
Index

- accountability 336, 342
accounting methods 232, 310, 311, 355,
367, 423–4, 458
Acemoglu, D. 461
Act for Enhancing Research and
Development Competences (2008)
198
action phase, of foresight 384
ad hoc classifications 361
ad hoc groups 50, 301, 364, 451
ad hoc surveys 368, 410
adaptability, organizational 252, 258
adaptive capabilities 248, 309
adhocracy 253
advanced technologies 45, 351, 359,
450
advanced technology surveys (Canada)
50, 123–4
Advisory Board (NESTI) 241
African Intergovernmental
Committee on Science,
Technology and Innovation
Indicators 51
ageing population 249, 328, 398, 420,
452
aggregate measures, economic
performance 232–5
Aghion, P. 306
Åkerblom, M. 73, 76–8
altruistic punishment 427
American Recovery and Reinvestment
Act 2009 (US) 336, 337
analytical publications 224–5
Annual Economic and Fiscal Report
(Japan) 207
*Annual Report on the Japanese
Economy* (Japan) 198
Apps 452
Aristotle 428
arrival cities 10
Arthur D. Little 63
Arundel, A. 90, 116, 279, 294, 461
Asia 205, 305, 306, 314
Alliance for Science, Technology and
Research for America (ASTRA)
340
The Atlantic Century 292
Audit Commission 410
Australia 46, 88–105, 91, 236, 303, 313,
338, 341, 369, 423–4
autonomy 387, 406, 408, 413
average partial effect (APE) 166
award programs 409
Basic Plan of Developing National
Official Statistics (Japan) 200, 210
basic scorecards (KAM) 293
Becker, M. 451
benchmarking 104, 217, 283, 286, 290,
292–3, 393, 409
Best Available Charitable Option
(BACO) 422
best practice 65, 80, 89, 219, 248, 279
Beyond GDP programme 424
bias 65, 79, 140, 142, 143, 169, 170,
181, 187, 237, 255, 257, 258–9,
388, 415
bibliometrics 224, 227, 236, 338, 354,
369, 384, 388, 390
bilan sociétal 423
bilancio sociale 423
biotechnology 50, 57, 236, 304, 353–4,
361
biotechnology statistics 219, 227, 349,
364–5, 451
Biotechnology Statistics (OECD) 221
‘blended value’ methods 422
block structure classification 375
Blue Sky Forums 47, 83, 221–2, 227,
240–41, 303, 397, 453, 457
Blue Sky indicators project 227–8, 311
Boden, M. 398
Bogdandy, A. von 5
Bogotá Manual 51
Borins, S. 409
brain drain 302

- Bräunling, G. 74
 Brazil 42, 222, 305, 314
 Bresson, C. de 64, 71, 73
 Brooks, D.H. 302, 317
 budget-based measures 240
 built environment, impact assessment 423
 bureaucratic structures 253, 262
 business cycle 152, 157, 159, 160
 business demographics, measuring 454
 business enterprise expenditure on R&D (BERD) 232
 business innovation systems 454–5, 459–60
 business process reengineering 259
 business registers 56–7, 257, 454
 Business Research and Development and Innovation Surveys (BRDIS) 10, 338–9, 340, 341, 343, 457
 business sector innovation 240, 405–6, 456–7
 business surveys 17, 56
- Canada 46, 57, 62, 64, 91, 118, 119, 121, 236, 308, 338, 341, 356, 369, 409
 Canadian surveys 45, 50, 123–4, 409–10
Canberra Manual 219
 capital expenditure on innovation 143, 153–4
 Career of Directorate Holders 236
 Carter, C.F. 63
 CDM Model 170, 455
 Center for High Impact Philanthropy 422
 Central Bureau of Statistics (Dutch) 79, 82
 Central Register of Establishments and Enterprises (Norway) 179
 Centre for European Economic Research (ZEW) 135, 144, 288
 Chabbal, R. 73, 461
 chain-link model 71, 111
 China 42, 196, 222, 228, 290, 305, 314
 Christensen, C.M. 49
 citation analysis 355, 388
 civil society, tools to measure 425
 classifications 46, 56–9, 359, 360–68, 372–6, 408, 416
 Classifications of the functions of government (COFOG) 58, 408
 climate change 306, 427
 CMU-NISTEP Survey 201–3, 205
 co-citation analysis 355
 co-innovators 459
 Co-ordinating Action Project, *see* MEADOW
 co-producers 51
 co-publication statistics 446
 codification 16, 317
 codified knowledge 370, 384, 452
 cognitive interviewing 229–30
 cognitive testing 9, 47, 65, 80–81, 82, 83, 89, 90, 130, 250
 Cohen, W.M. 12, 202
 Coleccia, A. 461
 collaboration 49, 313, 314, 335, 339, 370, 398, 446
 collaborators 459
 combined R&D and innovation surveys 10–11, 84; *see also* Norwegian innovation surveys
 Commissioner for Research and Innovation (EU) 446
 Committee for Scientific and Technological Policy (CSTP) 42, 221, 226
 communication culture 382, 386
 communication innovation 412
 communities of practice 442–5, 447, 450
 Community Innovation Surveys (CIS) 41, 42, 60–85, 340
 academic interest/involvement 60–61, 75
 community of practice 442
 compulsory aspect 48
 coordination of Swedish employer survey with 265
 criticisms of 89
 decentralized mode 256
 final English text (2010) 21–37
 Finland 328
 first (CIS 1) 44
 Oslo Manual and 72–5
 frequency 60
 from 2006–2012 81–4
 from second to fourth 75–81
 future challenges 84–5

