

## Index

- absorptive capacity of FDI, regional innovation performance, 48–52
- Directed Technical Change theory, 112
- European Union (EU) innovation efficiency, cross-country gap, 325
- expenditure for acquisition of foreign technology, 23–2
- export processing zones (EPZs), foreign direct investment (FDI), 74–5
- foreign direct investment (FDI)
  - absorptive capacity, regional innovation performance, 48–52
  - in China, 52–9
  - China's outward, by industry distribution, 284
  - in export processing zones (EPZs), 74–5
  - indigenous firms, export competitiveness and, 10
  - innovation capacity and, 10
  - and innovation capacity, empirical evidence, 59–65
  - innovation in China and, 112–13
  - innovation-growth linkage, coastal and inland regions, 69
  - intensity, foreign asset share in total industrial assets, 53–4
  - regional FDI stock distribution, 53–4
  - regional innovation capacity impact of, 63, 68
  - regional innovation efficiency and, 65–8
  - technology transfer and, 258–9
  - technology upgrading and, 108–12
  - trade in China, 52–3
  - foreign direct investment (FDI), spillovers
    - exports in technology-intensive industries and, 80–2
    - from processing-trade-FDI (PT-FDI), 78–80
    - theory, literature, 76–7
  - foreign technology imports, 23–4
- Huawei Technologies P/L. *See* internalization, reverse learning, capabilities upgrading
- imitation to innovation, 3–4, 318–23
- indigenous firms, export competitiveness, 10
- industrial competitiveness, 3
- industrial output, 3
- innovation. *See also* open innovation; radical innovation; regional innovation
  - capacity, empirical evidence, 59–65
  - China's capabilities, literature and research on, 7–9
  - constraints, risks to, 195–6
  - definition, sources of, 4–7
  - foreign direct investment (FDI) and, 112–13
  - foreign, indigenous enterprises, 59
  - growth, developmental impact, 392
  - inputs, R&D and research personnel, 16–24
  - invention applications, regional distribution, 54–6
  - national innovation performance, determinants, 329–30
  - national innovation systems, technology acquisition, adaptation and development, 268–74

- new products sales, exports across ownership structures, 37–9
- output across industries, new product sales and export values, 32–3
- output across industries, patent applications, 32–3
- outputs by firm ownership, 34
- ownership structures and, 35–8
- performance, patents, published journals, high-tech export, 24–9
- quality, science citation ranking, 27–9
- R&D expenditure, industry distribution, 29–34
- R&D expenditure, regional disparity, 39–43
- regional economic growth and, 68–9
- regional efficiency, 65–8
- role of state, industrial policy and, 7, 14, 232–3
- sales of new products, regional distribution, 54–6
- sector development, 7
- university role, 12
- innovation capacity
  - basic innovation capacity determinants, 330–1
  - defined, 325–6
  - emerging economies, 349–50
  - emerging economies, innovation efficiency, 350–1
  - empirical evidence, foreign direct investment (FDI), 59–65
  - foreign direct investment (FDI), 10
  - innovation activity, cross-country differences, 333–6
  - innovation efficiency determinants, 331–3
  - patenting determinants and, 326–7, 328
  - stochastic frontier analysis (FSA) and, 327–8
- innovation efficiency, cross-country gap European Union (EU) and, 325
- innovation-growth linkage, coastal and inland regions, 69
- internalization, reverse learning, capabilities upgrading, 297
- Chinese firms, overview, 283–8
- firms' innovativeness, OFDI, 287–8
- Huawei Technologies P/L, 291–5
- Huawei Technologies P/L, history of alliance, 300–2
- investment in developing countries, 284–7
- knowledge sourcing and, 279–80
- learning from subsidiaries, 304–8
- learning process, studies, 281–3
- manufacturing firms, overseas investment, 284
- outward directed investment, China, 283
- outward FDI, 284
- research, criteria for case inclusion, 289–91
- research, data collection, 291
- research design, 289
- research method, 288–9
- reverse learning from cooperation, 300–4
- reverse learning from customers, 297–300
- ZTE Corporation, 295–6
- international collaboration, radical innovation, 314–16
  - collaborative innovation activities, 317
  - collaborative innovation in China, overview, 316
  - collaborative types, regional distribution, 317–18
  - innovation performance impact, 319–20
  - novel innovation and, 320–3
  - policy implications, 323–4
  - scientific literature, 314–16
- national innovation performance (NIP) capabilities building and, 365–7
- China, 360
- competition, product market and, 362–3
- competition to motivate innovation and, 369
- determinants, theoretical framework, 359–65
- factor markets and, 363
- human capital and, 360
- human resource management practices and, 369–71

