

Systems of Innovation: Growth, Competitiveness and Employment Volume I

Edited by

Charles Edquist

Professor of Technology and Social Change

Department of Technology and Social Change, Linköping University, Sweden

and

Maureen McKelvey

Associate Professor of Technology and Social Change

Department of Technology and Social Change, Linköping University, Sweden

Contents

<i>Acknowledgements</i>	ix
<i>Introduction</i> Charles Edquist and Maureen McKelvey	xi
PART I AN INTRODUCTION TO SYSTEMS OF INNOVATION	
1. Charles Edquist (1997), 'Systems of Innovation Approaches-Their Emergence and Characteristics', in Charles Edquist (ed.). <i>Systems of Innovation: Technologies, Institutions and Organizations</i> , Chapter One, London and Washington: Pinter, 1-35	3
PART II NATIONAL SYSTEMS OF INNOVATION	
2. Chris Freeman (1995), 'The "National System of Innovation" in Historical Perspective', <i>Cambridge Journal of Economics</i> , 19 (1), February, 5-24	41
3. Bengt-AkeLundvall (1992), 'Introduction', in Bengt-Ake Lundvall (ed.), <i>National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning</i> , Chapter I, London: Pinter Publishers, 1-19, references	61
4. Parimal Patel and Keith Pavjtt (1994), 'National Innovation Systems: Why they are Important, and How they Might be Measured and Compared', <i>Economics of Innovation and New Technology</i> , 3, 77-95	82
5. Jorge Nidsi, Paolo Saviotti, Bertrand Bellon and Michael Crow (1993), 'National Systems of Innovation: In Search of a Workable Concept', <i>Technology in Society</i> , 15 (2), 207-27	101
PART III REGIONAL SYSTEMS OF INNOVATION	
6. Michael Storper (1995), 'The Resurgence of Regional Economies, Ten Years Later: The Region as a Nexus of Untraded Interdependencies', <i>European Urban and Regional Studies</i> , 2 (3), 191-221	125
7. Philip Cooke, Mikel Gomez Uranga and Goio Etxebarria (1997), 'Regional Innovation Systems: Institutional and Organisational Dimensions', <i>Research Policy</i> , 26 (4-5), December, 475-91	156
8. Alfred Marshall (1947), 'Industrial Organization, Continued. The Concentration of Specialized Industries in Particular Localities', in <i>Principles of Economics: An Introductory Volume</i> , Eighth Edition, Chapter X, London: Macmillan and Co. Ltd, 267-77	173
9. Anders Malmberg and Peter Maskell (1997), 'Towards an Explanation of Regional Specialization and Industry Agglomeration', <i>European Planning Studies</i> , 5 (1), February, 25—41	• 184

10. AnnaLee Saxenian (1996), 'Inside-Out: Regional Networks and Industrial Adaptation in Silicon Valley and Route 128', *Cityscape: A Journal of Policy Development and Research*, 2 (2), May, 41-60 201

PART IV SECTORAL AND TECHNOLOGICAL SYSTEMS

11. B. Carlsson and R. Stankiewicz (1991), 'On the Nature, Function and Composition of Technological Systems', *Journal of Evolutionary Economics*, 1 (2), 93—118 223
12. Erik Dahmen (1988); "'Development Blocks" in Industrial Economies', *Scandinavian Economic History Review*, XXXVI (1), 3-14 249
13. Stefano Breschi and Franco Malerba (1997), 'Sectoral Innovation Systems: Technological Regimes, Schumpeterian Dynamics, and Spatial Boundaries', in Charles Edquist (ed.), *Systems of Innovation: Technologies, Institutions and Organizations*, Chapter Six, London and Washington: Pinter, 130-56 261
14. Richard R. Nelson (1996), 'The Evolution of Comparative or Competitive Advantage: A Preliminary Report on a Study', *Industrial and Corporate Change*, 5 (2), 597-6H 288
15. Michael E. Porter (1998), 'Clusters and the New Economics of Competition', *Harvard Business Review*, November-December, 77-90 309
16. William Lazonick (1993), 'Industry Clusters versus Global Webs: Organizational Capabilities in the American Economy', *Industrial and Corporate Change*, 2 (1), 1-24 323
17. Jan Fagerberg (1995), 'User-Producer Interaction, Learning and Comparative Advantage', *Cambridge Journal of Economics*, 19 (1), February, 243-56. 347