- influence on other countries 60
- limitations of a simple interpretation of results 90
- measurement, *see* measurement of innovation
- novelty question in 44
- origin of 61–2
- policy relevant indicators 60
- questionnaires, *see* questionnaires
- reliance of ECR on 290, 291
- use of data 60, 61
- user innovation 124–5
- comparability, *see* cross-sectoral comparability; international comparability
- competitiveness reports 289–92, 294
- complementarities (HRM) 253
- composite index 311
- composite indicators 281, 283, 285, 292, 307
- computer-assisted telephone interviews (CATI) 92, 124, 125, 130
- concept representation 196–7
- Conference Board Leading Economic Index® 392
- Conference Board (US) 455
- confidentiality 444
- consensus building 42
- consumers 8, 15, 43, 50–51, 115, 116–17, 118, 121, 125–7, 128, 129, 304, 458–9
- context of change, indicators and 444–5
- continuous learning 269
- controls, Norwegian surveys 180–81
- convergent technologies 349, 353, 360, 398
- cooperation for innovation 79
- coordination 252, 256–7, 263–5, 266–8
- Corbel, P. 229
- core indicators 443, 450
- core statistical surveys 200
- Corrado, C. 233, 310, 458
- cost–benefit analysis 422, 427
- cost-minimizing behaviour 140
- Council of Canadian Academies (CCA) 455, 457
- Council of the European Union 5, 200
- Council for Science and Technology Policy (CSTP) 200
- Country Profile Module (IUS Dashboard) 293
- country profiles 226, 283, 286, 287, 291
- Cowan, R. 16
- creations 126
- creative accumulation 449
- creative destruction 449, 462
- creative effort 95–6, 100–103
- Crépon, B. 170, 455
- cross-impact analysis 388
- cross-sectional surveys 10, 442
- cross-sectoral comparability 75, 83, 144, 145
- custom scorecards (KAM) 293
- DALYS 423
- data
 - access and use of 292–3
 - see also* metadata; microdata; statistical data
- data analysis 443
- data collection
 - initiatives 241–2
 - linked surveys 249
 - in nanotechnology 369
 - Norwegian surveys 179, 180–81
 - OECD standards 218
 - science, technology and innovation 220
 - United States 341, 342
- data quality 82, 89, 443, 446
- databases 220–21, 444
- Davis, K. 5, 16
- decentralization (organizational) 262, 269, 272
- Decision No. 1608/2003/EC 5
- definitions
 - in CIS questionnaires 78–9
 - of innovation 3, 4–6, 64, 65, 71–2, 89, 415
 - see also Oslo Manual*
- delegates (NESTI) 42
- delegation of responsibility 247–8, 252, 262
- Delphi method 385
- demand, *see* supply and demand
- demand-pull model, of innovation 111
- demand-side approach 304, 327, 335, 336

- demographics 259–60, 306, 328, 404, 454
- Denmark 72, 81, 273, 310, 329, 414, 415
- Department of Commerce (US) 45, 200, 339, 340, 344
- design
in CIS 44
see also survey design
- Deutsche Telekom Stiftung 288
- developing countries, *Oslo Manual* in 51–2
- Developing Science, Technology and Innovation Indicators for the Future 241
- development agenda, innovation and 52
- DG Enterprise 74
- diffusion
of existing indicators 452–3
of innovation 49, 113–14, 119–22, 127–8, 129, 152–3
see also technology diffusion
- dimension-of-merit improvements 113
- direct impact, foresight studies 388
- direct R&D funding 307, 308
- Directorate for Public Governance and Territorial Development 456
- Directorate of Science, Technology and Industry (DSTI) 73, 218, 456
- Directorate-General for Enterprise and Industry 290
- Directorate-General for Policy Planning (Japan) 199, 204
- Directorate-General for Research and Innovation 289
- discount rates, SROI method 427
- disruptive innovation 49
- doing, using and interacting (DUI) model 111
- double counting 153
- drivers of innovation 413
- drivers of research 75
- Duguet, E. 170, 455
- dynamic capabilities 248
- dynamic increasing returns 165
- dynamic random effects probit model 165–6, 167
- dynamics of innovation 157
- Economic Analysis and Statistics (EAS) 218, 222
- economic development 109, 322, 325, 337
- economic growth 12, 51, 322, 331, 351, 420, 461–2
- economic performance 232–5, 253, 273, 302
- economic recession 6, 45, 305–6, 324
- Economic Survey* (OECD) 207
- ecosystem approach 325, 327, 328, 330
- Edquist, C. 294
- educated workforce 236
- education 302, 304, 329
classifications 58–9, 367
discount rates 427
foresight and 399
indicators 423
social value in 432
spending and results 420
user innovation 117
- effective demand/supply, value and 429
- effectiveness indicators 389, 391, 395
- efficiency indicators 389, 391, 395
- electronic questionnaires 180–81, 183–4, 213
- emerging and enabling technologies (EETs) 350–56
3D classification 360–68
developing a monitoring system for 371–6
development of an operational definition for 356–60
recommendations on survey strategies and indicators 368–70
- emerging technologies 349, 351, 360, 365, 399
- employee outcomes, organizational structure/change 248
- employee questionnaire (MEADOW) 262, 266–8
- employee-first approach 257
- employee-level information 249
- employer questionnaire (MEADOW) 263–5, 270, 271–2
- employer–employee surveys (MEADOW) 249, 254–8, 262–73, 409
- employer-first approach 255–6, 257–8
- employer-level information 249

- employment, high-growth firms 454–5
 employment policy 252
 employment relations 253
 employment tenures 253–4
 enabling technologies 352, 359; *see also* emerging and enabling technologies
 end users 50–51
 endogenous growth models 157
 energy-saving technologies, *see* green technology
 enterprise, as a statistical unit 57, 179
 entrepreneurship 122, 304, 321, 430
 entry and exit rates (innovation) 159–61, 164
 EQUAL Programme 422
 errors, reporting innovation 97–103
 Europe 306, 325, 338
Europe 2020 Competitiveness Report 288, 291–2
 Europe, *see* individual countries
 European Commission 5, 44, 48, 58, 62, 74, 75, 135, 208, 282, 289, 290, 424
 European Company Survey (ECS) 256
European Competitiveness Report (ECR) 289, 290–91
 European Economic Area (EEA) 196, 208
 European Foundation for the Improvement of Living and Working Conditions (EFILWC) 256
 European Innovation Monitoring System (EIMS) 74, 75
 European Innovation Scoreboard (EIS) 282, 285
 European Parliament 5, 200
 European Patent Office (EPO) 220, 289
 European Public Sector Innovation Scoreboard 424
 European Statistical Office 41
 European Structure of Earnings Survey (ESES) 256
 European Union 248, 325, 344
 EU-27 60, 185, 284, 286, 289, 292, 293, 415
 European–American Business Council (EABC) 292
 Eurostat 57, 75, 82, 89, 196, 203, 234, 256, 302, 458; *see also Oslo Manual*
 evaluation, foresight studies 389–90, 390–91
 evidence-based methods 385, 400, 457
 evidence-based policy 207, 273, 351
ex ante assessment 389, 391–2
ex post assessment 389, 392, 393
 Executive Opinion Survey 287, 289, 291
 exit and entry rates (innovation) 159–61
 expenditure on innovation 60, 66, 67, 68, 70, 85
 difficulties measuring 240
 international comparability 80–81
 MIP survey 143, 145, 153–4
 Norwegian survey 192–4
 public sector surveys 415–16
 user innovators 116, 117
 expenditure on R&D 10, 116, 224
 Finland 322, 323, 324
 innovation indicators 232, 233, 293, 294
 Norway 185, 186, 192–4
 United States 336, 337, 338, 343, 344
 experimental indicators 223, 306, 312, 315, 316, 426
 expert assessment 392
 experts, role of, NESTI 41–2
 explicit elements, US innovation strategy 335
 exploratory surveys 73, 90
 export-orientation, Finland 321, 322
 external environment, organizational change 251–2
 external R&D 80, 153, 191, 193
 external sources 95, 96, 97, 103
 extramural R&D 230, 232, 237
 failed product innovations 112
 false positives, elimination of 124, 125–6
 false starts, in EETs 352
 Federal Ministry of Education and Research (BMBF) 135, 138
 Federation of Finnish Technology Industries 328

