CONTENTS

1. Innovation system research and developing countries
   Assessing its current contribution and future relevancy
   Jan Vang, Cristina Chaminade, KJ Joseph, Bengt-Ake Lundvall

Part I. Innovation and development

2. Building inclusive innovation systems in developing countries
   Challenges for IS research
   Tilman Altenburg

3. Innovation, poverty and inequality
   Cause, coincidence, or co-evolution?
   Susan E. Cozzens and Raphael Kaplinsky

4. Innovation systems, technology and development
   Unpacking the relationship(s)
   Jan Fagerberg and Martin Srholec

Part II. Scales in innovation systems: Theoretical progress and empirical overview

5. National Innovation Systems in developing countries
   Chinese National Innovation system in transition
   Xielin Liu

6. Regional innovation systems in developing countries
   Integrating micro and meso-level capabilities
   Ramon Padilla-Pérez, Jan Vang and Cristina Chaminade

7. Sectoral Innovation Systems in developing countries
   The case of ICT in India
   KJ Joseph

8. The Global dimension of Innovation Systems
   Linking Innovation Systems and Global Value Chains
   Carlo Pietrobelli and Roberta Rabellotti
Part III. Building blocks in Innovation systems in developing countries: Challenges under globalization

9. The role of indigenous firms in innovation systems in developing countries
   The developmental implications of national champion firms’ response to underdeveloped national innovation systems
   Helena Barnard, Tracy Bromfield and John Cantwell

10. The role of multinational corporations in national innovation systems in developing countries
    From technology diffusion to international involvement
    Anabel Marin and Valeria Arza

11. The role of universities in innovation systems in developing countries
    Developmental University Systems: Empirical, Analytical and Normative Perspectives
    Claes Brundenius, Bengt-Åke Lundvall and Judith Sutz

Part IV: IS-based policies in the new global setting

12. Institutions and Policies in Developing Economies
    Mario Cimoli, Giovanni Dosi, Richard R. Nelson and Joseph E. Stiglitz

13. Designing IS policies for development in the new global context
    Cristina Chaminade, Jan Vang, KJ Joseph, Bengt-Åke Lundvall
CONTRIBUTORS

Tilman Altenburg is an economic geographer and head of the department “Competitiveness and Social Development” at the German Development Institute (DIE), the German think tank for development policy issues. He holds a PhD from the University of Hamburg. Since 1986 he has done empirical research on different aspects of private sector development, including work on innovation systems, clusters and value chains, business development services, entrepreneurship development, and public-private partnerships in developing countries.

Valeria Arza is researcher in economics of innovation at the Argentinean National Research Council (CONICET) and Lecturer in the University of Buenos Aires (UBA). She holds a PhD from SPRU, University of Sussex, and a M.Sc. from the London School of Economics. She has done research on several topics related to the determinants on firms' innovative behaviour in developing countries. More in particular, she has published papers on the role of the environment on firms' investment decisions and the relevance of public/private and global partnerships for technology diffusion.

Helena Barnard completed her PhD at Rutgers with a dissertation on how developing country firms use FDI to the developed world as a mechanism for upgrading. She has published amongst others in Research Policy and International Journal of Technology Management. She is currently based at the Gordon Institute of Business Science of the University of Pretoria where she continues her research on the effect of concentrated
local capacity and foreign connections in the learning and upgrading of developing countries.

**Tracy Bromfield** holds a PhD in Chemistry from the University of Witwatersrand, and is currently the Manager of Applied Research at Sasol Technology R&D. She completed her MBA at the Gordon Institute of Business Science of the University of Pretoria in 2008. Her MBA research project was supervised by Dr Helena Barnard, and focussed on the joint processes of technology accumulation and learning to manage Intellectual Property in a developing country firm.

**Claes Brundenius** is Honorary Professor at the Research Policy Institute (RPI), Lund University, Sweden. He holds a PhD in Economic History from Lund University. He has been Guest Professor in the United States and Research Director at the Centre for Development Research in Copenhagen. He has frequently been working for international agencies in developing countries, especially in Latin America. His main interest lies in analyses on the role and impact of STI policies and strategies in developing and emerging economies. His current work is focusing on policy analysis of technological change and knowledge based development in Latin America and the Caribbean, East Asia, and Southern Africa (SADC).

**John Cantwell** is Professor of International Business at Rutgers University, Newark, NJ, USA. He received his PhD from Reading University in the UK, an MSc from the University of London, and BA from the University of Oxford. His research focuses on
technological innovation and multinational corporations. He has been Program Chair of the Academy of International Business (AIB), President of the European International Business Academy (EIBA), and he is an elected AIB Fellow and EIBA Fellow. He has so far published eleven books, over 55 articles in refereed academic journals, and over 70 chapters in edited collections.

