CAMBRIDGE

Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

INDEX

AbbVie, 221
Abreu, M., 169
Absorptive capacity of firms
  commercialization of IP and, 11
  knowledge transfer and, 38, 267
  in mode 1 conception of knowledge transfer, 363
Academics
  professor's privilege, abolition of, 7, 41, 69, 163, 199–205, 397, 403
  surveys of, 429–430, 436–439, 461–462
Africa. *See also specific country*
  blockchain technology in, 455
  measurement challenges in, 454–455
  metrics of knowledge transfer in, 440, 452, 455
  Strategy for Science, Technology and Innovation (STISA-24), 452–454
  university knowledge transfer policies in, 8–9
African Continental Free Trade Agreement (AfCFTA), 454
African Innovation Outlook series, 454, 455
African Observatory for Science, Technology and Innovation (AOSTI), 455
Albuquerque, E., 38, 264, 269
Alessandrini, M., 342
Algeria, university knowledge transfer policy in, 8–9
Amadei, J.R.P., 269–270
Amazon, 349–350
Anglo Platinum (South Africa), 343
Annual reports, 462
Argentina
  channels of knowledge transfer in, 38
  government funding of R&D in, 13
  industry financing of R&D in, 48
  structural challenges for public R&D in, 16
Arque-Castells, P., 364
Arundel, Anthony, 59, 398, 452, 453, 455, 459, 461–462
Arza, V., 265
Asia. *See also specific country*
  metrics of knowledge transfer in, 440
  university knowledge transfer policies in, 7, 8
Association of University Technology Managers (AUTM)
  Better World Project, 75, 444–445
  IP licensing model, metrics for, 53, 56, 59
  Licensing Activity Survey, 73
  metrics of knowledge transfer and, 426–427, 444
  questionnaire, 350
  surveys of KTOs, 73
ASTP, 426, 458, 459
Australia
  surveys of KTOs in, 53
  university, patent filings by, 114
Austria
  pre-emption rights principle in, 154–155
  professor's privilege, abolition of, 7, 397
Axel patent, 395

Ballard (Canada), 343
Bangladesh, university knowledge transfer policy in, 8
BASF, 221
Belgium, metrics of knowledge transfer in, 436

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

"Big data," 441–442
BioMed X Innovation Center, 220–221
Biotechnology, patent filings in, 109–112
Block, F., 396
Blockchain technology, 455
Böhringer-Ingelheim, 221
Bolivia, government funding of R&D in, 13
Bordoy, C., 59
Brazil
  Brazilian Agriculture Research Corporation (Embrapa), 270, 277
  Brazilian Centre for Research in Energy and Materials (CNPEM), 279–280
  Brazilian Innovation Survey, 282
  Brazilian National Service for Industrial Training (SENAI), 282
  Butantan Institute, 277–279
  channels of knowledge transfer in, 38
  collaborative research in, 267
  Constitution, 419
  consultancies in, 290–291, 293–294
  Coordination for the Improvement of Higher Education Personnel (Capes) program, 273–275
  CT-Infra, 273–275
  education and training in, 265
  Finep, 272
  Good Law, 273
  government funding of R&D in, 13
  Greater Brazil Plan, 273
  growth of public R&D in, 263–264
  income level, patent filings by, 93, 106–107
  Industrial, Technological and Foreign Trade Policy (PITCE), 273
  Industrial Property Law 1996, 267, 269, 280
  Innovate Company Program, 273
  Innovation Act 2004, 267, 269, 272–273, 280–282, 284–287, 291, 293, 376, 408, 419, 420
  Intellectual Property Law 1996, 284
  Investment Maintenance Program (PSI), 273
  ITec platform, 33
  knowledge capabilities gap in, 368
  knowledge transfer in
    absorptive capacity of firms and, 267
    bureaucratic issues, 271–272, 294–295
    case study, 376
    challenges of, 420–421
    channels of, 287–291
    consultancies and, 290–291, 293–294
    cooperative agreements and, 282–284
    demand-side incentives supporting, 408, 420
    financial factors, 419–420
    formal channels of, 287–290
    funding and, 270–271
    high level R&D, lack of, 265
    incentives, 293
    informal channels of, 266–267, 287
    institutional factors, 419
    institutional practices, 291–294
    instruments, 274
    legal framework of, 284–287
    legislation patterned on Bayh-Dole Act in, 406–407
    non-disclosure agreements and, 290
    "open science" and, 266–267
    overview, 22, 263–264, 294–295
    patent licensing and, 287–290, 375–376
    policies and practices, 274, 376
    in "processing industry," 265
    by public research institutes, 270, 277–280
    research agreements and, 290–291
    spin-offs and, 266
    supply-side incentives supporting, 410, 420
    technological partnership agreements and, 290

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

type of knowledge, correlation with, 266
by universities, 270
university knowledge transfer policy, 8
weakness of channels, 264
KTOs in, 373
legislation patterned on Bayh-Dole Act in, 396, 419
metrics of knowledge transfer in, 426, 432–433
Ministry of Agriculture, 277
Ministry of Education, 273–275
Ministry of Health, 277–279
Ministry of Science, Technology, Innovation and Communication, 33, 273, 287–290
National Education and Research Network (RNP), 280
National Electric Energy Agency, 284
National Institute for Pure and Applied Mathematics (IMPA), 280
National Institute of Industrial Property (INPI), 280, 294
New Science, Technology and Innovation Legal Framework, 419
Oil National Agency, 284
Oswaldo Cruz Foundation, 277
patent licensing in, 287–290, 375–376
patent metrics in, 86
Productive Development Policy, 273
public investment in science and technology in, 273–275
public research institutes
collaboration with industry, 405
consultancies and, 293–294
cooperative agreements and, 282–284
innovation and, 282–284
knowledge transfer by, 270, 277–280
KTOs in, 267, 285–286, 291–293, 294
non-financial compensation, 294
number of, 276
patent filings by, 280–282
revenues of, 279
rationale for inclusion in study, 18–21
R&D/GDP ratio in, 25–26
research infrastructure in, 273–276
research publications in, 266, 287
Science and Technology Act 2016, 284–285, 286
Sectoral Funds, 263, 269, 272
seminars in, 266
specialization of innovation in, 27
Telecom Research and Development Center, 282
“two-way flow” of ideas in, 418
universities
bureaucratic issues, 271–272, 294–295
collaboration with industry, 398, 405–406
consultancies and, 290–291, 293–294
cooperative agreements and, 282–284
fragility of linkages with industry, 265, 269
funding and, 270–271
increase in interaction with industry, 265
innovation and, 282–284
knowledge transfer by, 270
knowledge transfer policy, 8
KTOs in, 267, 268, 285–286, 291–293, 294, 408
low level of interaction with industry, 264–265
non-financial compensation, 294
number of, 276
patent filings by, 267, 268–270, 280–282, 295
patent licensing and, 410
public research universities, 276–277
research agreements and, 290–291
technological problems and, 270
Brehm, S., 312–313
Breschi, S., 342–344

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Bristol-Meyers-Squibb, 395
Brito Cruz, C.H., 265
Britto, G., 264–265
Burkina Faso, government funding of R&D in, 13