- final report, on changes to CIS
questionnaire 76
- financial intermediation 153, 154, 156, 157
- Finland 72, 126, 273, 303, 307, 310, 313, 320–31
economy 331
EU membership 325
innovation strategy, *see* innovation strategy
innovation system 320, 323, 325, 326, 330
international comparability 90, 320
multi-stakeholder dialogue 330–31
- Finnish Funding Agency for Technology and Innovation (TEKES) 323, 324
- Finnish Innovation Fund – SITRA 323
- Finnish Science and Technology Council 323–4
- firm age, MIP participation 149–50
- firm heterogeneity 165, 166, 167, 168
- firm performance 136, 157, 170, 247, 339
- firm size 58, 90, 100, 102, 116, 119, 150, 186, 302
- firm-level productivity 455
- firm-specific attributes, persistence of innovation 165, 167
- firms
capacity to innovate 247
inclusion in the CIS 74
as user innovators 114–16, 118, 121, 123–5, 129
see also innovative firms; large firms; small firms
- Flex survey 265
- flexibility (organizational) 252, 258
- Flowers, S. 116, 125
- follow-up surveys 63, 64, 89, 92, 123–4, 124–5, 127, 130, 260
- Foray, D. 451
- forecasting models 387, 388
- foresight 381–400
communities of practice 450
impacts 386, 388, 394–6
manifestations 382–3
methodology 384–5
national projects 386–7
priority-setting 388–9
Russian experience 350
STI indicators, *see* STI indicators
time horizons 386, 391–2, 396
- foresight diamond 383, 385, 400
- foresight mapping 400
- Foresight Maturity Model (FMM) 387
- FOS classification 366–7
- framework conditions 45, 304, 314, 462
- framing (Foresight Maturity Model) 387
- France 65, 68–9, 71–2, 82, 256, 310, 369, 423, 424
- Francoz, D. 229
- Frascati Manual* 41, 48, 51, 61, 63, 66, 71, 74, 203, 218–19, 240, 242, 302, 356
- Fraunhofer Institute 65, 67, 71, 288
- free revealing (peer-to-peer) 119–20, 121, 127, 128
- Freeman, C. 205, 235, 302, 353, 444
- Freitas, I.M.B. 259
- frequency analysis, of keywords 388
- frontline delivery institutions 406
- funding, value assessment 430, 431–2
- future prediction 383
- Gaps in Technology* (OECD) 302
- Gault, F. 125, 127, 208, 451
- GBAORD estimates 240
- GDP 6, 46, 159, 184, 185, 222, 223, 308, 310, 324, 328, 336, 425, 453
- Gellman Research Associates 63–4
- gender, user innovation 117
- general statistical surveys 200
- general-interest services 407
- general-purpose technology (GPT) 304, 352–3, 359
- generation phase, of foresight 384
- generic surveys 416
- Georghiou, L. 381, 389
- GERD 233, 453
- Germany 65, 67, 72, 90, 197, 229, 288, 307, 369
impact of PISA on 5–6
innovation panel surveys 135–70
- gijutsu-kakushin* 198, 204

- global challenges, foresight and 398
 Global Competitiveness Index 289, 292
Global Competitiveness Report (GCR) 288, 291, 320
Global Entrepreneurship Monitor (GEM) 122
Global Information Technology Report 320
 Global Innovation Index 286–8, 289, 320
 globalization 196, 232, 303, 327–8, 397, 404
Glossary of Statistics Terms (OECD) 359
 Godin, B. 63, 75
 Goldmann, M. 5
 goods and services 7, 144, 145, 350, 369, 375
 Goto, A. 202
 governance 16, 441–2
 government
 discussion, measurement of innovation 200
 role of 237–8
Government at a Glance (OECD) 409
 Government Innovation Index (Korean) 409, 410
 Government Performance and Results Act (1992) 342
 grand challenges 306, 311, 312, 330
 green innovation 355
 green technology 312, 351, 353, 365
 Griliches, Z.H. 359
 Grim, T. 387
 growth, innovation as investments driving 309–12
 growth-accounting approaches 232, 310, 311, 355, 458
 Grünewald, W. 74
Guide to Measuring the Information Society (OECD) 219, 363
 Gurria, A. 301

 Hagén, H.-O. 262
 Hall, B.H. 455
Handbook on Deriving Capital Measures of Intellectual Property Products (OECD) 232
Handbook on Economic Globalisation Indicators (OECD) 357–8

Handbook for Internationally Comparative Education Statistics (OECD) 219
 Hansen, J.A. 63, 66, 73, 338
 hard data 294
 hard investments 311
 harmonized measurement
 of innovation 196
 science and technology 351
 see also MEADOW
 headline indicators 446, 453–5, 461
 health(care) 304, 329–30, 420, 423, 424, 427, 432
 heartland technologies 353, 360, 362
 heatmap 230–31
 heterogeneity
 public sector organizations 406, 416
 see also firm heterogeneity
 high-growth firms 454–5
 High-Level Panel (EC DG) 453, 454, 455
 high-tech firms 116, 119, 120, 124, 160
 high-tech manufacturing 151, 152, 153, 154, 155, 156–7
 Hill, C.T. 338
 Hippel, E. von 45, 113, 117, 124
 Hollanders, H. 90, 279, 294
 horizontal projects (OECD) 304
 hospital complexes, new 329
 Hulten, C.R. 310
 human resource management (HRM) 253
 human resources 73, 200, 304, 356, 393
 human resources for science and technology (HRST) 219, 227

 Ibero-American Network of Science and Technology Indicators (RICYT) 42, 51
 Iceland 414, 415
 Ifo Innovation Test 135
 IIT Research Institute 63
 impact assessment 422–4
 impact indicators 370, 389, 391
 implementation, of innovation 48–9
 Implementing Regulation (995/2012/EC) 44
 implicit elements, US innovation strategy 334–5

