

# Preface

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Much of the economic and social progress due to technology, along with the growing importance of technological change in world production and employment, has been characteristic of the last four decades. Technological change not only determines growth but also affects international competition and modernization within an economy. Technology has been central to both economic growth and core elements of social welfare that are only partly captured by standard measures of gross domestic product (GDP), including health, education and gender equality.

Technology creation and diffusion are the main components not only of innovation and growth but also of their long-run sustainability, with adoption and diffusion of new technologies affecting economic structure and competitiveness.

The concept of innovation has been frequently used almost as a synonym for technical change. In this case, innovation is seen as a process that has linkages and feedbacks, and connects all the elements of the Schumpeterian triad: invention, innovation and diffusion, together with the more coherent concept of incremental innovation. Within this framework, development is understood as the process of economic transformation brought about by innovation. This concept of development could, therefore, be considered, to a certain degree, as a background for the systems of innovation approach, because this is a core tool for the study of an economy's ability to create and diffuse innovation, and furthermore to 'develop'. The term 'system of innovation' indicates the national technological capabilities, as well as the structure and planning of research and development, with European innovation systems nowadays playing an important role in the economies of EU member states.

One of the most important economic events of recent decades in Europe has been the process of European economic integration. Economic theory, however, is unclear with respect to the effects of economic integration. This book offers such an empirical analysis. It uses the unique example of the EU to analyse whether convergence or divergence occurred among the involved member states. However, this book asserts that convergence and divergence may occur in various ways, mainly affected by national or regional dynamic conditions.

The book argues that national or regional economic development depends mainly on technical change, social and human capital, and knowledge creation and diffusion. The book is intended to provide a basic understanding of the current issues and the problems of the knowledge economy, technical change and innovation activities; it also examines many aspects and consequences of regional integration that are obscure or yet to be explored. In particular, with its wide range of topics, methodologies and perspectives, the book offers stimulating and wide-ranging analyses that will be of interest to students, economic theorists, empirical and social scientists and policy makers, as well as the informed general reader.

The book consists of eight chapters, as follows:

- Chapter 1 focuses on the nature and dynamics of research, education and innovation from a public as well as a private perspective (fractal research, education and innovation ecosystem – FREIE) in the context of the quadruple innovation helix and the Mode 3 knowledge production system architecture.
- Chapter 2 attempts to examine the main models and to review the patterns and the determinants of the diffusion process, and also to analyse the role and the impact of the relationship between adoption, innovation activities, diffusion process and development process.
- Chapter 3 focuses on the innovation initiatives of the EU. It is essential to extend the scope of the initiative to include innovation for financial sector products, processes and regulatory approaches. The authors make this argument using examples of financial sector innovations in the USA following the Great Depression and on the basis of an examination of the 2008 financial crisis.
- Chapter 4 attempts to examine the structure and role of national and regional systems of innovation and their implications for sustainable development and integration and convergence in the EU.
- Chapter 5 attempts, using a theoretical framework, to review the distinction between coding and territorialization. Moreover, a historical account of policy evolution is presented using key documents and evaluations published by EU departments and (funded) organizations dealing with regional innovation policy.
- Chapter 6 focuses on the nature and dynamics of entrepreneurship and innovation as drivers of economic development and their interdependencies and interaction with political regimes in which they exist, with reference to Greece.
- Chapter 7 focuses on one type of externality, namely knowledge spillovers. The empirical studies of the effects of knowledge

spillovers in Europe have normally focused on the localized effects on either total factor productivity or knowledge production measured in terms of patent output. The purpose of this chapter is to quantitatively review the empirical literature on spatial knowledge spillovers within and between European regions by means of meta-analysis to determine the extent to which such spillovers have been empirically documented as well as their spatial reach. In addition, the authors have applied a meta-regression analysis to analyse the determinants of observed heterogeneity across and between publications.

- Chapter 8 attempts to examine the economic role of innovation and efficiency enhancement in economic integration and convergence that is even more important, taking into consideration the slowdown and the effects created by the current financial crisis. Within this framework, the key factors influencing the integration and convergence process are creation and diffusion of innovation, along with productive efficiency enhancement, mainly around three key areas: innovation and research; strengthening networks and clusters; and efficient use of production factors.

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