Cai, Y.Z., 321
Cambridge Inventor-Ownership Model, 171
Cambridge University, 142, 149, 163, 397, 404
Cameron, William Bruce, 78
Campbell, D.F.G., 364
Canada
  Canada Intellectual Property Office (CIPO), 128–131
  IP office, patent filings by, 131–132
  metrics of knowledge transfer in, 426–427
  national and institutional policies and practices supporting knowledge transfer in, 40
  surveys of KTOs in, 53, 56
Canon, 114–128
Cappelli, R.D., 219
Caryannis, E.G., 364
Central South University of Forestry and Technology (China), 308
Centre for European Economic Research (ZEW), 191, 209
Chan, K.W., 366, 367
Changzhou University, 308
Channels of knowledge transfer, 36–39
  collaborative research, 364–365, 368–369, 380, 460
  consultancies, 38, 290–291, 293–294, 341, 380, 398–400, 460
  contracts, 38, 50–52, 380, 439–440, 460
  education and training, 398–400, 460
  formal channels, 36–37, 38–39, 50–52, 76, 372, 443, 445, 446
  hiring of university graduates, 36
  informal channels, 36–37, 38–39, 50–52, 76, 372, 445
  "open science," 50–52, 169, 266–267, 439–440
  patent licensing, 398–400
  research publications, 303, 398–400
  seminars, 209, 266, 267, 287, 398–400
  spin-offs as, 217–218, 243, 266, 309, 398–400
Chaves, C.V., 265, 269
Chemical engineering, patent filings in, 111
Chemistry, patent filings in, 108, 109
Chile, metrics of knowledge transfer in, 436
China
  Central Committee of Communist Party of China, 300
  channels of knowledge transfer in, 38
  China Academy of Telecommunication Technology, 111
  Chinese Patent Office, 26–27
  Chinese Science Academy, 308
  collaborative research in, 313
  Company Law, 306, 323
  Contract Law, 306, 323
  Decision on Reforming the Science and Technology System, 300
  Drug Research Institution, 308
  European Union compared, 300
  government funding of R&D in, 13
  income level, patent filings by, 93, 95, 97, 103, 105, 106–107
  industry financing of R&D in, 48
  Innovation Centers, 310
  innovation in, 300
  investment in R&D, 301–302
  IP office, patent filings by, 131–132
  ITC, 26–27
  knowledge capabilities gap in, 368
  knowledge transfer in
    ambiguous corporate governance and regulation as barrier to, 322–323
    barriers to, 299–300, 321–323
    case study, 377–378
    immaturity of technology market as barrier to, 321–322
    increased rewards and compensation, 308
    Innovation Centers and, 310

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

KTOs, 308
lack of financial support as barrier to, 322
legal framework, 304–306
legislation patterned on Bayh-Dole Act in, 406–407
marketing of information, 309
overview, 22, 299–300, 323–324
performance evaluation systems, 308
policies and practices, 377–378
policies promoting, 307–311
in provinces, 307
by public research institutes, 306–307
science parks and, 310–311, 320–321
spin-offs and, 309
strategic alliances for innovation and, 310
transaction costs as barrier to, 323
by universities, 306–307
Law of Higher Education 1998, 301
Law on Promoting the Transformation of Scientific and Technological Achievements (PTSTA), 299, 305–306, 323–324, 378
2015 amendments, 306–311, 322, 378
metrics of knowledge transfer in, 426, 427, 428, 432–433
Ministry of Commerce, 313
Ministry of Education, 301
Ministry of Finance, 306, 378
Ministry of Industry and Information, 310
National High-Speed Train Technology Innovation Center, 310
National Outline for Educational Reform and Development, 301
National Plan for Medium and Long-Term S&T Development, 301
National Science and Technology Plan, 310
National Technology Transfer Center, 308
National Technology Transfer Demonstration Institution, 308
985 Project, 301, 323
OECD countries compared, 300
patent applications in, 303–304
Patent Law 1984, 305, 323
patent licensing in, 313–320
patent metrics in, 86
Patent Office, 305
patent sales or assignments in, 313–320
Program on Promoting Scientific and Technological Achievements, Transfer and Transformation, 307
public R&D, 300
public research institutes
collaboration with industry, 309–310, 405
IP and, 306
knowledge transfer by, 306–307
KTOs in, 308
patent exploitation rates, 316–318
patent filings by, 128
patent licensing by, 314–316, 320
patent sales or assignments by, 318–319
role in R&D, 300–301
rationale for inclusion in study, 18–21
R&D/GDP ratio in, 25–26
recruitment policies of KTOs, 413
research publications in, 303
Science and Technology Progress Law 2007, 304, 323
science parks in, 310–311, 320–321
State Intellectual Property Office of China (SIPO), 128–131, 303–304, 444
State-Owned Asset Supervision and Administration Commission, 306
strategic alliances for innovation, 310
Strategy of Invigorating China through Science and Education, 301

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

China (cont.)
technology market in, 311–312
Tongji University Creative Cluster, 321
Torch Program, 310
TusPark, 320
211 Project, 301, 323
universities
collaboration with industry, 309–310, 311, 312–313, 398, 405–406
IP and, 306
knowledge transfer by, 306–307
knowledge transfer policy, 8
KTOs in, 308
leaves of absence in, 309
ownership of patents, 410
patent exploitation rates, 316–318
patent filings by, 128, 314
patent licensing by, 314–316, 320
patent sales or assignments by, 314, 318–319
role in R&D, 300–301
in WIPO, 305
Xi'an S&T Market, 312
Zhangjiang Hi-Tech Park, 321
Zhejiang Online Technology Market, 312
Zhongguancun Science Park, 320–321
Cho, H.-D., 240–242
Closs, L.Q., 270–271
Cohen-Boyer patents, 55, 395
Collaborative research. *See also specific country*
in Brazil, 267
as channel of knowledge transfer, 380, 460
as channels of knowledge transfer, 364–365, 368–369
in China, 313
firms and, 372
in Germany, 219
IP licensing model and, 387–388
in Korea, 248, 249, 251
metrics of knowledge transfer and, 52, 428–429, 430–431
public research institutes and, 372
in South Africa, 349
in United Kingdom, 149, 154
Colombia
income level, patent filings by, 93
public research institute, patent filings by, 114
universities
knowledge transfer policy, 8
patent filings by, 114
Columbia University, 395
Comin, D., 219–220
Commercialization of IP. *See also specific country*
conflicts regarding, 9–11
decline of public research institutes and, 10–11
diversification of, 411
effect on funding, 9–10
firms, absorptive capacity of, 11
incentives for, 69
lack of opportunities in middle-income countries, 413
Mertonian norms and, 10
metrics of knowledge transfer and, 55–56
patent protection policies and, 81
socially responsible research commercialization, 32–33, 34
universities and, 398
Community engagement, 361
Company S (Korea), 247–249, 251
Computer technology, patent filings in, 111
Conceptual framework of knowledge transfer
channels of knowledge transfer, 36–39
downstream outcomes and, 69
financial benefits, profits distinguished, 68–69
formal channels of knowledge transfer, 36–37, 38–39, 76
hiring of university graduates and, 36
incentives for investor involvement and commercialization and, 69
informal channels of knowledge transfer, 36–37, 38–39, 76

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

overview, 21, 35–36
patents, differing impact on research incentives and, 69–70
Consultancies. *See also specific country*
in Brazil, 290–291
in Brazil, 293–294
as channel of knowledge transfer, 38, 290–291, 293–294, 341, 380, 398–400, 460
in Korea, 249
metrics of knowledge transfer and, 50–52, 430–431, 460
in South Africa, 341
in United Kingdom, 174
Contracts. *See also specific country*
as channel of knowledge transfer, 38, 50–52, 380, 439–440, 460
in Germany, 219
in Korea, 251
metrics of knowledge transfer and, 50–52, 428–429, 430–431
in South Africa, 341
in United Kingdom, 154, 414
Convergence of knowledge transfer policies and practices, 393–394, 397–398, 413–415
Cooper, D., 338
Costa Rica
channels of knowledge transfer in, 38
university knowledge transfer policy in, 8
Criscuolo, P., 366, 367
Cross-country trends in public R&D, 11–13
Cuntz, A., 200, 205
Cusmano, L., 341, 343–344
Czarnitzki, Dirk, 191, 200–206, 209, 215, 216–218
Czech Republic
pre-emption rights principle in, 154–155
university ownership of patents in, 397

de Castro, P.G., 266, 267
Declaration on the Fourth Industrial Revolution, 454–455
Demand pull firms, 374
De Negri, F., 263, 265, 275–276
Denmark
Danish Agency for Science, Technology and Innovation (DASTI), 426
metrics of knowledge transfer in, 426
Ministry of Higher Education in Science, 426
pre-emption rights principle in, 154–155
professor's privilege, abolition of, 7, 397
De Wet, G., 339
Digital communications, patent filings in, 111
Distell Group (South Africa), 343–344
Dos Santos, M.E.R., 267
Dutrénit, G., 265

Economic growth as rationale for public R&D, 5
Edler, J., 191
Education and training. *See also specific country*
in Brazil, 265
as channel of knowledge transfer, 398–400, 460
in Korea, 249
in middle-income countries, 405–406
public R&D and, 4
in South Africa, 335, 337, 340–341
in United Kingdom, 174
WIPO university applicant names, verifying accuracy of, 137
Egypt
universities
knowledge transfer policy, 8–9
patent filings by, 114
Electrical engineering, patent filings in, 108, 109
Eom, B.-Y., 228, 258
Equifinality, 362
Es-Sadki, Nordine, 452, 453, 455, 459, 461–462
European Commission
Commission's Competence Centre on Technology Transfer (CC TT), 458

