging economies, and the increase in the introduction and adoption of IT or digital technologies in machine tools.

In Chapter 10, Ting-Lin Lee, in “From ‘nuts and bolts’ to ‘bits and bytes’: the evolution of Taiwan ICT in a global knowledge-based economy”, demonstrates the important role of two public actors in the evolution of the ICT industry in Taiwan. The sectoral system of innovation of the Taiwanese semiconductor industry is largely shaped by two government research institutes, Industrial Technology Research Institute (ITRI) and the Institute of Information Industry (III). In the case of Taiwanese ICT, sectoral systems of innovation are embedded in the national system of innovation, and their evolution is both supported and hampered by the government.

Chapter 11 examines the creation of a new sectoral system in a rural area in Tanzania. Janske van Eijck and Henny Romijn in their article on “Prospects for *Jatropha* biofuels in Tanzania: an analysis with strategic niche management” conclude that the innovation system for *Jatropha* biofuels in Tanzania is still embryonic and that its future is still unclear. One can learn from this chapter is that creating and nurturing sectoral systems of innovation in new technology-based industries in the rural areas of the developing countries can be both challenging and complex.

Innovation and technological change follow noticeably different pathways depending on the sector in which they take place. The expert contributors in this book promote this understanding by exploring a wide range of sectoral systems, from traditional to high technology sectors, and across a number of developing countries. They examine key actors and main characteristics of sectoral systems and their effects on innovation and developments. They also look at how these systems change and evolve, highlighting policy lessons to be drawn from the analysis. Many of the complexities and challenges involved in sectoral systems of innovation and production in developing countries are elucidated as well. This book is suitable for postgraduate students and academic researchers in the fields of innovation policy, management of technology, industrial economics and strategy. Readers will learn a lot from this book about the nature, structure, organization and dynamics of innovation and production in various sectors.

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**The other side of innovation, Vijay Govindarajan and Chris Trimble, Harvard Business Review Press (2011), 288 pages, ISBN: 978-1422169963**

Can modern business organizations make strategy as innovation actually work? Some of the most well-known researchers have taken a dim view of the possibility. Clayton Christensen has consistently warned that while established organizations will succeed with sustaining innovations, they will struggle mightily with disruptive ones. Chris Zook has recommended

that companies take only small steps outside their existing business. However this book insists that while acknowledging that there are still more questions than answers, there is no managerial reason why established organizations should be incapable of executing any innovation initiative. So this book offers practical new advice for senior executives, chief innovation officers, leaders of innovation initiatives, members of innovation teams, aspiring innovators, and all those who support innovation.

Coming up with the brilliant idea can seem like the fulfillment of innovation, but it is not enough. After that comes the other side of innovation-the challenges beyond the idea. Execution. Generally, because the brilliant idea itself has such strong appeal, the other side is usually an afterthought. However ideas are only beginnings. So this book focuses on the real innovation challenges beyond the idea. To execute innovation, this book argues that many innovation initiatives require a special kind of team and plan. Organizations evolve into what this book calls Performance Engines. Performance Engines' nonstop quest for repeatability and predictability takes many initiatives out of reach. The Performance Engine is powerful and capable. It delivers productivity and efficiency, it is capable of growth, and it has some ability to innovate. It can tackle continuous process improvements and product development that are similar to past efforts. Beyond these limits, the fundamental incompatibilities between innovation and ongoing operations make it impossible for the Performance Engine to innovate on its own. Because of the incompatibilities, innovation leaders often imagine themselves as rebels fighting the establishment. But one person against the bureaucratic octopus is an extra-ordinarily bad bet. The fundamental prescription of this book is that each innovation initiative needs a special kind of team with a custom organizational model and a special kind of plan that is revised only through a rigorous learning process. Despite the inevitable tensions, innovation leaders must strive for a relationship of mutual respect with the Performance Engine.

This book is composed of two parts. The part I focuses on the team and part II focuses on the plan. Both parts I and II include a brief but important