PART V CASE STUDIES OF SYSTEMS OF INNOVATION

18. Richard R. Nelson (1992), 'National Innovation Systems: A Retrospective on a Study', *Industrial and Corporate Change*, 1 (2), 347-74 363
19. Linsu Kim (1993), 'National System of Industrial Innovation: Dynamics of Capability Building in Korea', in Richard R. Nelson (ed.), *National Innovation Systems: A Comparative Analysis*, Chapter 11, New York and Oxford: Oxford University Press, 357-83 391
20. Ludovico Alcorta and Wilson Peres (1998), 'Innovation Systems and Technological Specialization in Latin America and the Caribbean', *Research Policy*, 26 (7-8), April, 857-81 418
21. Susan Bartholomew (1997), 'National Systems of Biotechnology Innovation: Complex Interdependence in the Global System', *Journal of International Business Studies*, 28 (2), Second Quarter, 241-66 443

22. Bo Carlsson (1995), 'The Technological System for Factory Automation: An International Comparison', in Bo Carlsson (ed.), *Technological Systems and Economic Performance: The Case of Factory Automation*, Chapter 15, Dordrecht: Kluwer Academic Publishers, 441-75 469

Name Index 505

Systems of Innovation: Growth, Competitiveness and Employment Volume II

Edited by

Charles Edquist

Professor of Technology and Social Change

Department of Technology and Social Change, Linköping University, Sweden

and

Maureen McKelvey

Associate Professor of Technology and Social Change

Department of Technology and Social Change, Linköping University, Sweden

Contents

Acknowledgements

ix

An introduction by the editors to both volumes appears in Volume I

PART I INTERACTIVE LEARNING AND NETWORKS OF INNOVATION

1. Stephen J. Kline and Nathan Rosenberg (1986), 'An Overview of Innovation', in Ralph Landau and Nathan Rosenberg (eds), *The Positive Sum Strategy: Harnessing Technology for Economic Growth*, Washington, DC: National Academy Press, 275-305 3
2. Chris DeBresson and Fernand Amesse (1991), 'Networks of Innovators: A Review and Introduction to the Issue', *Research Policy*, 20 (5), October, 363-79 34
3. Bengt-Ake Lundvall (1988), 'Innovation as an Interactive Process: From User-Producer Interaction to the National System of Innovation', in Giovanni Dosi, Christopher Freeman, Richard Nelson, Gerald Silverberg and Luc Soete (eds), *Technical Change and Economic Theory*, Chapter 17, London and New York: Pinter Publishers, 349-69 51

PART II EVOLUTIONARY THEORIES OF INNOVATION

4. Joseph A. Schumpeter (1979/1976), 'The Process of Creative Destruction', in *Capitalism, Socialism and Democracy*, Part II, Chapter VII, London: George Allen & Unwin, 81-6 75
5. Richard R. Nelson and Sidney G. Winter (1977), 'In Search of Useful Theory-of Innovation', *Research-Policy*, 6, 36-76 81
6. Giovanni Dosi (1988), 'The Nature of the Innovative Process', in Giovanni Dosi, Christopher Freeman, Richard Nelson, Gerald Silverberg and Luc Soete (eds), *Technical Change and Economic Theory*, Chapter 10, London and New York: Pinter Publishers, 221-38 122
7. Maureen McKelvey (1997), 'Using Evolutionary Theory to Define Systems of Innovation', in Charles Edquist (ed.), *Systems of Innovation: Technologies, Institutions and Organizations*, Chapter Nine, London and Washington: Pinter, 200-222 140

PART III INSTITUTIONAL THEORIES

8. Charles Edquist and Bjorn Johnson (1997), 'Institutions and Organizations in Systems of Innovation', in Charles Edquist (ed.), *Systems of Innovation: Technologies, Institutions and Organizations*, Chapter Two, London and Washington: Pinter, 41-63 165