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

European Commission (cont.)
Expert Group on KT Metrics, 458
Expert Group on Metrics for Knowledge Transfer, 458–459
Joint Research Centre, 458
National Associations Advisory Committee (NAAC), 458
European Molecular Biology Laboratory (EMBL), 220
"European paradox," 457
European Union. *See also specific country*
China compared, 300
Community Innovation Surveys (CIS), 195, 344, 345, 440, 453–454
European Patent Office (EPO), 81–82, 128–131
KTOs in, 457–458, 459
metrics of knowledge transfer in, 457–459
Multiannual Financial Framework (MFF), 457
PATSTAT database (*See* PATSTAT database)
surveys of KTOs in, 53, 56
university knowledge transfer policies in, 7
Eurostat, 345

Fedderke, J.W., 338
Ferreira, G.C., 270–271
Financial incentives
firms and, 372
for investor involvement and commercialization, 69
in middle-income countries, 394
for participation in knowledge transfer, 31–32, 34
public research institutes and, 372
for universities, 412
Finland
pre-emption rights principle in, 154–155
professor's privilege in, 7
Firms. *See also specific firm*
barriers to knowledge transfer, 372–373
characteristics of, 374
collaborative research and, 372
commercialization of IP and absorptive capacity of, 11
demand pull firms, 374
financial incentives and, 372
knowledge capabilities gap and, 366–369, 380
knowledge transfer and absorptive capacity of, 38, 267
linkage with public research institutes, 371–372, 380–381
mode 1 conception of knowledge transfer, absorptive capacity in, 363
patent licensing and, 381
policies and practices of, 22, 374
R&D intensity of, 38
successful knowledge transfer policies and practices, 369–371
surveys of, 429–430, 439–441, 461–462
Firm survivor bias, 218
Florida State University, 395
Fongwa, N.S., 339
Foreign-oriented patent filings, 90–92
Formal channels of knowledge transfer, 36–37, 38–39, 50–52, 76, 372, 443, 445, 446
France
Centre National de la Recherche Scientifique (CNRS), 111–112
Commissariat à l'Energie Atomique et aux Energies Alternatives (CEA), 111, 114
income level, patent filings by, 93, 97, 104, 106
Institut national de la santé et de la recherche médicale (INSERM), 111, 128
IP office, patent filings by, 131–132
public research institute, patent filings by, 114, 128
universities
ownership of patents, 397
patent filings by, 128

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

patenting activities of, 155
Freeman, Christopher, 4, 226
Freitas, I.M.B., 429
Friedman, J., 256
Friedrich-Schiller-University, 220, 221
Fudan University, 322

Germany
CarLa Catalytics Research Lab, 222
collaborative research in, 219
commercialization of IP in, 393–394
contracts in, 219
demand pull in, 365
displacement effects in, 413–414
EXIST program, 208
Federal Ministry of Economics (BMWi), 205
Federal Ministry of Education and Research (BMBF), 183–184, 196–199, 205
Federal Statistical Office, 183
Fraunhofer Association, 111, 114, 182, 183, 185, 186–187, 191–193, 195, 196, 209, 213, 219–220, 221, 361, 365
German Cancer Research Institute, 220
German Meteorological Office (DWD), 193
German National Account, 218
German Patent and Trademark Office (DPMA), 200
German University Excellence Initiative, 206–207, 222
Helmholtz Association, 182, 183, 184–185, 186–187, 195, 198, 209, 213, 365
Helmholtz Centre for Research on Environmental Health, 221
Helmholtz Institute, 221
Helmholtz Society, 220
income level, patent filings by, 93, 97
InnovationLab, 222
Innovative Hochschule scheme, 208
IP office, patent filings by, 131–132
knowledge capabilities gap in, 368
"Knowledge Creates Markets" campaign, 196–199, 205
knowledge transfer in
benefits to business of, 217–220
case study, 379–380
changes in, 196–199
channels of, 209–214
economic literature on, 214
funding schemes, 206–208
historical background, 185–187
innovation, effect on, 219
job creation, effect on, 218–219
leading users of, 195–196
legislation patterned on Bayh-Dole Act in, 404
limitations to, 215–217
opportunity cost of, 215–217
overview, 22, 182–183, 223–224
patent valorization agencies, 205–206
policies and practices, 378–379, 403
by public research institutes, 191–195
spin-offs, effect on, 217–218
supporting interviews, 220–223
by universities, 187–191, 220–223
Leibniz Association, 182, 183, 185, 192–195, 198, 209, 213, 365
Max Planck Association, 182, 183, 184–185, 186–187, 191–193, 195, 196, 209, 213, 221, 365
Max Planck Institute for Medical Research, 220
metrics of knowledge transfer in, 426, 432–433, 436
Ministry of Health, 193
Ministry of Transport and Digital Infrastructure, 193
National Center for Tumor Diseases Heidelberg, 220
patent licensing in, 393–394
patent metrics in, 86
patent valorization agencies, 205–206
pre-emption rights principle in, 154–155
professor's privilege, abolition of, 7, 41, 163, 199–205, 397, 403

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Germany (cont.)
public research institutes
channels of knowledge transfer in, 209–214
expenditures by, 183–185
knowledge transfer by, 191–195
overview, 182
patent filings by, 128
rationale for inclusion in study, 18–21
R&D/GDP ratio in, 25–26
research publications in, 219
Robert Koch Institute, 193
SIGNO program, 205
Spitzencluster initiative, 207, 222
universities
channels of knowledge transfer in, 209–214
expenditures by, 184
knowledge transfer by, 187–191, 220–223
overview, 182
patent filings by, 200–205, 403
statistics on, 183
supporting interviews, 220–223
Geuna, A., 432
Ghana, university knowledge transfer policy in, 8
Gibbons, M., 362–363
Goldberg, I., 338
Government funding of R&D, 12–13
Graff, G.D., 396
Greece, pre-emption rights principle in, 154–155

Haas, M.R., 366
Harbin Institute of Technology, 128
Harvard University, 112
Hendry, John, 149
High-income countries. *See also specific country*
challenges for public R&D in, 17–18
convergence of knowledge transfer policies and practices in, 393, 413–415
demand-side incentives supporting knowledge transfer in, 407–411
displacement effects in, 411–412, 413–414
diversification of knowledge transfer policy in, 411–412
firms, linkage with public research institutes and universities, 402
ideal knowledge transfer policy mix, 411–413
income level, patent filings by, 93–107
knowledge transfer policies and practices in, 402–404
legislation patterned on Bayh-Dole Act in, 413–415
metrics of knowledge transfer in, 440
middle-income countries, knowledge transfer compared, 400–402
public research institutes, linkage with firms and universities, 402
supply-side incentives supporting knowledge transfer in, 407–411
timing and sequence of knowledge transfer policy changes, 410
universities, linkage with firms and public research institutes, 402
Huang, Can, 300
Hunan University of Chinese Medicine, 308
Hungary
pre-emption rights principle in, 154–155
university ownership of patents in, 397
Huya Bioscience International, 322
Hvide, Hans K., 69
Hybrid Model, 171

Impala Platinum (South Africa), 343
Income level, patent filings by, 92–93
India
Council for Scientific and Industrial Research (CSIR), 413
Department of Science and Technology, 461
government funding of R&D in, 13
income level, patent filings by, 93, 100–101, 106–107