- national innovation performance (cont.)  
 incentives strengthening, multiple levels, 368–71  
 innovation system, closed *vs.* open, 364–5, 375–7  
 institutions and, 363–4  
 institutions' development and, 371–3  
 intellectual property rights (IPR) and, 371  
 investment for innovation, market role, 368–9  
 macroeconomic incentives and, 361–2  
 national innovation performance (NIS) framework, 358–9  
 national innovation system (NIS) approach, 358  
 physical investment and, 360–1  
 policy choices, 365–75  
 policy-making, implementation coordination, 373–4  
 state capabilities and, 361  
 technological efforts and, 361  
 21st century space, 375–7  
 National Innovation Strategy (NIS), 15, 358–9
- ONIS. *See* Open National Innovation System
- open innovation, 11–12  
 breadth of openness determinants, ordered-Logit model estimates, 182  
 challenges, 166–7  
 defined, 141  
 depth of openness determinants, ordered-Logit model estimates, 185–7  
 determinants of, 171–3  
 firm size and industry, moderating effect, 193–4  
 globalization and, 168  
 government policy, firm practices, 146–9  
 inbound, policies towards, 150–2  
 inbound *vs.* outbound, 141  
 innovation, constraints, risks, 173–7  
 measurement, control variables, 180–1  
 measurement, dependent variables, 178–9  
 measurement, independent variables, 179–80
- open innovation networks, policies towards, 153–6  
 outbound, policies towards, 152–3  
 overview, 142–6  
 ownership effect, 190–3  
 policies affecting, 149–56  
 practices, 158–63  
 public policies for, 156–8  
 research data, methodology, 177–8  
 research, descriptive statistics and correlations, 182  
 research, OLS robustness check, 187–90  
 research on, 170  
 selected cases, 159  
 trends, 163–5  
 types, mode and frequencies, 163
- Open National Innovation System (ONIS), 14  
 China's path to innovation and, 381–3  
 constraints and risks, universities' role, 388–9  
 foreign, indigenous innovation relationship in, 383–4  
 incentives and institutions, efficiency of innovation, 389–91  
 indigenous-foreign combination, stages of development, 385–6  
 knowledge sourcing and, 386–7  
 leading players, state-owned enterprises (SOEs), 387–8
- optic fiber, cable industry  
 production chain, 242  
 research, definition of variables, 244  
 research, factor analysis, 247–8  
 technology characteristics perception, 244
- patents, patent performance, 13–14, 24–6. *See also* innovation capacity applications *vs.* granted, 24–6  
 mean patent application numbers, 41–2  
 ownership structure and, 37  
 patenting capacity, selected countries, 346–8  
 patenting efficiency determinants, 343