- Improving Measures of Science, Technology and Innovation* 457
- in-house innovation 60, 93, 95–6, 97, 103, 116, 283
- in-house R&D 71, 72, 80, 140, 152, 193, 309
- income surveys 423
- incremental innovation 43, 65, 113, 251, 294, 388
- India 42, 222, 305, 314
- indicators, *see* innovation indicators; STI indicators
- indirect impact, foresight studies 388
- indirect R&D funding 307, 308
- individual heterogeneity, persistence of innovation 165, 166, 167, 168
- individual learning 269, 270, 272
- industrial coverage 58
- industrial R&D surveys 63
- industrialization, Finland 320, 321, 322
- industry
 - classifications 57–8, 361
 - errors in reporting 99, 100, 101
 - innovation entry and exit rates (1993–2010) 160–61
 - questionnaire design 144–5
 - strategy, Finland 321–2
 - structure and international comparability 223–4
 - type, user innovation 116
- industry–science linkages 386, 398–9
- information and communications technology (ICT) 227, 236, 303, 304, 353
- Finland 324, 325, 326, 328
- ICT revolution 349, 362, 363
- increased diffusion and application of 306
- measurement approaches 362–3
- organizational flexibility 252
- sector definition 50
- use survey 265
- Information Technology and Innovation Foundation (ITIF) 292
- Innobarometer Surveys 83, 410–11, 414, 415, 417
- Innovation 25 (Japan) 198
- innovation
 - activities 43–4
 - award programs 409
 - benefit from 111–12
 - changing topography of 314
 - data *see* data
 - definitions 3, 4–6, 64, 65, 71–2, 89, 415
 - see also Oslo Manual*
 - difficulty of subject 7–8
 - drivers 413
 - as investments that drive growth 309–11
 - lack of data on characteristics of 89–90
 - as more than R&D 308–9
 - as multidisciplinary 311–13
 - platforms for 452
 - public support for 240
 - research 75
 - socio-economic environment 305–6
 - understanding of 228–31
 - Japanese 197–8
 - managerial 88–105
 - see also* business sector innovation; process innovation; product innovation; public sector innovation; social innovation; technological innovation; user innovation
- Innovation Efficiency Index 287
- Innovation in Firms* (OECD) 224–5, 309
- innovation indicators
 - communities of practice 442–5
 - concept of the ‘market’ 8
 - defined 6
 - desirable properties 446
 - developing and using 11–12
 - EETs 350, 368–70
 - harmonized measures for
 - organizations and work 247–73
 - impact 16–17
 - as interventions 17–18
 - language and governance 441–2
 - in the longer term 457–61
 - as a means of governance 16
 - MIP survey 150–57
 - policy dialogues 306–16
 - producers of 15
 - public law perspective 5
 - reports 289–92

- rules governing 16
- scoreboards 279, 280–81, 282–9, 294
- selection 294
- in the short term 447–57
- social innovation 420–33
 - developing a family of related methods 428–32
 - goals 421
 - limitations of current 425–8
 - tools and approaches 421–5
- as a technology 15–17
- United States 338–40
 - barriers to 341
 - political and intellectual setting 342–3
 - relationship between public policy 343–4
- TFP database 455users of 15
- Innovation Input Sub-Index 287
- Innovation Measurement and Policies 75
- Innovation Microdata Project 224–5, 231, 309
- Innovation Output Sub-Index 287
- innovation outputs 66, 79–81
- innovation performance
 - desire for data 341
 - foresight and 381, 382, 395
 - see also* innovation scoreboards; international comparability; measurement of innovation
- innovation policy
 - broader view of 303–4
 - globalized economic activity and 196
 - implementation 199–200
 - Japan 198–9, 207
 - United States 333–7, 342
 - ‘whole-of-government’ view 218, 304, 306
 - World Bank guide to 52
 - see also* science, technology and innovation policy
- Innovation Policy Platform (OECD) 226
- innovation sales share 66, 67, 68, 70, 75, 80, 143, 155
- innovation scoreboards 222–4, 239, 279, 280–81, 282–9, 294, 320, 424, 443
- innovation status 91, 372
- MIP, persistence of innovation 158, 161, 163, 164, 165, 166
- Tasmanian Innovation Census 3, 94
- innovation strategy 12–13
 - Finland 320–31
 - healthcare 330
 - history 321–4
 - and national characteristics 320
 - and technology 324–8
 - OECD 303–6
 - international comparability indicators 206–7
 - mainstreaming of innovation policy 316–17
 - new perspective on measuring innovation 221–2
 - role of indicators in framing policy dialogues 306–16
 - United States 333–45
 - implicit and explicit elements 334–5
 - innovation goals 333–4
 - Obama administration 335–7
- innovation surveys 42–3; *see also* Community Innovation Surveys
- innovation systems
 - socioeconomic model 288
 - see also* business innovation systems; national innovation systems
- Innovation Union 240
- Innovation Union Competitiveness Report* 289–90
- Innovation Union Scoreboard (IUS) 60, 282–5, 290, 320, 443
- Innovation Union Scoreboard (IUS) Dashboard 293
- innovation–science link 312
- Innovationsindikator 288–9
- innovative firms
 - defined 49
 - response to MIP 140
 - share of 454
 - targeting young 314–16
- innovative gazelle firms 316
- innovator share
 - MIP survey 151–3
 - Norwegian survey 186, 188
- innovator status, MIP survey 142, 143
- inobeshion* 198
- input indicators 153, 370, 391, 393