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

IP office, patent filings by, 131–132
legislation patterned on Bayh-Dole Act in, 396
metrics of knowledge transfer in, 461
National Knowledge Commission, 395
public research institute, patent filings by, 114
university knowledge transfer policy in, 8
Indonesia, university knowledge transfer policy in, 8
Industry. *See* Firms
Informal channels of knowledge transfer, 36–37, 38–39, 50–52, 76, 372, 445
Initech (Korea), 244, 247, 251
Innovation
IP licensing model, stifling effects of, 47–48
patents, effect of, 82
as rationale for public R&D, 4–5
International Property Rights Index (IPRI), 252
Invention patents, 303
Investment in public R&D
conflicts between old and new rationales for, 9–11
economic growth as rationale for, 5
innovation as rationale for, 4–5
rationales for, 3–5, 21
social rate of return of, 5
trade-offs between old and new rationales, 9–11
IP licensing model. *See also specific country*
advantages of, 45–47
alliances with industry and, 387–388
as channel of knowledge transfer, 36, 39, 398–400
collaborative research and, 387–388
collection of knowledge transfer metrics, 53–56
disadvantages of, 47–49
as discouraging collaboration, 49
division of revenues, 388
indicators, 70–71
innovation, stifling effects on, 47–48
institutional policies and, 50
KTO characteristics, metrics of, 60
legislation and, 50
low-income countries, disadvantages in, 46, 49
metrics of knowledge transfer and, 52, 60, 78
middle-income countries, disadvantages in, 46, 49
minimizing costs of knowledge transfer, 49–50
non-financial disadvantages of, 48
open IP policies, 50
patent valorization and, 205–206, 386–387
public research institutions, effects on, 42–43
research publications and, 47, 48
restrictions on licensing, 49
secondary benefits of, 47
signaling function, 47
socioeconomic effects of, 44–45
standardized indicators, 59–60
supplementary metrics from KTOs, 56, 57–58
support of new industry, 45–46
surveys of KTOs, 53–56
tacit knowledge and, 387
undue influence of industry and, 48
universities, effects on, 42–43
IP office, patent filings by, 128–132. *See also specific office*
Ireland, metrics of knowledge transfer in, 436
Israel
income level, patent filings by, 106
IP office, patent filings by, 131–132
universities
knowledge transfer policy, 6, 394
patent filings by, 114
Italy
IP office, patent filings by, 131–132
metrics of knowledge transfer in, 426, 436
NetVal, 426
professor's privilege in, 7
universities

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Italy (cont.)
ownership of patents, 397
patenting activities of, 155

Japan
income level, patent filings by, 93, 99, 104
IP office, patent filings by, 131–132
Japan Patent Office (JPO), 128–131
metrics of knowledge transfer in, 436
public research institute, patent filings by, 128
universities
knowledge transfer policy, 7
patent filings by, 128
Jenoptik, 220
Jiang, Y., 313
Johns Hopkins University, 111, 112
Jones, Benjamin F., 69
Jongwanich, J., 321
Jordan, legislation patterned on Bayh-Dole Act in, 396

Kahn, M.J., 338
Kaplan, D., 339, 341, 364
Kenney, M., 47
Kenya, M-PESA payment system, 455
Kim, L.-S., 227, 235–236
Kim, Sun-Young, 249, 250
Knowledge capabilities gap, 366–369, 380
Knowledge transfer. *See also specific country*
barriers to, 372–373, 381
best practices, 77
channels of, 36–39
conceptual framework of (*See* Conceptual framework of knowledge transfer)
convergence of policies and practices, 393–394, 397–398, 413–415
cultural factors, 418–419
demand pull in, 364–365
demand-side incentives supporting, 155–156, 407–411, 420
downstream outcomes and, 69
ecosystem, understanding of, 76
enabling environment, importance of, 77
financial benefits, profits distinguished, 68–69
financial factors, 419–420
flexibility of policies, 77
formal channels of, 36–37, 38–39, 76, 372, 443, 445, 446
geography and, 27–28
high-income countries, policies and practices in, 402–404
hiring of university graduates and, 36
ideal policy mix, 411–413
improved evidence for policy-making, 71–72
incentives for investor involvement and commercialization and, 69
incentives for participation in, 31–32, 34
informal channels of, 36–37, 38–39, 76, 372, 445
institutional factors, 419
institutional policies and practices supporting, 40–41
institutional versus national policies and practices, 374–375
institutions and, 26–27
IP licensing model (*See* IP licensing model)
knowledge capabilities gap and, 366–369, 380
linear model, 362–363, 365–366
metrics of (*See* Metrics of knowledge transfer)
mode 1 conception, 362–363, 365–366
mode 2 conception, 363–364
mode 3 conception, 364–365, 380
national policies and practices supporting, 40–41
national versus institutional policies and practices, 374–375
overview, 21
patent metrics (*See* Patent metrics)
patents, differing impact on research incentives and, 69–70
policy priorities, 76–77
public R&D in context of, 37

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

questions regarding policies and practices, 414
R&D/GDP ratio and, 25–26
role of policies and practices in promoting, 39–40
specialization of innovation and, 27
startups and, 373
structural characteristics of, 25–28
successful policies and practices, 361–362, 369–371
supply-side incentives supporting, 152–155, 407–411, 420
systemic failures, heterogeneous remedies for, 28–29
technology push and, 362–363
timing and sequence of policy changes, 410
"two-way flow" of ideas and, 418
Knowledge transfer offices (KTOs)
characteristics of, 60, 373–374
improved evidence for policy-making and, 71–72
linear model of knowledge transfer and, 365–366
metrics of knowledge transfer
characteristics, metrics of, 60
data from, 430–431
metrics regarding, 73–75
policies and practices supporting knowledge transfer, 431–436
surveys of, 53–56
metrics regarding, 60, 73–75
mode 1 conception of knowledge transfer and, 365–366
nexus function of, 73–74
overview, 35
policies and practices of, 373–374
in public research institutes, 35
recruitment policies, 413
return on investment (ROI) of, 74–75
revenue and, 74–75
role of policies and practices in promoting knowledge transfer, 39
standardized indicators, 59–60
supplementary metrics from, 56, 57–58
surveys of, 53–56, 73, 428–429, 461–462
in universities, 35
Kochenkova, A., 55
Kolmar BNH (Korea), 246–247, 251
Kolmar Korea, 245, 246, 247
Korea, Republic of
Act on the Promotion of Industrial Education and Industry-University Collaboration 2003, 227, 229
collaborative research in, 248, 249, 251
commercialization of IP, efficiency of, 233–236
Connect Korea project, 230
consultancies in, 249
contracts in, 251
education and training in, 249
ETRI, 244–245
goals of patent system in, 424
government-funded non-practicing entities (NPEs), 250–251
Hub University for Industrial Collaboration (HUNIC) project, 230
income level, patent filings by, 93, 97, 100, 104, 106
Intellectual Discovery (ID), 250–251, 252
IP office, patent filings by, 131–132
knowledge capabilities gap in, 368
knowledge transfer in
case study, 376–377
challenges relating to public research institutes, 255–256
channels of knowledge transfer generally, 238–242, 258
collaborative R&D and, 248, 258
contracts, 251
expenditures on public R&D, 231–233
foreign firms and, 238
formal channels of, 242–244
government-funded non-practicing entities (NPEs) and, 250–251

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Korea, Republic of (cont.)
graduate students, hiring of, 250
immature government capabilities as challenge, 253, 258–259
important factors in, 251–252
informal channels of, 247–250, 258
innovation, effect on, 238
institutional challenges, 252–253
laboratory companies and, 243–244
license income and, 236
methodology of survey on, 260
national versus institutional policies and practices, 375
new technologies and, 233
overview, 22, 257–259
patent licensing and, 242, 244–245, 248, 375–376
policies and practices, 376–377, 404
policies to improve, 228–231
public key infrastructure (PKI) and, 244–245
by public research institutes, 248–249, 250, 257–258
sector distribution of, 238
seminars and, 247–248
SMEs, challenges relating to, 253–255
spin-offs and, 243
startups and, 243–244, 245–247
statistics, 231–238
supporting interviews, 260
by universities, 257–258
university knowledge transfer policy, 7
venture capital and, 249–250
Korea Atomic Energy Research Institute (KAERI), 245–247, 248
Korea Institute for Advancement of Technology (KIAT), 229–230, 260
Korean Intellectual Property Office (KIPO), 128–131, 422
Korea Technology Exchange, 229
KTOs in, 373, 376–377
Leaders in Industry-University Cooperation (LINC) project, 230
Market-Driven IP and Technology Transfer Promotion Plan, 230–231
metrics of knowledge transfer in, 426, 432–433
Ministry of Food and Drug Safety, 246
Ministry of Information and Communication, 244–245
National Research Council of Science & Technology (NST), 243
patent licensing in, 242, 244–245, 248, 375–376
patent metrics in, 86
professors, startups and, 423
public goods, public R&D as, 423
public research institutes
bureaucracy versus, 424
challenges in knowledge transfer relating to, 255–256
channels of knowledge transfer generally, 238–242
collaboration with firms, 400, 402, 411
investments by, 229–230
knowledge transfer by, 248–249, 250, 257–258
KTOs in, 228–229, 231, 255–256
ownership of patents, 422, 423–424
patent filings by, 128, 233
public R&D, role in, 226–227
startups and, 422
technology holding companies, 229
rationale for inclusion in study, 18–21
R&D/GDP ratio in, 25–26
Science and Technology Policy Institute (STEPI), 238
small and medium-sized enterprises (SMEs) in, 228, 236–238, 253–255, 377, 411, 424