Cristina Chaminade is Associate Professor in innovation studies at the Centre for Innovation, Research and Competence in the Learning Economy (CIRCLE), Lund University (Sweden). She is affiliated to LEAP4D (Learning Economy Analysis for Development) at the Research Policy Institute, Sweden and visiting professor at HHL Leipzig School of Business (Germany). She holds a PhD in Economics from Autonomous University of Madrid (UAM). Her research focuses mainly on understanding innovation and knowledge creation in the globalized learning economy. She is coordinating several projects on globalization of innovation in China, India, South Africa and Central America. She has been author of numerous articles, book chapters and books in the fields of innovation systems and innovation system policy, particularly in developing countries.

Mario Cimoli is Program Officer at the Division of Production, Productivity and Management, United Nations Economic Commission for Latin America and the Caribbean (ECLAC) and Professor of Economics at the University of Venice, Italy. He holds a PhD from University of Sussex. His fields of interests are: Development

**Susan E. Cozzens** is Professor of Public Policy and Director of its Technology Policy and Assessment Center at the Georgia Institute of Technology. Dr. Cozzens’ research interests are in science, technology, and inequalities, and science, technology, and innovation policy in developing countries. She is actively internationally in developing methods for research assessment and science and technology indicators. Dr. Cozzens has a distinguished record of service, funding, and publication in the fields of science policy and science and technology studies. She is past Chair of the Committee on Science, Engineering, and Public Policy of the American Association for the Advancement of Science; past Chair of AAAS Section Y; current editor of *Research Evaluation*; senior consulting editor for *Science and Public Policy*; past editor of *Science, Technology, & Human Values*, the journal of the Society for Social Studies of Science (4S); and has served on councils and committees for several professional societies.

**Giovani Dosi** is Professor of Economics at the Sant'Anna School of Advanced Studies in Pisa (Italy), where he also coordinates the Doctoral Program in Economics and Management and leads the Laboratory of Economics and Management (LEM). His major research areas include economics of innovation and technological change, industrial organisation and industrial dynamics, theory of the firm and corporate governance, economic growth and development.
Professor Dosi is Co-Director of the task forces on Industrial Policy, and on Intellectual Property Rights, Initiative for Policy Dialogue (Joseph Stiglitz chairman), Columbia University New York, Visiting Professor at Manchester University (UK); Editor for Continental Europe of Industrial and Corporate Change, Research consultant for national and international public and private entities.

He is author and editor of several works in the areas of Economics of Innovation, Industrial Economics, Evolutionary Theory, Organizational Studies. A selection of his works has been published in *Innovation, Organization and Economic Dynamics. Selected Essays*, Cheltenham: Edward Elgar, 2000.

**Jan Fagerberg** is professor at the University of Oslo, where he is affiliated with the Centre for Technology, Innovation and Culture (TIK). He has studied history, political science and economics and holds a D. Phil. from the University of Sussex (1989). In his research Fagerberg has particularly focused on the relationship between technology (innovation and diffusion) on the one hand and competitiveness, growth and development on the other and has published extensively on these topics in books and journals. Fagerberg is one of the editors of "The Oxford Handbook of Innovation" (Oxford University Press 2004). His most recent book is "Innovation Path Dependency and Policy: The Norwegian case" (Oxford University Press 2008), co-edited with David Mowery and Bart Verspagen.

**KJ Joseph** is Professor at the Centre for Development Studies at Trivandrum in India, visiting Professor at Centre for Studies in Science Policy JNU, New Delhi and Consultant
Raphael Kaplinsky is Professor of International Development at the Open University in the UK. His current research interests include the distributional impacts of globalisation, the impact of the Asian Driver economies (China and India) on developing countries, the economic and social consequences of the commodities boom, and the emergence of disruptive innovation in China and India. He has an extensive publication record in the fields of globalisation, global value chains and appropriate technology, and more recently on the impact of China on the developing world and on terms of trade reversal.

Xielin Liu is professor and director of Research Center of Management of Information and Innovation, Graduate University of Chinese Academy of Science. He holds a PhD from Tsinghua University. His research areas mainly cover innovation policy, management of technology and innovation. He has published many papers in Research Policy, Technovation, Journal of Management Studies, and International Journal of Technology Management.

Bengt-Åke Lundvall is professor in economics at Aalborg University and special term professor at Sciences-Po, Paris. He coordinates the worldwide research network Globelics. He and Christopher Freeman developed the concept national system of innovation in the eighties. Among his books are: How Europe’s Economies learn (2006
Co-edited with E. Lorenz), Innovation policy in the globalising learning economy (2002 
Co-edited with S. D. Archibugi) and National systems of innovation (1992).

**Anabel Marin** is an economist from Argentina. She has a MSc in Industrial 
Development and a PhD in Science and Technology Policy (SPRU, Sussex). Her main 
research interests are about technological learning and growth, especially in 
industrialising countries, and the role of firms and institutions in those processes. Most of 
her work has been about the role of multinational companies in technology creation and 
diffusion in industrialising countries. She has studied this topic in Argentina and India, 
and is now extending this analysis to Brazil and China. More recently she has become 
interested in understanding different mechanisms connecting global and national systems 
of knowledge in industrialising countries as a way of enabling learning and growth. She 
is also currently working in a research project about innovation in natural resource based 
industries in Latin America.