- INSEAD 286, 287
 Institut für Wirtschaftsforschung (Ifo) 65, 67; *see also* Ifo Innovation Test
 Institute of Statistics (UNESCO) 51
 institutional learning 456
 intangibles 233–4, 309–10, 311, 416, 458
 intellectual property rights (IPRs) 117–19, 225, 237, 335
 interactive software tools 292–3
 interdisciplinary discussion 382, 386
 interdisciplinary thinking 396
 international classifications 46
 international comparability
 biotechnology 50
 criticism of CIS for lack of 89
 Finland 90, 320
 innovation expenditure question 80
 interpretation and difficulties in 90
 investment in intangibles 310
 J-NIS (2003) 206–7, 210
 MEADOW 247, 256–7
 microdata analysis 443
 R&D surveys 63
 standard-setting 218
 see also innovation scoreboards
 international coordination 417
 International Energy Agency 287
 International Labour Organization (ILO) 59, 286
 International Monetary Fund (IMF) 286, 287
 international organizations (NESTI) 42
 International Patent Classification (IPC) 361
 International Standard Classification of Education (ISCED) 59, 367
 International Standard Classification of Occupations (ISCO) 59, 367
 International Standard Industrial Classification (ISIC) 57, 205, 408
 internet 328
 interpretation 89, 90, 97–103
 intramural R&D 153, 184, 185, 186, 230
 investment, innovation as 309–11
 investment-driven economy, Finland 321
 Israel 236, 313, 369
 Italy 65, 66, 70, 71, 72, 234, 369, 423
 Japan 126, 229, 286, 290, 344, 369, 381
 free revealing 121
 innovation surveys 196–210
 CMU-NISTEP 201–3, 205
 innovation policy and need for 198–9
 J-NIS (2003) 203–6
 impacts of 206–7
 methodology 213–14
 misuse 207
 J-NIS (2009) 206
 J-NIS (2013) 206, 234
 statistical system 199–201, 209
 understanding of innovation 197–8
 innovation system 205, 207, 208
 use of IPRs 117, 118
 job creation 322, 324, 325, 449
 job satisfaction 248, 253
 job stress 248
 Jong, J.P.J. de 119, 122, 126, 127
 Karolinska Solna 329
 Katainen, J. 330
 Keenan, M. 389
 Kelvin, Lord 217
 keyword analysis 354–5, 388
 Kim, H.H. 120, 125
 Kim, J.B. 120, 125
 kind-of-activity units (KAU) 179, 184
 King, A. 311
 King James Bible 441
 Kleinknecht, A. 73
 Kline, S.J. 71
 KNOWINNO-INNOSERV 231
 knowledge
 innovation and type of 112–13
 institutional competence 209
 investment in 310
 operational definition of technologies 357–8
 Oslo Manual 47
 persistence of innovation 165, 166
 protection of 117–19
 user innovation 113
 knowledge absorption 382
 knowledge accumulation 165, 247

- Knowledge Assessment Methodology (KAM) 293
 knowledge base (organizational) 262, 272
 knowledge creation 209, 382, 420
 knowledge development 269–72
 knowledge economy 448
 Knowledge Economy Index (KEI) 293
 knowledge flows 202, 236, 237, 370, 448, 451–2, 456
 Knowledge Index (KI) 293
 knowledge intensity 47
 knowledge interactions, capturing 235–7
 knowledge management 17, 47–8, 49, 81, 226, 252, 451
 Knowledge Networks and Markets (KNM) 452
 knowledge production 111, 235, 352
 knowledge spillovers 119, 202
 knowledge transfer 17, 46, 321, 459
 knowledge-based assets 234, 310
 knowledge-based capital (KBC) 233–4, 458
 knowledge-based theories 248
 knowledge-intensive activities 234, 454
 knowledge-intensive business sector (KIBS) 99, 100, 101, 104
 knowledge-intensive services 152, 153, 154, 155, 156
 Korean Government Innovation Index (GII) 409, 410
 Kraemer-Mbula, E. 52

 Labour Force Survey 368
 labour productivity 137, 310, 311, 454
 lagging indicators 392, 393
 Lam, A. 451
 language 6–7, 43, 47, 48, 196, 197–8, 358, 441
 Lanoy, N. de 79
 large firms 57, 90, 110, 119, 137, 161, 207, 445, 449–50
 large-scale surveys 63, 135, 417, 424
 Latin America 42, 51, 306
 leadership (Foresight Maturity Model) 387
 leading indicators 391–2, 393
 learning 47
 learning culture 269
 learning indicators 392, 393
Learning Organisations Matter 269
 learning organizations 262, 269, 272
 learning-by-doing 165
 learning-to-learn 165
 Lempert, R.J. 383
 Levin, R.C. 201
 life satisfaction surveys 423
 linear model, of innovation 111
 linkages 237, 309, 312, 313, 386, 398–9, 451
 linked surveys 248–50, 254–8, 265
 local government, agencies/administrations 406
 local kind-of-activity units (LKAU) 179, 184
 ‘lock-in’, due to codification 16
 longitudinal surveys 10, 258–61
 Lopes, A. 125
 low-tech manufacturing 151, 152, 153, 154, 155, 156, 157
 Lundvall, B.-Å. 52, 448

 macro-economic framework (neoclassical) 233
 ‘made available to potential users’ 456
 mail surveys 140–42
Main Science and Technology Indicators (MSTI) 221
 Mairesse, J. 170, 443, 455
 major product innovation 43
 management practices 254, 259
 managerial abilities, persistence of innovation 165
 managerial understanding, of innovation 88–105
 mandatory surveys 181, 189, 190, 191, 193, 200–201, 415
 Mannheim Enterprise Panel (MEP) 137
 Mannheim Innovation Panel (MIP) 135–6
 innovation indicators 150–57
 non-responding firms 138, 140, 141, 148, 151
 panel mortality 137, 146, 148, 149
 panel participation 146–50
 persistence of innovation 157–68
 questionnaire 143–6
 reliance of ECR on 290

- responding firms 137, 138, 140, 141, 148, 149, 151, 169, 177
- response rates 138–43, 148, 150, 176
- sample 136–43, 147, 150
- sector coverage (1993–2012) 174
- sector distribution (1993–2011) 175
- Mansfield, E. 357
- manufacturing
 - errors in reporting 100, 101
 - innovation, United States 339
 - MIP
 - cost reduction due to innovation 156–7
 - expenditure on innovation 153, 154
 - innovator share 151, 152, 153
 - market novelties 156
 - persistence of innovation 158, 159, 160, 162, 163, 164, 166, 167, 168
 - sales share 155
 - Norwegian survey
 - innovation share (1992–2010) 188
 - R&D expenditure 185
 - technology, Canada 450
- Marburger, J. 303, 399, 444, 453, 460
- market 8, 43
- market failure(s) 233, 307
- market potential 387
- marketing innovation; *see*
 - organizational and marketing innovation
- Martin, B. 382
- Marx, K. 428–9
- MEADOW 247–73
 - consortium and external contributors 276–8
 - linked employer–employee surveys 254–8
 - longitudinal aspect 258–61
 - organizational measurement framework 250–54
 - questionnaire 261–2, 263–5, 266–8, 270, 271–2
 - research and policy relevance 247–50
 - Swedish employer survey 262–73
- measurement of innovation 3
 - approaches to 9–11
 - CIS
 - (1950s to 1993) 62–72
 - Germany 135–70
 - Japan 196–210
 - Norway 178–95
 - concept of the ‘market’ 8
 - defined 6
 - definition of innovation 4
 - harmonized 196
 - see also* MEADOW
 - importance 217
 - OECD agenda 227–40
 - in public sector, *see* public sector innovation
 - rules 9, 16
 - in services 46
 - user innovation 122–8
- Measuring Innovation: A New Perspective* (OECD) 221–2, 227–8, 239, 306, 307, 313, 314, 315
- Measuring Productivity* (OECD) 359
- MEPIN study 410, 411, 412, 414, 415, 416, 424
- metadata 234
- methodology
 - foresight 384–5
 - see also* survey methodologies
- micro-based measures 234
- microdata 12
- microdata analysis 230–31, 443
- microdata files 306
- microdata lab 242
- Microeconomic Data – Country Fiche 290
- microelectronic technologies 351, 362
- Ministerial Meetings on Science 301, 302
- Ministry of Education, Culture, Sports, Science and Technology (MEXT) 199–200, 202
- Ministry of Employment and Economy (Finland) 327
- Ministry of Internal Affairs and Communications (MIC) 199
- Mintzberg, H. 262
- MIT 68, 71
- modelling
 - foresight and 399
 - future prediction 383
- modernization 254
- modifications 126; *see also* technology modification