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Special R&D Zone Promotion Act 2006, 243, 246
Special Research Institute Promotion Law 1973, 227
Technology Transfer and Commercialization Promotion Act 2006, 229–230, 256, 422
Technology Transfer Promotion Act 2000, 227, 228–229, 233, 246, 257, 376
"twin dominance" of industry and government in, 226, 228
universities
channels of knowledge transfer generally, 238–242
collaboration with firms, 411
knowledge transfer by, 257–258
knowledge transfer policy, 7
KTOs in, 227–229, 231
ownership of patents, 397, 422, 423–424
patent filings by, 128, 422–423
public R&D, limited role in, 226–228
sector distribution of knowledge transfer by, 238
Korea Electronics Telecomm, 111, 128
Kotha, R., 366–367
Kroll, H., 322
Kruss, G., 338, 341
KTOs. *See* Knowledge transfer offices (KTOs)
Kuriakose, S., 338
Kwon, K.-S., 238

Lan, X., 313
Latin America. *See also specific country*
metrics of knowledge transfer in, 440
university knowledge transfer policies in, 8
Lee, Keun, 228, 258
Legislation regarding university knowledge transfer policies, 6–9, 80
LG (Korea), 253–254
Licensing of IP. *See* IP licensing model
Liefner, I., 322
Linear model of knowledge transfer, 362–363, 365–366
Lissoni, F., 155
Liu, C., 321
Liu, H., 313
Livesey, F., 266, 268
Low-income countries. *See also specific country*
basic economic needs as challenge for public R&D in, 16
challenges for public R&D in, 14–18
heterogeneity as challenge for public R&D in, 16
IP licensing model, disadvantages of, 46, 49
metrics of knowledge transfer in, 440
structural challenges for public R&D in, 16–17
Lubango, L.M., 342
Ludwig-Maximilian University, 220, 221
Lula da Silva, Luiz Inácio, 273
Lundin, N., 312–313
Lundvall, Bengt-Åke, 4

Ma, J., 313
Malaysia
channels of knowledge transfer in, 38
government funding of R&D in, 13
income level, patent filings by, 93, 102–103, 106–107
legislation patterned on Bayh-Dole Act in, 396
public research institute, patent filings by, 114
universities
knowledge transfer policy, 8
patent filings by, 114
Malerba, F., 342–344
Mannheim Innovation Panel (MIP), 195, 219
Marais, L., 339
Massachusetts Institute of Technology, 112, 282
Materials, patent filings in, 109–111
Mazzucato, Mariana, 391
Measurement, patent filings in, 108, 109–111

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Medical technology, patent filings in, 109
Mello, J.M.C., 267
Merck Serono, 221
Mertonian norms, 10
Metallurgy, patent filings in, 109–111
Metrics of knowledge transfer. *See also specific country*
  academics, surveys of, 429–430, 436–439, 461–462
  annual reports and, 462
  benefits of knowledge transfer, 442–445
  "big data," 441–442
  collaborative research and, 52, 428–429, 430–431
  collection of metrics for IP licensing model, 53–56
  commercialization of IP and, 55–56
  consultancies and, 50–52, 430–431, 460
  contracts and, 50–52, 428–429, 430–431
  cost-benefit analysis, 442–445, 462–463
  costs of, 446
  data collection, 78
  data discrepancies, 462
  disproportionate focus of, 78, 79
  economic relevance of, 428
  "European paradox," 457
  financial benefits of knowledge transfer, 443–444
  firms, surveys of, 429–430, 439–441, 461–462
  formal channels of knowledge transfer, 443, 445, 446
  full functionality of knowledge transfer and, 427–428
  Higher Education-Business and Community Interaction (HE-BCI) survey, 430–431
  in high-income countries, 440
  indicators, 70–71
  informal channels of knowledge transfer, 445
  institutional level, data collection at, 434–436, 445–446
  international comparability of, 427
  IP licensing model and, 52, 60, 78
  KTOs
    characteristics, metrics of, 60
    data from, 430–431
    metrics regarding, 73–75
    policies and practices supporting knowledge transfer, 431–436
    surveys of, 53–56, 461–462
  limitations of, 428
  in low-income countries, 440
  in middle-income countries, 428, 440
  non-financial benefits of knowledge transfer, 444–445
  non-IP-mediated knowledge transfer, 347–349, 429, 452–454, 460–461
  normalizing of data, 79
  "open science," 50–52, 439–440
  overview, 21, 22, 35–36, 77–78, 79, 445–446
  patent metrics (*See* Patent metrics)
  publicly available data, 441–442
  public research institutes
    benefits of knowledge transfer to, 431
    policies and practices supporting knowledge transfer, 431–436
    surveys of, 461–462
  reluctance to provide data, 462
  research publications and, 441–442
  standardized indicators, 59–60
  supplementary metrics from KTOs, 56, 57–58
  types of metrics, 425
  universities
    data from, 430–431
    policies and practices supporting knowledge transfer, 431–436
  value of measured activities, 427
  "vanity" metrics, 78
  WIPO Assessment Questionnaire for Stakeholders from Academic and Research Institutions, 464–474 (*See also* WIPO Assessment Questionnaire for

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Stakeholders from Academic and Research Institutions)
Mexico
channels of knowledge transfer in, 38
government funding of R&D in, 13
income level, patent filings by, 93, 102
university knowledge transfer policy in, 8
Middle-income countries. *See also specific country*
basic economic needs as challenge for public R&D in, 16
challenges for public R&D in, 14–18
collaboration between universities and industry, 412–413
convergence of knowledge transfer policies and practices in, 413–415
demand-side incentives supporting knowledge transfer in, 407–411
education and training in, 405–406
financial incentives in, 394
heterogeneity as challenge for public R&D in, 16
high-income countries, knowledge transfer compared, 400–402
ideal knowledge transfer policy mix, 411–413
income level, patent filings by, 93–107
IP licensing model, disadvantages of, 46, 49
knowledge transfer policies and practices in, 405–407
lack of commercialization opportunities in, 413
lack of research capacity in universities, 412
legislation patterned on Bayh-Dole Act in, 413–415
metrics of knowledge transfer in, 428, 440
public research institute knowledge transfer policy in, 394
structural challenges for public R&D in, 16–17
supply-side incentives supporting knowledge transfer in, 407–411
timing and sequence of knowledge transfer policy changes, 410
university knowledge transfer policy in, 394
Miller, K., 364–365
Mode 1 conception of knowledge transfer, 362–363, 365–366
Mode 2 conception of knowledge transfer, 363–364
Mode 3 conception of knowledge transfer, 364–365, 380
Mondi (South Africa), 343
Morocco
income level, patent filings by, 93
public research institute, patent filings by, 114
universities
knowledge transfer policy, 8–9
patent filings by, 114
M-PESA payment system, 455
Munari, F., 374–375
Munich Innovation Group, 187–188

National technology exchanges, 374
Nelson, Richard R., 4
Netherlands, metrics of knowledge transfer in, 436
New Zealand, surveys of KTOs in, 53
Nigeria
channels of knowledge transfer in, 38
National Office for Technology Acquisition and Promotion (NOTAP), 8–9
university knowledge transfer policy in, 8–9
Non-IP-mediated knowledge transfer, metrics of, 347–349, 429, 452–454, 460–461
Northwestern University, 128
North-West University (South Africa), 349–350
Norway
metrics of knowledge transfer in, 436

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Norway (cont.)
pre-emption rights principle in, 154–155
professor's privilege, abolition of, 7, 69, 397