**Richard R. Nelson** is an Economist by profession. During his career he has taught in 
Oberlin College, Carnegie Mellon University, Yale University and in Columbia 
University. He is now a Professor of International and Public Affairs at George 
Blumenthal. He has also served as Research Economist and Analyst at the Rand 
Corporation, and at the President’s Council of Economic Advisors. His main interest has 
been in a long-run economic change. Much of his research has been directed towards 
understanding technological change, how economic institutions and public policies 
influence the evolution of technology, and how technological change in turn induces
institutional and economic change more broadly. His work has been both empirical and theoretical. Along with Sidney Winter, he has pioneered in developing a formal evolitional theory of economic change. Their joint book An Evolutionary Theory of Economic Change is widely recognised as a landmark in this field. Over the course of his career, he has been particularly attracted to working with and coordinating in relatively large research teams. His National Innovation Systems project involved a team of approximately 20 scholars, and his recent study on The Sources of Industrial Leadership involved the coordination of a similar-size group. He was the Director of the Institute for Social and Policy Studies at Yale University, and has directed Columbia’s Public Policy Doctoral Consortium.

**Ramon Padilla-Pérez** is currently an Economic Affairs Officer at the United Nations Economic Commission for Latin America and the Caribbean (ECLAC). He holds a PhD in Science and Technology Policy from SPRU, University of Sussex and an M.Sc. in Economics from the London School of Economics (LSE). He has conducted extensive research on international trade, industrial policy, and science and technology policy in Latin America. He is involved in international research and technical assistance projects in the field of science, technology and innovation.

**Carlo Pietrobelli** is Professor of International Economics at the University of Roma Tre, Italy, where he directs the Centre for Research on the Economics of Institutions (CREI). He holds a PhD in Economics from the University of Oxford (UK) and a PhD in Economics from the University of Rome ‘La Sapienza’. His fields of expertise include

**Roberta Rabellotti** is Associate Professor at the Economics Department, University of Piemonte Orientale, Italy. She holds a DPhil from the Institute of Development Studies, University of Sussex and a M.Sc from the University of Oxford. Her areas of research interest are: industrial policies, small business promotion, international trade policies, industrial districts and clusters, sectoral industrial studies global value chains. Prof. Rabellotti has working experience with several international organizations such as the Inter-American Development Bank, the European Union, UNIDO, ILO, ECLAC-UN and UNCTAD. She has written numerous articles in international refereed journals as well books.

**Martin Srholec** is a post-doctoral research fellow at the Centre for Technology, Innovation and Culture (TIK), University of Oslo, Norway. He holds PhD degrees from University of Oslo and University of Economics in Prague. He has published in the areas of innovation studies, international economics and economic growth. His current research interests include patterns of innovation in firms, multilevel modeling of innovation and the link between innovation and productivity.
Joseph E. Stiglitz is an economist and a professor at Columbia University. He is a recipient of the John Bates Clark Medal (1979) and the Nobel Memorial Prize in Economic Sciences (2001). He is also the former Senior Vice President and Chief Economist of the World Bank. He is known for his critical view of the management of globalization, free-market economists (whom he calls "free market fundamentalists") and some international institutions like the International Monetary Fund and the World Bank. In 2000 Stiglitz founded the Initiative for Policy Dialogue (IPD), a think tank on international development based at Columbia University. Since 2001 he has been a member of the Columbia faculty, and has held the rank of University Professor since 2003. He also chairs the University of Manchester's Brooks World Poverty Institute and is a member of the Pontifical Academy of Social Sciences. Stiglitz is the most cited economist in the world, as of June 2008.

Judith Sutz is Academic Coordinator of the University Research Council and Professor of Science, Technology and Society at the Faculty of Social Sciences, Universidad de la República, Uruguay. She holds a Phd on Socio-Economics of Development from Paris-Sorbonne University. Her research focus on the specific conditions for innovation and knowledge production in developing countries, with special attention to public policies and the relations between research agendas, innovation and inequality. She has widely published, mainly with Rodrigo Arocena, on innovation and underdevelopment.
Jan Vang is currently associate professor in internationalization of technology and innovations at the Copenhagen Institute of Technology, Aalborg University. He holds a PhD from Lund University and a M.Sc. and B.Sc. from University of Copenhagen. His research focuses on the evolution of the global division of labour in R&D/innovation. Special attention is paid to Asian countries and IP-based industries. He is involved in several international research projects and conferences concerned with Asia as an innovation hub. He has written and (co)- edited numerous books, special issues and papers on globalization and innovation. He serves as review editor of Science, Technology and Society.
ACKNOWLEDGEMENTS

The editors are very thankful to the following scholars for participating in the blind review of all chapters in this Handbook: Martin Bell, Mats Benner, Martina Fromhold-Eisebith, Elisa Giuliani, Raphie Kaplinsky, Dana Minbaeva, David Mowery, Michael Storper, Yifei Sun, Florian Taeube, Ted Tschang and Peter Wad.

We also owe particular gratitude to Monica Plechero (at CIRCLE, Lund University) for her valuable comments and her assistance in the revision and edition of the Handbook.