- Mohnen, P. 443
 monetary value, outcomes of
 innovation 433, 434
 Mozambique 123, 125
 multi-factor productivity (MFP)
 growth 455
 multi-stakeholder dialogue, Finland
 330–31
 multidisciplinary, innovation as
 311–13
 multidisciplinary research 398–9
 Murray, B. 64, 71
 mutual adjustment 253, 262
 Myers and Marquis 63
- Nagaoka, S. 445
 Nagata, A. 202
 nanobiotechnology 374
 nanoelectronics 373
 nanomaterials 373
 nanomedicine 374
 nanophotonics 374
 nanotechnology 50, 236, 304, 349, 350,
 351, 353, 361, 369, 371–6
 Nas, S.O. 83
 National Academies Panel (US) 241,
 316, 457
 national accountants 233
 National Audit Office 410
 National Center for Science and
 Engineering Statistics (NCSES)
 229, 338, 340, 344, 457
 National Classification of Products
 (NCP) 376
 National Industrial Strategy White
 Paper (Finland) 325
 national innovation systems
 Finland 320, 323, 325, 326, 330
 foresight studies 382, 396
 innovation policy 196
 Japanese 205, 207, 208
 terminology 235
 National Institute of Science and
 Technology Policy (NISTEP)
 199, 201, 203, 204, 206, 208,
 229
 National Institute of Statistics (Istat)
 66, 70
 National Research Council (US) 200,
 316, 338
- National Science Foundation (NSF)
 10, 63, 75, 90, 316, 338, 339, 340,
 341, 460–61
 national statistical offices (NSOs) 76,
 80, 89, 91, 197; *see also* individual
 offices
 NBIC technologies, *see* biotechnology;
 information and communications
 technology; nanotechnology
 neoclassical economics 233, 429
 Nesta Public Sector Innovation Index
 409, 410, 411, 414, 415, 416
 Netherlands 65, 69, 71, 72, 118, 121,
 122, 126
 network capital 49
 New innovation indicators: conceptual
 basis and practical problems 72–3
 New Partnership for Africa's
 Development (NEPAD) 42, 51
 new public management 254
 New Sources of Growth: Intangible
 Assets (OECD) 458
 'new to Canada' 64, 71
 'new to the enterprise' 79
 'new to the firm' 44, 49, 50, 60, 65, 71,
 72, 80, 90, 104, 339, 340, 450
 'new to market' 44, 49, 60, 65, 83, 144,
 156, 225, 309, 433
 'new to the world' 44, 49, 65, 74, 207,
 340
 new venture creation 119, 122, 128
 NGOs 420, 422, 425, 426, 429, 432
 Nokia 323, 326
 Nomenclature of Territorial Units for
 Statistics (NUTS) 59
 non-EU countries 5
 non-innovators 94, 95–6, 103, 162, 163,
 164, 166
 non-IT using products 363
 non-market services 407
 non-R&D innovation 62, 73, 74, 153
 non-R&D performers 66, 83, 96–7,
 310, 448–50
 non-response analysis, J-NIS 2003
 survey 205–6
 non-response surveys (MIP) 140, 142
 non-technological innovation 46, 48,
 76, 81, 303
 innovation surveys 66, 67, 70, 205
 Nordhaus, W. 420

- Nordic countries 65; *see also* Denmark; Finland; Norway; Sweden
- Nordic Fund for Industrial Development 42, 461
- Nordic Innovation Indicators Group 72, 73
- North American Industry Classification System (NAICS) 57, 58, 360–61
- Norway 72, 273, 414
- Norwegian innovation surveys 178–95
- combined surveys
 - benefits 182–3
 - effect on innovation rates 187–91
 - effect on number of R&D performers 191–2
 - effect on R&D and innovation expenditure 192–4
 - method of integration 183–4
 - methodology 187
 - potential effects 187
 - questionnaire 187
 - data capture and treatment 180–81
 - estimating national totals 181–2
 - frequency 182
 - population and sampling 179–80
 - statistical unit 179
- Norwegian Statistical Office 85
- novelty 44, 49, 66, 67, 68–9, 70, 74, 89, 156, 164
- Obama administration 335–7, 453
- object-based innovation surveys 63–4, 88, 408
- observation period (CIS) 84
- Observatory of Public Sector Innovation 456
- observed firm heterogeneity 165
- observers (NESTI) 42
- occupational classification 58–9, 367
- OECD 63, 203, 289, 292
- as clearing house for information exchange 224
 - collaboration with SCImago research group 446
 - as a consensus organization 42
 - development of innovation statistics 208
 - Innovation Strategy, *see* innovation strategy
 - main goal for innovation surveys 75
 - measurement agenda 227–40
 - measuring STI at 301–3
 - mission 217
 - production and use of STI indicators 218–26
 - testing of firm managers
 - understanding of innovation 90
 - see also Oslo Manual; Working Party of National Experts on Science and Technology Indicators*
- Office of National Statistics (UK) 82
- official statistical surveys, Japan 199, 200, 203–6
- old indicators 444
- one-page module, CIS questions 77, 83
- one-year transition probabilities, persistence of innovation 157–8, 161
- Oner, A. 390
- open innovation 117, 237, 303, 306, 313, 398
- open method of coordination 248
- open-ended survey questions 90–91, 104–5, 229
- opinion surveys 292, 294
- organizational change
 - harmonized surveys 248
- MEADOW
 - general survey framework 254–61
 - guidelines 248
 - measurement framework 250–54
 - questionnaire 261–2, 263–5, 266–8
 - research and policy relevance 247–8
 - Swedish employer survey 262–73
- organizational design 252–3, 261–2
- organizational learning 448
- organizational and marketing
 - innovation 66, 145, 412
- CIS surveys 76, 78, 81, 83
- Japanese 205
- microdata analysis 230, 231
- need for work on 447–8
- Norwegian 190
- Tasmanian Innovation Census 94
 - errors in reporting 98, 101, 102
 - understanding of 104
- organizational routines 451