Ok, J.-Y., 235–236
Oliveira, P., 268–269
Onderstepoort Biological Products (South Africa), 331
Open IP policies, 50
"Open science," 50–52, 169, 266–267, 439–440
Organic chemistry, patent filings in, 109
Organisation for Economic Co-operation and Development (OECD), 300
O'Shea, R.P., 364
Oslo Manual, 430, 440
Oxford Biomedica, 249

PACEC, 154
Pakistan, university knowledge transfer policy in, 8
Panasonic, 114–128
Paris Convention for the Protection of Industrial Property, 305
Patent Cooperation Treaty (PCT)
advantages of use in patent metrics and, 84
as data source for patent metrics, 81, 84–85, 132–134
disadvantages of use in patent metrics and, 84–85
identifying universities and public research institutes for purposes of patent metrics, 86–89
income level, patent filings by, 92–103
South Africa and, 331–333, 349
statistical trends in patent filings under, 90
supplementary metrics regarding, 56
technology field, patent filings by, 108–109, 111
university, patent filings by, 112–128
Patent metrics
academia, focus on, 81–82
applicability to universities and public research institutes, 83
data sources, 84–86
foreign-oriented patent filings and, 90–92
identifying universities and public research institutes for purposes of, 86–89
income level, patent filings by, 92–93
individual patent holders, 82–83
innovation, effect of patents on, 82
IP office, patent filings by, 128–132
lack of standardized information, 86–87
low-income countries, patent filings by income level in, 93–107
middle-income countries, patent filings by income level in, 93–107
name-cleaning and, 87–88
name-matching and, 88
overview, 21, 80–81, 132–134
Patent Cooperation Treaty (PCT) as data source, 81, 132–134 (*See also* Patent Cooperation Treaty (PCT))
patent family definition and, 85, 88–89
PATSTAT database as data source, 81, 132–134 (*See also* PATSTAT database)
public R&D versus private R&D, 82
public research institute, patent filings by, 114, 128
quality checks, 89
residence and, 89
statistical trends in patent filings, 90
technology field, patent filings by, 107–112
underestimation, 83
university, patent filings by, 112–128
WIPO university and public research institute applicant names, verifying accuracy of, 137

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Patents
differing impact on research incentives, 69–70
goals of patent system, 424
invention patents, 303
resident versus non-resident applications, 280
valorization, 205–206, 386–387
PATSTAT database
advantages of use in patent metrics and, 85
as data source for patent metrics, 81, 85–86, 132–134
disadvantages of use in patent metrics and, 85
Germany
knowledge transfer in, 187–188
patent filings in, 200
identifying universities and public research institutes for purposes of patent metrics, 86–89
income level, patent filings by, 104–107
quality checks in patent metrics, 89
statistical trends in patent filings in, 90
technology field, patent filings by, 109–111
Patton, D., 47
People's Republic of China. *See* China
Pereira, F.C., 267
Peru
government funding of R&D in, 13
university knowledge transfer policy in, 8
Phaho, D., 339
Pharmaceuticals, patent filings in, 109–112
Philippines
government funding of R&D in, 13
public research institute, patent filings by, 114
universities
knowledge transfer policy, 8
patent filings by, 114
Pinheiro-Machado, 268–269
Poland, university ownership of patents in, 397
Porto, G.S., 270, 271
Portugal, failures of knowledge transfer in, 364
Pouris, A., 339, 342
Póvoa, L.M.C., 265, 266–267, 269, 270
Private R&D, public R&D contrasted, 6, 82
Professor's privilege, abolition of, 7, 41, 69, 163, 199–205, 397, 403
Public goods, public R&D as, 4, 5, 423
Public R&D
commercialization of IP (*See* Commercialization of IP)
in context of knowledge transfer, 37
cross-country trends in, 11–13
economic growth as rationale for public R&D, 5
education and training and, 4
government funding of, 12–13
high-income countries, challenges in, 17–18
innovation as rationale for public R&D, 4–5
investment in (*See* Investment in public R&D)
low-income countries, challenges in, 14–18
middle-income countries, challenges in, 14–18
private R&D contrasted, 6, 82
as public good, 4, 5
socially responsible research commercialization, 32–33, 34
Public research institutes. *See also specific country*
barriers to knowledge transfer, 372–373
best practices, 381
collaborative research and, 372
decline of, 10–11
financial incentives and, 372
foreign-oriented patent filings by, 90–92
incentives for participation in knowledge transfer, 31–32, 34
income level, patent filings by, 92–93

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Public research institutes (cont.)
IP licensing model, effect of, 42–43
knowledge capabilities gap and, 380
KTOs in, 35
linkage with firms, 371–372, 380–381
metrics of knowledge transfer
benefits of knowledge transfer to, 431
policies and practices supporting knowledge transfer, 431–436
middle-income countries, knowledge transfer policy in, 394
patent filings by public research institute, 114, 128 (*See also specific institute*)
patent licensing and, 381
patent metrics (*See* Patent metrics)
questions regarding knowledge transfer policies and practices, 414
role in public R&D, 12
statistical trends in patent filings by, 90
successful knowledge transfer policies and practices, 369–371
surveys of, 461–462
technology field, patent filings by, 107–112
WIPO applicant names, verifying accuracy of, 137

QS World Ranking of Universities, 188–191
Quality checks in patent metrics, 89
Quan, X.H., 311

Ramaphosa, Cyril, 355
Rammer, C., 191
Rapini, M.S., 264–265, 266, 270, 271
Rationales for investment in public R&D
conflicts between old and new rationales, 9–11
overview, 3–5, 21
trade-offs between old and new rationales, 9–11
Rauen, C.V., 271, 292, 293
Ray, A.S., 172, 460–461
rDNA, 395
Research publications. *See also specific country*
in Brazil, 266, 287
as channel of knowledge transfer, 303, 398–400
in China, 303
in Germany, 219
IP licensing model and, 47, 48
metrics of knowledge transfer and, 441–442
in South Africa, 347–349
in United Kingdom, 169
use as metrics, 59
Return on investment (ROI) of KTOs, 74–75
Roche, 221
Rogers, M., 171, 172
Romania, government funding of R&D in, 13
Rorwana, A., 342
Rosli, A., 150
Rossi, Federica, 150, 432
Russian Federation
government funding of R&D in, 13
industry financing of R&D in, 48
university knowledge transfer policy in, 7, 8

Saha, S., 461
Samsung, 253–254
SAP, 221
Sappi (South Africa), 343
Sasol (South Africa), 343, 349–350, 368
Schmoch, U., 191, 199–200
Science Citation Index (SCI), 303
Scimago Institutions Rankings World Report, 88
Scopus (database), 88
Seminars
in Brazil, 266
as channel of knowledge transfer, 209, 266, 267, 287, 398–400
in Korea, 247–248
Sengupta, A., 172, 460–461
Seoul National University, 112–114, 236

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Shanghai Jiao Tong University, 128
Shapiro, M.A., 50
Shenzhen University, 114
Sibanda, M., 338
Siegel, D.S., 429
Silberman, J., 256
Silicon Valley, 396–397
Singapore
  Agency of Science, Technology and Research (ASTAR), 111, 114
  public research institute, patent filings by, 114
  recruitment policies of KTOs, 413
  university, patent filings by, 114
Slovakia, university ownership of patents in, 397
Slovenia, university ownership of patents in, 397
Socially responsible research commercialization, 32–33, 34
Social rate of return of investment in public R&D, 5
South Africa
  Agricultural Research Council (ARC), 330–331, 347, 349, 352
  apartheid in, 328–329
  Armscor, 331
  Bio-economy Strategy, 340
  Biotechnology Regional Innovation Centres, 336
  business sector
    linkage with public R&D, 337, 345–347
    scient, technology, and innovation policy, 336–337
  Centres of Competence, 335, 342–344
  Centres of Excellence, 335
  collaborative research in, 349
  consultancies in, 341
  contracts in, 341
  Council for Geosciences, 330–331
  Council for Mineral Technology, 330–331
  Council for Scientific and Industrial Research (CSIR), 330–331, 335, 343, 347, 349–350, 352, 410–411, 413
  Denel, 331, 349–350
  Department for Planning, Monitoring and Evaluation (DPME), 352
  Department of Science and Technology (DST), 333, 335, 339–340, 350, 354
  Department of Trade and Industry (DTI), 333, 337, 340, 354
  education and training in, 335, 337, 340–341
  Elsenburg Agricultural Training Institute, 343–344
  Eskom, 331, 349–350
  Global Entrepreneurship Monitor, 335–336
  government funding of R&D in, 13, 330
  Higher Education National Funding Formula, 335
  Human Sciences Research Council (HSRC), 330–331, 350
  income level, patent filings by, 93, 101, 107
  Industrial Development Corporation, 333
  Industrial Policy Action Plan, 337
  innovation
    financing of, 333
    in oil and gas sector, 343
    outputs, 345
    in platinum, 343
    policy, 333–334
    in pulp and paper sector, 343
    surveys, 344
    in viticulture, 343–344
  "innovation chasm," 339
  Innovation Fund, 333–334, 335–336, 355
  Intellectual Property Rights from Publicly Financed Research and Development Act, 9, 333–334, 389, 390, 391
  IP office, patent filings by, 131–132
  knowledge capabilities gap in, 368
  knowledge transfer in
    barriers to, 353
    case study, 378