9. John Zysman (1994), 'How Institutions Create Historically Rooted Trajectories of Growth', *Industrial and Corporate Change*, 3(1), 243-83 188
10. Friedrich List (1885), 'The National Division of Commercial Operations and the Confederation of the National Productive Forces', in *The National System of Political Economy*, Translated from the original German by Sampson S. Lloyd, M.P., Chapter XIII, London: Longmans, Green and Co., 149-62 229
11. Nathan Rosenberg (1960), 'Some Institutional Aspects of the Wealth of Nations', *Journal of Political Economy*, **LXVIII** (6), December, 557-70 243

PART IV INNOVATIONS, GROWTH AND EMPLOYMENT

5

12. Moses Abratnovitz (1989), 'The Proximate Sources of Growth', 'The Search for Deeper Causes: Technological Effort as Investment', 'The Search for Deeper Causes: National and Historical Determinants' and 'Longer Thoughts about Long-term Growth', in *Thinking about Growth: And Other Essays on Economic Growth and Welfare*, Part I, Sections IV-VII, Cambridge: Cambridge University Press, 13-79 259
13. Birgitte Gregersen and Bjorn Johnson (1998), 'How do Innovations Affect Economic Growth? Some Different Approaches in Economies', in Lars Herlitz (red.), *Mellem Økonomi og Historie*, Denmark: Historiestudiet, Aalborg Universitet, 83-109, references 326
14. Richard R. Nelson (1990), 'Capitalism as an Engine of Progress', *Research Policy*, 19 (3), June, 193-214 354
15. Charles Edquist, Leif Hommen and Maureen McKelvey (1998), 'Product Versus Process Innovation: Implications for Employment', in Jonathan Michie and Angelo Reati (eds), *Employment, Technology and Economic Needs: Theory, Evidence, and Public Policy*, Chapter 7, Cheltenham, UK and Northampton, MA, USA: Edward Elgar, 128-52 376

PART V DYNAMICS OF GOVERNMENT POLICY AND FIRM STRATEGY

16. J.S. Metcalfe (1997), 'Science Policy and Technology Policy in a Competitive Economy', *International Journal of Social Economics*, 24 (7/8/9), 723-40 403
17. Richard G. Lipsey and Kenneth Carlaw (1998), 'Technology Policy: Basic Concepts', in *A Structuralist Assessment of Technology Policies — Taking Schumpeter Seriously on Policy*, Chapter 1, Ontario: Industry Canada, Research Publications Program, Working Paper Number 25, October, 1-33, references 421

Systems of Innovation II

18. Maureen McKelvey and Francois Texier (2000), 'Surviving Technological Discontinuities through Evolutionary Systems of Innovation: Ericsson and Mobile Telecommunication', in P.P. Saviotti and B. Nootebcom (eds), *Technology and Knowledge: From the Firm to Innovation Systems*, Cheltenham: Edward Elgar, 227-48 456
 19. Bo Carlsson and Staffan Jacobsson (1997), 'Diversity Creation and Technological Systems: A Technology Policy Perspective', in Charles Edquist (ed.), *Systems of Innovation: Technologies, Institutions and Organizations*, Chapter Twelve, London and Washington: Pinter, 266-94 478
 20. Michael Borrus and Jay Stowsky (1998), 'Technology Policy and Economic Growth', in Lewis M. Branscomb and James H. Keller (eds), *Investing in Innovation: Creating a Research and Innovation Policy that Works*, (Chapter 2, Cambridge, Massachusetts: MIT Press, 40-63 507
 21. Charles Edquist, Leif Hommen, Bjorn Johnson, Tarmo Lemola, Franco Malerba, Thomas Reiss and Keith Smith (1998), 'The Systems of Innovation Approach and its General Policy Implications' and 'Specific Policy Implications of ISE and its Sub-projects', in *The ISE Policy Statement: The Innovation Policy Implications of the 'Innovation Systems and European Integration' (ISE) Research Project*, Chapter 3 and excerpt from Chapter 4, Sweden: Department of Technology and Social Change, Linkoping University, 23-49 531
- Bibliography* 559
Name Index 571