- organizational structure 81, 269
 - employee outcomes 248
 - employer-level questions 263–5
 - harmonized surveys 248
 - work organization and 252–3
- Oslo Manual* 4–5, 88, 356
 - ambiguity in 71
 - Annex 2 81
 - Annex A 51
 - classification 58
 - on combined surveys 11
 - countries using 41
 - definitions of innovation 3, 4, 12, 42–51, 74, 89, 90, 104, 356–7
 - diffusion of user innovation 128
 - first edition 43–4
 - language and grammar 6–7, 43, 47, 48
 - review 229
 - revision 42–3, 207, 227, 302, 303, 304, 458, 459, 461
 - role of experts 41–2
 - rules 4, 5, 8, 9, 16, 41
 - second edition 45–8
 - statistical unit recommendation 57
 - study of linkages 237
 - third edition 48–9, 52
 - using in developing countries 51–2
- Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data* 48
- output indicators 72, 73, 75, 84
 - emerging and enabling technologies 370
 - foresight evaluation 389, 393
 - innovation scoreboards 294–5
 - Mannheim Innovation panel 143–4, 153–4, 163–4
 - public sector surveys 416–17
- Overview Module (IUS Dashboard) 293
- panel surveys 10, 135–70, 259–61, 442
- Paperwork Reduction Act (1980) 341
- patent analysis 355, 384, 385
- patent classification 361
- patent databases 221
- patent indicators 223, 227, 388, 445–6
- patent statistics 82, 218, 219–20, 236, 282
- Patent Statistics Manual* (OECD) 221, 357
- patenting 315, 344, 454
- peer adoption 120
- peer learning 42, 43
- peer review 42, 446
- peer-to-peer diffusion 119–20, 121, 127, 128
- Perez, C. 353
- performance data, US desire for 342
- permanent innovation 157
- persistence of innovation 157–68
- Peters, B. 165, 166, 170
- philanthropists 421
- Piganiol, P. 301
- pilot surveys 65, 75, 81, 126, 234, 417
- pilot testing 82
- planned innovation 144
- planning (Foresight Maturity Model) 387
- platforms for innovation 452
- policy analysts 42, 62, 76, 82, 203, 442, 444
- policy community 444–5
- policy dialogues, role of innovation indicators 306–16
- policy indicators 60, 74, 226
- policy intervention, indicators as a 17–18
- policy issues 460, 461
- policy mix indicators 222
- policy needs 43
- policy publications 225–6
- policy-driven innovation 238
- policy-making
 - European Union 248
 - foresight, STI indicators and 400
 - institutions 406
 - Japanese surveys 198–9, 207
 - linked surveys 249
 - United States 342
- political drivers 413
- Political Stability and Absence of Violence/Terrorism Index 287
- Pollard, M. 82
- Popper, R. 383
- Porter Hypothesis 340
- positioning indicators 222, 306
- pre-foresight phase 384

- primary sampling unit (PSU) 249, 255–7
- priority setting 388–9
- private sector innovation, *see* business sector innovation
- problem-oriented technologies 353
- process indicators 370, 390, 393–4
- process innovation 46, 73, 74, 76, 94, 357
 - BRDIS survey 339
 - definitions 43, 71, 412
 - errors in reporting 98, 100, 101, 102, 103, 104
 - MIP survey 140, 142–3, 144, 145, 153, 156–7
 - new to market 83
 - Norway 190
 - output indicators 84
 - percentage of firms reporting 85
 - third party involvement 237
 - user firm innovation overlap 116
- process innovators 152, 163, 164, 185, 191, 450
- producer adoption 119, 120, 128
- producer and analytical communities 442–4
- producer innovation 109, 110–14, 130
- producer innovators 111, 117
- producer perspective, technology use surveys 45, 47
- product innovation 46, 73, 74, 76, 357
 - BRDIS survey 339
 - definitions 43, 45, 71, 72, 128, 412
 - errors in reporting 98, 100, 101, 102, 103
 - failed 112
 - microdata analysis 230
 - MIP survey 140, 142–3, 143–4, 145, 152, 155–6
 - Norway 190
 - object-based surveys 65
 - output indicators 84, 154–5
 - percentage of firms reporting 85
 - third party involvement 237
 - understanding of 104
 - ‘world-first’ 83
- product innovators 84, 98–9, 152, 163–4, 185, 191, 309
- product quality 252
- productivity 225, 253, 305
 - growth 455
 - public sector 420
 - scientific 354, 367, 446
 - see also* labour productivity; total factor productivity
- productivity perspective 47–8
- Programme for International Student Assessment (PISA) 5–6
- propensity to innovate 16, 45, 161, 442–3, 445, 453
- Proposed Guidelines for Collecting and Interpreting Technological Innovation Data* 48, 73
- proxy indicators 445
- public law perspective 5
- public policy (US) 337, 343–4
- public procurement
 - as a promoter of private sector innovation 456–7
 - survey approaches 414
- public sector
 - defined 407
 - organizations 254, 403, 405–6, 413, 415, 416
 - productivity 420
 - reform 254
 - value assessment 422–3
- public sector innovation
 - exploratory surveys 73, 90
 - measuring 3, 403–17, 456
 - approaches to 408–9
 - conceptual background 405–6
 - early and recent studies 409–14
 - future work 417
 - importance of gaining experience in 456
 - key issues 415–17
 - OECD agenda 238
 - reasons for 403–4
 - standards and guidelines 456
 - statistical issues 406–8
 - tools 424
 - subsidies 165
- public services 403, 405, 406, 407, 420
- publication indicators 445–6
- publication statistics 282
- publications, on indicators 221, 224–6
- PUBLIN project 404