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

South Africa (cont.)
consultancies and, 341
demand-side incentives supporting, 410–411
failures of, 337–339, 364
impacts of, 352–353
informal channels of, 341
IP-mediated knowledge transfer, 341–342, 349–352
KTOs, 351–352
legislation patterned on Bayh-Dole Act in, 406–407
metrics of, 344–352
non-IP-mediated knowledge transfer, 347–349
overview, 22, 328–329, 353–355, 389–392
patent licensing, 375–376
policies and practices, 378
policies to address failures of, 339–341
by public research institutes, 349–352
by universities, 349–352
university knowledge transfer policy, 8, 9
legislation patterned on Bayh-Dole Act in, 396
Medical Research Council, 330–331
metrics of knowledge transfer in, 426, 432–433, 436
Ministry of Higher Education and Training, 330
Mintek, 347, 349–350
National Advisory Council on Innovation, the Technology Innovation Agency (TIA), 334
National Development Plan (NDP), 329, 334, 355, 389
National Foundry Technology Network, 337
National Intellectual Property Management Office (NIPMO), 334, 340–341, 350, 353, 389–390, 391
National R&D Strategy, 333–334, 340
National Research Foundation, 330, 331, 334, 335, 336, 338
NECSA, 331
New Growth Path, 334
Office of Auditor General, 347
Office of Technology Transfer Support Fund, 389–390
oil and gas sector, innovation in, 343
Patent Cooperation Treaty (PCT) and, 331–333, 349
patent licensing in, 375–376
patent metrics in, 86
platinum, innovation in, 343
Public Investment Corporation, 333
public R&D in
linkage with business sector, 337, 345–347
scient, technology, and innovation policy, 335–336
public research institutes
collaboration with industry, 405
expenditures on R&D, 331, 332–333, 348
historical background, 330
IP management policies, 354
knowledge transfer by, 349–352
overview, 330–331
Public Research IP Act, 340, 353–354, 355
pulp and paper sector, innovation in, 343
rationale for inclusion in study, 18–21
R&D/GDP ratio in, 25–26
R&D Tax Incentive, 333–334, 355
Researcher Rating Scheme, 335
research publications in, 347–349
sanctions against, 328–329
science and technology policy, 333–334
Sector Innovation Fund, 339–340
Sector Innovation Programme, 339–340, 355
South Africa Bureau of Standards Design Institute, 337
South Africa Bureau of Standards (SABS), 330–331

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

South African Patent Office (SAPO), 330, 331
South African Research Chairs Initiative, 335, 336
Southern African Research and Innovation Managers Association (SARIMA), 340–341, 350
specialization of innovation in, 27
state-owned enterprises in, 331
technikons, 330
Technology and Human Resources for Industry Programme (THRIP), 340, 343–344, 374
"technology colony," 339
Technology Innovation Agency, 336, 352, 355
Telkom, 331
Ten-Year Innovation Plan, 333–334, 337, 339
Transnet, 331
Transnet Design, Innovation and Research Centre, 337
universities
collaboration with industry, 398, 405–406
expenditures on R&D, 331, 332–333, 348
historical background, 330
IP management policies, 354
knowledge transfer by, 349–352
knowledge transfer policy, 8, 9
KTOs in, 353
patent filings by, 114
research in, 330
USPTO and, 331–333, 349–350
viticulture, innovation in, 343–344
White Paper on Science and Technology, 333, 334, 340, 355, 363
South African Wine and Brandy Company, 343–344
Southeast University of China, 128
Southern African Development Community (SADC), 454–455
South Korea. *See* Korea, Republic of
Korea
failures of knowledge transfer in, 364
income level, patent filings by, 106
metrics of knowledge transfer in, 426, 436
RedOTRI, 426
universities
ownership of patents, 397
patent filings by, 114
Spin-offs. *See also specific country*
as channel of knowledge transfer, 217–218, 243, 266, 309, 398–400
universities and, 158–164, 398
Squeff, F.H.S., 265, 275–276
Stand-Alone Company Model, 171
Standardized indicators, 59–60
Stanford University, 236, 395
Startups
knowledge transfer and, 243–244, 245–247, 373
public research institutes and startups and, 422
Stellenbosch University, 343–344, 349, 352
Sunbiotech (Korea), 246
Surveys
of academics, 429–430, 436–439, 461–462
of firms, 429–430, 439–441, 461–462
Higher Education-Business and Community Interaction (HE-BCI) survey, 430–431
of KTOs, 53–56, 73, 428–429, 461–462
of public research institutes, 461–462
WIPO Assessment Questionnaire for Stakeholders from Academic and Research Institutions, 464–474 (*See also* WIPO Assessment Questionnaire for Stakeholders from Academic and Research Institutions)
Sweden
inventor ownership in, 397
metrics of knowledge transfer in, 436
national and institutional policies and practices supporting knowledge transfer in, 40

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Sweden (cont.)
professor's privilege, abolition of, 7, 397
universities
patent filings by, 114
patenting activities of, 155
Switzerland, university ownership of patents in, 397

Takara Shuzo, 249
Tan, J., 320–321
Tan, L., 319, 322
Tang, P., 171–172
Taxol, 395
Technical University of Denmark, 442
Technical University of Munich, 221
Technology field, patent filings by, 107–112. *See also specific field*
Telecommunications, patent filings in, 111
Telles, L.O., 270
Tengeh, R.K., 342
Thailand
channels of knowledge transfer in, 38
government funding of R&D in, 13
university knowledge transfer policy in, 7, 8
"Third mission" policies, 6–9
Thursby, G., 48
Thursby, M.C., 48
Todo, Y., 320–321
Tokyo University, 111–114
Toole, A., 218–219
Torkomian, A.L.V., 269–270
Toyota Jidosha, 114–128
TRL scale, 254
Tsinghua University, 128, 313, 320, 322
Tunisia, university knowledge transfer policy in, 8–9
Turchi, L.M., 271, 292, 293
Turkey, patent filings by income level in, 93
"Two-way flow" of ideas, 418

Uganda, channels of knowledge transfer in, 38
United Kingdom
British Technology Group (BTG), 149, 403, 404
Catalyst Fund, 153
Catapult Centres, 153
channels of knowledge transfer in, 52
Charities Act 2006, 144
Co-Investment Fund, 155–156
collaborative research in, 149, 154
commercialization of IP in
comparison of universities and public sector research establishments (PSREs), 166–168
KTOs and, 163
patent licensing, 393–394
public sector research establishments (PSREs) and, 164
universities and, 158–164
Community Innovation Survey (CIS), 168–169
consultancies in, 174
contracts in, 154, 414
demand pull in, 365
Department for Business, Energy and Industrial Strategy (BEIS), 144
Department for Business, Innovation and Skills, 164
Department for Education (DfE), 144
Department for Employment and Learning Northern Ireland (DELNI), 144
Department for Trade and Industry (DTI), 150
Department of Culture, Media and Sport, 146
displacement effects in, 413–414
education and training in, 174
Education Reform Act (ERA) 1988, 143
Enterprise Capital Funds, 155–156
Enterprise Investment Scheme (EIS), 155–156
government regulation of IP rights, 154–155

