India and the Knowledge Economy Leveraging Strengths and Opportunities

Carl Dahlman Anuja Utz

Finance and Private Sector Development Unit of the World Bank's South Asia Region and
The World Bank Institute

Contents

Foreword x Acknowledgments xi Currency Equivalents xiii Abbreviations and Acronyms xiii
Summary xv Strengthening the Economic and Institutional Regime xviii Developing Educated and Skilled Workers xx Creating an Efficient Innovation System xxiii Building a Dynamic Information Infrastructure xxvii Looking Ahead xxix Launching a Process xxxi A Final Note xxxiii
Chapter 1 India and the knowledge economy: Opportunities and challenges The Current Economic Context 1
Knowledge Is Key in an Increasingly Dynamic and Competitive Global Environment Assessing India's Opportunities and Challenges in the Knowledge Economy 10
Other Global Comparisons with India 16
Road Map for the Book: Strengthening the Four Pillars of the Knowledge Economy
Chapter 2 Economic and institutional regime, including governance 21 Benchmarking the Economic and Institutional Regime 21 Benchmarking Governance 23
Issues and Recent Developments in the Economic and Institutional Regime Measures to Strengthen the Economic and Institutional Regime 36 Summary of Issues and Recommendations 44
Chapter 3 Education and human resources 47 Benchmarking Education 48
Issues and Recent Developments in Education and Human Resource Development Measures to Strengthen Education and Human Resources 63 Summary of Issues and Recommendations 72
Chapter 4 Innovation system 75 Benchmarking Innovation 76 Issues and Recent Developments in the Innovation System 83 Measures to Strengthen the Innovation System 91 Summary of Issues and Recommendations 100
Chapter 5 Information infrastructure 103 Benchmarking Information Infrastructure 104 India's Global Standing in Information Communications Technology 106 Issues and Recent Developments in the Telecommunication and IT Sectors Measures to Strengthen the Information Infrastructure 121 Summary of Issues and Recommendations 127

Chapter 6 Moving ahead with the knowledge economy in India 131

Indian Initiatives in the Knowledge Economy 13

Looking Ahead 135

Taking Action 137

Launching a Process 138

A Final Note 140

Annexes

- 1 India's Total Factor Productivity Construction: Theoretical Framework 141
- 2 Knowledge Assessment Methodology 143
- 3 Knowledge Economy Index for India and Comparator Countries, 1995 and Most Recent Period 145
- Overall Knowledge Economy Scorecards for Brazil, China, Korea, Poland, and Russia,
 Selected Variables, 1995 and Most Recent Period
 147
- 5 Data for the Scorecards for India, Brazil, and China, 1995 and Most Recent Period 149
- 6 Economic and Institutional Regime: Scorecards for Comparator Countries, Selected Variables, Most Recent Period 151
- 7 Governance Data for India 153
- 8 Various Costs of Doing Business in India, 2004 155
- Education: Scorecards for Comparator Countries, Selected Variables,
 Most Recent Period 159
- 10 Innovation: Scorecards for Comparator Countries, Selected Variables, Scaled by Population, Most Recent Period 161
- 11 Information Infrastructure: Scorecards for Comparator Countries, Selected Variables, Most Recent Period 163
- 12 ICT Indicators for India and China, Various Years 165

Notes 167

References and Bibliography 173

Figures

- A India: Real Gross Domestic Product Per Worker, Alternative Projections, 1995-2020 **xvi**
- B India: Percentage Share of Global Gross Domestic Product, Years 0-1998 xxx
- 1-1 India: Real Gross Domestic Product Per Worker, Alternative Projections, 1995-2020 **3**
- 1-2 Gross Domestic Product Per Capita (Purchasing Power Parity), India and Comparators, 1990-2003 **7**
- 1-3 Growth in Per Capita Income for Korea and Ghana, 1960-2000 8
- 1-4 Knowledge Economy Index: India, Comparators, and the World, 1995 and Most Recent Period 12
- 1-5 Cross-Country Comparison on the Four Pillars of a Knowledge Economy, India and Comparators, 1995 and Most Recent Period **13**
- 1-6 India's Knowledge Economy Scorecard on Selected Variables, 1995 and Most Recent Period 14
- 1-7 Progress on the Human Development Index, India and Comparators, 1975-2002 **14**
- 1-8 Knowledge Economy Scorecards on Selected Variables for Brazil, China, and India. Most Recent Period **16**

- 1-9 Gross State Domestic Product and Literacy Rates for Indian States, 1999-2000 17
- 2-1 Benchmarking the Economic Incentive Regime, India, Comparators, and the World, 1995 and Most Recent Period **22**
- 2-2 India's Scorecard on the Economic Incentive Regime, Selected Variables, Most Recent Period 23
- 2-3 Governance Comparisons: India (1998 and 2002), with South Asia (2002), and with Low-Income Countries (2002) **25**
- 2-4 Eliminating Barriers for Faster Growth in India 26
- 2-5 Share of World Merchandise Exports, India and Comparators, 1990-2003 **29**
- 2-6 Merchandise and Service Exports, India and Comparators, 2002 29
- 2-7 Service Exports, India and China, 1982, 1995, and 2002 **30**
- 2-8 Gross Foreign Direct Investment as Percentage of Gross Domestic Product, India, Comparators, and the World, 1980-2002 **31**
- 3-1 Benchmarking Education: India, Comparators, and the World, 1995 and Most Recent Period 48
- 3-2 India's Scorecard on Education, Selected Variables, Most Recent Period 49
- 3-3 Gross Primary Enrollment Rates, India and Comparators, 1990-2001 52
- 3-4 Gross Secondary Enrollment Rates, India and Comparators, 1990-2001 52
- 3-5 Gross Tertiary Enrollment Rates, India and Comparators, 1990-2000 **58**
- 4-1 Innovation by Population and Absolute Size, India and the World, 1995 and Most Recent Period 77
- 4-2 India's Scorecard on Innovation, Selected Variables, Most Recent Period 78
- 4-3 Patents Granted by the United States Patent and Trademark Office to Brazil, China, and India, 1997-2003 **81**
- 4-4 Patents Granted to Indian Subsidiaries 90
- 5-1 Percentage of Total Telephone Service (Fixed and Mobile) Provided by Private Operators in India, 2000-04 **104**
- 5-2 Benchmarking Information and Communications Technologies, India and the World. 1995 and Most Recent Period **105**
- 5-3 India's Scorecard on Information and Communications Technologies, Selected Variables, Most Recent Period 106
- 5-4 Telephones, Computers, and the Internet: India and Comparators, 1995-2002 **107**
- 5-5 Growth of Telephony in India: Numbers of Landline and Mobile Subscribers, 1996-2004 **112**
- 5-6 Teledensity in India, 1995-2004 **113**
- 5-7 Employment in the Indian Information Technology Sector, 2000-03 116
- 5-8 India's Projected Information Technology Industry, Export and Domestic Markets, 2008 118
- 5-9 Gains from Offshoring \$1 of Services from the United States (Source) to India (Host) 119
- 6-1 India: Percentage Share of Global Gross Domestic Product, Years 0-1998 132

Tables

- 1-1 India's Gross Domestic Product by Sector, 1997-2003 4
- 2-1 Custom Duty Rates in India and Other Developing Countries, Various Years 28
- 3-1 Enrollment by Educational Stages in India, 1990-91 and 2001-02 51
- 3-2 Percentage of Schools under Different Types of Management in India, Various Years 53
- 3-3 Spending on Education, India and Comparators, 2001 **55**