- patenting efficiency, selected countries, 346–8
- patenting frontier estimation, 336–40
- patents granted by USPTO, 336, 350
- triadic patent families, across BRICS, 26
- triadic patent families, China and other OECD economies, 26
- policy choices, implications, 392–4
  - international collaboration, radical innovation, 323–4
  - national innovation performance (NIP), 365–75
  - open innovation, government policy, firm practices, 146–9
  - policy-making, implementation
    - coordination, national innovation performance (NIP), 373–4
  - processing trade-FDI (PT-FDI), 106–7
  - role of state, industrial policy, 7, 14, 232–3
- processing trade-FDI (PT-FDI), 74–5. *See also* technology, technology-intensive industries
  - export performance, indigenous export growth, 101–3
  - policy implications, 106–7
  - spillovers, domestic firms export value, 98–100, 101
  - spillovers, indigenous firms export performance, 103–5
- radical innovation, 13. *See also*
  - international collaboration, radical innovation
- R&D
  - collaboration with partners, universities, 215–17
  - composition, by funding sources, 19
  - composition, by types of activities, 18–19
  - expenditure, above scale manufacturing industries, 30–1
  - expenditure, across ownership structures, 35–2
  - expenditure, China, 1995–2012, 16–17
  - expenditure, China *vs.* other economies, 1995–2012, 17
  - expenditure, growth rate, 56–8
  - expenditure, R&D/GDP ratios, 39–41
  - funding sources, 42–3
  - globalization of, 72
  - government spending on, 15
  - indigenous, technology transfer and progress in emerging economies, 257–61
  - industrial, regional distribution, 54–6
  - international R&D stock analysis, summary statistics, 114–17
  - investment, composition of, 16–19
  - personnel, across sectors, 31
  - personnel, by executive entity, 20
  - personnel, comparison in per thousand employees, 22
  - personnel, compositions of, 20–4
  - research personnel and, 16
  - sectoral pattern, 114
  - total national R&D, percentage GDP for major industrial countries, 334–5
  - total number personnel, 20
  - regional FDI stock distribution, 53–4
  - regional innovation
    - foreign direct investment (FDI), absorptive capacity, innovation performance, 48–52
  - multinational enterprises (MNEs) and, 48
  - research on, 47
  - regional innovation capacity
    - impact, foreign direct investment (FDI), 63, 68
  - regional innovation efficiency, foreign direct investment (FDI), 65–8
- solar PV industry, India and China
  - leading companies, details, 265–7
  - mixing, technology creation and acquisition sequencing, 268
  - national innovation systems, technology acquisition, adaptation and development, 268–74
  - renewable technology targets, China, 264–5
  - renewable technology targets, India, 263

- solar PV industry, India and China (cont.)  
 science, technology development, 261–4  
 sustainability oriented innovation systems, 272–4  
 technology transfer, adopted indigenous knowledge creation mechanisms, 268  
 technology transfer, indigenous innovation, 265–8  
 South-South technology transfer, developing world, 389–91
- tacit knowledge. *See also* optic fiber, cable industry  
 acquisition, 12  
 emboldens of, 250  
 external *vs.* internal sources of, 238–42  
 research data, 243–4  
 research methodology, 12  
 technological learning, 168–9, 171, 196. *See also* optic fiber, cable industry  
 impact of, 236  
 industrialization and, 236–7  
 knowledge sources and, 248–50  
 technology, technology-intensive industries  
 efficiency improvement, GMM estimates, 132  
 export performance, top 10, 92–4  
 exports, foreign direct investment (FDI) spillovers, 80–2  
 exports, innovation indicators, domestic and foreign firms, 90–2  
 firm-level production, export data, 86–7  
 high-tech products, export and import volume, 33–4  
 indigenous *vs.* foreign, 6–7  
 Probit model estimates, export decision, 94  
 processing exports percentage, electronic industry, 92  
 processing exports share, China total, 81–2  
 product-level trade data, 87–90  
 technical change determinants, GMM estimates, 132  
 technical change, efficiency improvement, 124–6  
 technology acquisition expenditure, 54  
 technology diffusion, 5–6  
 upgrading, developing countries, 10–11  
 upgrading, drivers, 123–6  
 technology transfer  
 foreign direct investment (FDI) and, 258–9  
 imports and, 259  
 licensing and, 259  
 outward foreign direct investment (FDI) and, 260  
 technology transfer, foreign direct investment (FDI) and, 258–9  
 technology upgrading, foreign direct investment (FDI) and, 108–12  
 total factor productivity (TFP)  
 foreign, indigenous R&D efforts and, 119–21  
 growth determinants and technical change, GMM estimates, 126–8  
 growth estimation, 117–19  
 growth, technical efficiency, 121–3  
 trade in China, 52–3
- United Kingdom (UK) industrial innovation, university role, 226–31  
 universities, role, 12, 201–2  
 external resources utilization, 215–17  
 industrial innovation in China and, 207–8, 217–23  
 industrial innovation in China, university-concentrated cities, 224–6  
 industrial innovation UK, 226–31  
 literature, theoretical framework, 202–6  
 Open National Innovation System (ONIS), 388–9  
 research, control variables, 210–11  
 research data, 213–15  
 research, dependent variable measurement, 209  
 research, direct university measurement, 210  
 research methodology, data, 208–15
- ZTE Corporation. *See* internalization, reverse learning, capabilities upgrading