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

Higher Education-Business and Community Interaction (HE-BCI) survey, 430–431, 460–461
Higher Education Funding Council for England (HEFCE), 144, 145, 153, 172
Higher Education Funding Council for Wales (HEFCW), 144
Higher Education Funding Council (HEFC), 143
Higher Education Innovation Fund (HEIF), 152–153, 156
Higher Education Reach-out to Business and the Community (HEROBAC) Fund, 152
Higher Education Statistics Agency (HESA), 168, 169
income level, patent filings by, 93, 99
Industrial Strategy Challenge Fund, 156
Industrial Strategy White Paper, 156
Innovate UK, 153
knowledge capabilities gap in, 368
Knowledge Exploitation Programme, 152
knowledge transfer in
  case study, 378–379
  commercialization activities, 157–158
  community-based activities, 157–158
  demand-side incentives supporting, 155–156
  historical background of policies and practices, 148–151
  incentives regarding, 173–176
  legislation patterned on Bayh-Dole Act in, 404
  national versus institutional policies and practices, 375
  organizational practices, 169–173
  overview, 22, 141–142, 173–176
  path dependency and, 174
  people-based activities, 157–158
  policies and practices, 378–379, 403–404
  problem-solving activities, 157–158
  promotion of, 173–174
  public sector research establishments (PSREs) and, 154
  supply-side incentives supporting, 152–155
  symbiotic relationship with socioeconomic structure, 174
  universities and, 152–154
Knowledge Transfer Partnership (KTP) Scheme, 153
Lambert Agreements, 154
LINK Scheme, 149
local enterprise partnerships (LEPs), 151
Medical Research Council (MRC), 146
metrics of knowledge transfer in, 425–426, 427, 428, 430–431, 432–433, 436, 437, 460–461
National Centre for Universities and Business (NCUB), 157, 166–167
National Enterprise Board, 149
National Research Development Corporation (NRDC), 149
Office of Science and Technology (OST), 150
open funding competitions in, 155
Patent Law 1977, 154
patent licensing in, 393–394
patent metrics in, 86
Polytechnics and Colleges Funding Council (PCFC), 143
professor's privilege in, 163
public sector research establishments (PSREs)
  commercialization of IP in and, 164–168
  funding of, 146–148
  governance agreements, 148
  knowledge transfer and, 154
  overview, 146–147
  spin-offs and, 164

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

United Kingdom (cont.)
Public Sector Research Exploitation Fund, 154
rationale for inclusion in study, 18–21
R&D/GDP ratio in, 25–26
R&D tax credits in, 155
regional development agencies (RDAs), 151
Regional Innovation Fund, 151
research publications in, 169
Royal Society, 153–154
Science and Technology Committee, 156
Science Enterprise Challenge (SEC) Fund, 152
Scottish Funding Council (SFC), 144
Seed Enterprise Investment Scheme (SEIS), 155–156
Small Business Research Initiative (SBRI), 155
Social Investment Tax Relief (SITR), 155–156
Teaching Company Scheme, 149, 153
Teaching Excellence Framework (TEF), 145
UK Innovation Investment Fund, 155–156
UK Research Partnership Investment Fund, 153
universities
commercialization of IP and, 158–164
diversification of knowledge transfer policy, 411–412
funding of, 144–146, 148
geographic distribution of, 143–144
historical background, 142–143
incentives regarding knowledge transfer, 173–176
industry demand for knowledge from, 168–169
knowledge transfer and, 152–154
KTOs in, 169–171, 172
organizational practices, 169–173
ownership of patents, 397
patent filings by, 114
patenting activities of, 155
public versus private, 144
spin-offs and, 158–164
University Challenge Seed Fund, 152
University Funding Council, 143
Wellcome Trust, 153–154
United States of America
Advanced Technology Program, 396
Bayh-Dole Act, 6–7, 39, 71, 80, 83, 229, 257, 340, 362–363, 380, 394–398, 413–415, 457, 460
Defense Department, 396
Defense Industrial and Technology Base Initiative, 396
Engineering Research Centers, 396
Federal Technology Transfer Act, 396
improved evidence for policy-making in, 71
income level, patent filings by, 93, 97, 104
industry financing of R&D in, 48
IP licensing model in, 39, 394
IP office, patent filings by, 131–132
knowledge transfer in, 394–397
Manufacturing Extension Program, 396
metrics of knowledge transfer in, 426–427, 436, 444
mode 1 conception of knowledge transfer in, 363
national and institutional policies and practices supporting knowledge transfer in, 40
National Institutes of Health (NIH), 395
Silicon Valley, 396–397
Small Business Innovation Development Act, 396
Small Business Research and Development Enhancement Act, 396
standardized indicators in, 59
Stevenson-Wydler Technology Innovation Act, 396
surveys of KTOs in, 53, 56

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE
Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

United States Patent and Trademark Office (USPTO), 81–82, 128–131, 331–333, 349–350
universities
commercialization of IP and, 394–395
knowledge transfer policy, 6–7
patenting activities of, 155, 394–395
Universidade de São Paulo, 269, 277, 282–284
Universidade Estadual de Campinas, 269, 282–284, 290, 291
Universidade Federal de Minas Gerais, 282–284, 291
Universidade Federal de São Carlos, 269
Universidade Federal do Paraná, 282–284
Universidade Federal do Rio de Janeiro, 282–284
Universities. *See also specific country*; *specific university*
commercialization of IP and, 398
convergence of knowledge transfer policies and practices in, 397–398
diversification of knowledge transfer policy, 411–412
financial incentives for, 412
foreign-oriented patent filings by, 90–92
incentives for participation in knowledge transfer, 31–32, 34
income level, patent filings by, 92–93
IP licensing model, effect of, 42–43
knowledge capabilities gap and, 366–369, 380
knowledge transfer policies and practices, 22
KTOs in, 35
lack of research capacity in middle-income countries, 412
leaves of absence in, 398
legislation regarding IP policies, 6–9, 80
metrics of knowledge transfer
data from, 430–431
policies and practices supporting knowledge transfer, 431–436
middle-income countries, knowledge transfer policy in, 394
patent filings by university, 112–128 (*See also specific university*)
patent licensing and, 397–398
patent metrics (*See* Patent metrics)
patent ownership and, 397
professor's privilege, abolition of, 7, 41, 69, 163, 199–205, 397, 403
questions regarding knowledge transfer policies and practices, 414
role in public R&D, 12
spin-offs and, 158–164, 398
statistical trends in patent filings by, 90
successful knowledge transfer policies and practices, 369–371
technology field, patent filings by, 107–112
WIPO applicant names, verifying accuracy of, 137
University of California, 111, 112
University of Cape Town, 347, 349–350
University of Heidelberg, 220–221
University of Manchester, 149
University of Pretoria, 343, 349
University of Texas, 111, 112
University of Witwatersrand, 343, 349–350

Valorization, 205–206, 386–387
"Vanity" metrics, 78
Velez, M., 338
ViroMed Inc., 249–250, 251
Von Proff, S., 200

Wang, B., 313
Wang, Y.D., 311, 314
WIPO Assessment Questionnaire for Stakeholders from Academic and Research Institutions, 464–474

© in this web service Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-1-108-84279-2 — Harnessing Public Research for Innovation in the 21st Century
Edited by Anthony Arundel , Suma Athreye , Sacha Wunsch-Vincent
Index
More Information

WIPO Assessment (cont.)
financial incentives, 469
funding of R&D, 471
general information, 464–465
IP and technology management, 467–469
ownership of IP rights, 465–466
policy awareness, 472
problems, challenges, and strategic issues, 473–474
publication and dissemination policy, 472
third-party engagement, 470
Woltmann, S., 442
World Intellectual Property Organization (WIPO)
Assessment Questionnaire for Stakeholders from Academic and Research Institutions, 464–474 (*See also* WIPO Assessment Questionnaire for Stakeholders from Academic and Research Institutions)
China in, 305
Patent Cooperation Treaty (PCT) (*See* Patent Cooperation Treaty (PCT))
public research institute applicant names, verifying accuracy of, 137
university applicant names, verifying accuracy of, 137
World University Rankings, 330
Wuhan University, 322
Wunsch-Vincent, Sacha, 282

Yale University, 33
Yoon, C.-M., 230

Zhang, C., 339
Zhang, M.X., 323
Zhao, W.X., 320
Zhejiang University, 128, 309, 322
Zou, Y.H., 320

© in this web service Cambridge University Press www.cambridge.org