- QALYS 423, 430
 qualitative research 229, 404
 quality assurance 443, 445, 446
 quality circles 252, 259
 quality indicators 223, 395
 quality reviews 234
 quality of working life 248
 quantitative analysis 218, 385
 quantitative methods, building STI indicators 388
 questionnaires
 CIS
 changes/alterations 62, 75–81
 differences and lack of international comparability 89
 flexibility 83
 Germany 65, 143–6
 Japan 202, 204–5
 Norway 183–4, 187
 definitions of innovation 47
 ethical use 17–18
 MEADOW 250, 259, 261–2, 263–5, 266–8, 270, 271–2
 Tasmanian Innovation Census 107–8
 use of knowledge management practices 47–8
 questions
 cognitive testing 89
 open-ended 90–91, 104–5, 229
 respondent understanding of 9
 subject-based surveys 65–6, 67–70, 71

 radical innovations 110, 294, 356, 388
 random sample/sampling 136–7, 140, 180, 184, 213, 256, 257
 randomized controlled trials 426
 rational reasoning 285, 292
 Raymond, W. 165
 Reagan, R. 341
 recall error 259
 recruitment phase, of foresight 384
 refreshment strategy 260
 regional government, agencies/administrations 406
 regulation
 of indicators 16
 on innovation 340
 see also framework conditions
 Regulation (1450/2004/EC) 5, 48, 62
 reliability
 data/statistics 82, 89, 294
 innovation indicators 150–51
 renewal phase, of foresight 384
 rescaling 285
 research, drivers of 75
 research agendas 386, 389
 research community, access to data 242
 research and development (R&D) 61, 302
 as an asset-creating activity 232
 capitalization 233
 development of standard definitions 63
 Finland 320, 322, 323, 325, 330
 foresight 397, 399
 funding 307–8
 grants 240
 indicators 233
 innovation as more than 308–9
 innovation as supplementary to 71, 74
 intensity 96, 97, 103, 190, 222, 223, 224, 233, 358
 investment 322, 326, 338, 339, 343
 limitations as a measure of innovation 63
 Norway 184–6
 performance 10, 302, 355, 449
 performers 71, 72, 191–2, 234, 449
 policies 304
 as a proxy for innovation 445
 public support for 239
 relationship between innovation and 73–4
 resolving CIS bias towards 79
 statistics database 220
 surveys 62–3, 64–5, 66, 100, 282, 302
 see also combined R&D
 innovation surveys
 tax incentives 16–17, 226, 232, 239–40, 308
 United States 335
 see also expenditure on R&D;
 external R&D; extramural R&D; GERD; internal R&D;
 intramural R&D

- research fields, classification 361
 researcher databases 444
 resource orientation, evaluation studies 392–4
 response rates
 CIS
 differences in 75
 expenditure question 80
 Germany 138–43, 148, 150, 175
 Japan 207
 Norway 181
 Sweden 265–9
 Tasmanian Innovation Census 92
 retrospective questions 258–9, 260
 revealed preference 422, 427
 revised national strategy (US, 2011) 336–7
 revolutionary technologies 353
 Riggs, W. 113
 risk attitudes, persistence of innovation 165
 Roadmap 228
 roadmapping 385
 Robinson, J.A. 461
 Rosenberg, N. 71
 roundtables 306–7, 312
 routine innovation 65
 rules 4, 5, 8, 9, 16, 41
 Russia 42, 222, 286, 305, 314, 350, 369, 371–6

 Salamon, L. 425
 sample/sampling 9–10
 linked employer–employee surveys 255–8
 MIP survey 136–43, 147, 150
 Norwegian surveys 179–80
 public sector surveys 407
 Saritas, O. 390
 Saunders, D. 10
 scaling, Norwegian surveys 181
 scanning (Foresight Maturity Model) 387
 Scatter Plots Module (IUS Dashboard) 293
 Schaan, S. 49, 50, 120, 123
 Scholz, L. 65, 73
 Schumpeter, J. 66, 109, 110, 198, 449
 Science Council of Canada 64
Science and Engineering Indicators 340

Science, Growth and Society: A New Perspective 302
Science and the Policy of Governments 301
 Science Policy Research Unit (SPRU) 64
 Science Resources Studies (SRS) 338
 ‘science of science and innovation policy’ (SciSIP) 303, 453, 460
 Science and Technology Agency (STA) 202
 Science and Technology Basic Plans (STBP) 198–9, 200, 204
 science, technology, engineering and mathematics (STEM) 304, 316
Science, Technology and Industry Outlook (OECD) 225–6, 285, 286
Science, Technology and Industry Scoreboard (OECD) 222–4, 239, 285, 286, 320, 443
 science, technology and innovation
 data collection 220
 databases 220–21
 development of approaches to describe 356–60
 Finnish approach 322
 harmonized measurement 351
 measuring 301–3
 science, technology and innovation policy
 economic and social impacts 239–40
 evidence-based 351
 foresight 381, 399
 frameworks 355
 mainstreaming of 316–17
 need for pedagogical device 303
 shift to systemic view 302
 Science and Technology Statistical Compendium 2004 (OECD) 221
 scientific collaboration 314
 scientific knowledge 355, 369
 scientific productivity 354, 367, 446
 SCImago research group 446
 scoping interviews 229–30
 secondary data 220
 secondary use, statistical data 200–201
 sector-specific surveys 409, 416
 sectoral policy 316
 self-reported innovators 90, 92, 93, 94, 96, 103

- Senate Finance Committee (US) 308
 sensitivity analysis 281, 285, 288
 service sector, Norwegian survey,
 R&D expenditure 185
 service sector innovation 45–8, 73, 247
 MIP
 cost reduction 157
 expenditure on innovation 153–4
 innovator share 151, 152
 market novelties 156
 persistence of innovation 158,
 159–60, 162, 163, 164, 166,
 167, 168
 sales share 155
 survey design 144–5
 Norway (1997–2010) 188
 questions/questionnaires 78, 83, 145
 R&D 309
 Tasmanian Innovation Census 94
 errors in reporting 99, 100, 101
 see also public sector innovation
 Shah, S. 122
 Sichel, D.E. 310
 Sirilli, G. 73
 size classification 58
 Skejby Sygehus 329
 small firms 119, 151, 161
 small and medium-sized enterprises
 (SME) 60, 120, 124, 207, 282, 315,
 323, 445, 449
 Smith, K. 65, 73, 74
 Smits, R.E. 12
 social accounting matrices (SAMs) 367
 social climate bias 255
 social economy 425
 social impact assessment methods 422
 social innovation 459–60
 indicators, *see* innovation indicators
 theoretical underdevelopment 425–6
 social investment 425
 social outcomes, impact assessment
 423–4
 social relationships, technology and
 359
 social return on investment (SROI)
 method 422, 427
 social value assessments 427, 428–32
 socio-economic objectives (SEO)
 classification 366, 367
 socio-economic performance 253
 socioeconomic development, STI
 policy and 381
 socioeconomic environment, changes
 in 305–6
 socioeconomic model, Systems of
 Innovation 288
 Soete, L. 444, 449
 soft investments 311
 solution information 113
 Sonntag, V. 116
 Sony 111–12
 source(s) of innovation 66, 73, 144, 233
 ‘Sources and Methods’ metadata tool
 220
 sources of persistence 166, 167
 South Africa 42, 91, 222, 314
 South Korea 115, 118, 119, 120, 121,
 123, 125, 196, 197, 290
 spillovers 113, 119, 202, 233, 307
 stakeholders, in foresight 386
 stand-alone innovation surveys 234
 Standard Industrial Classification of
 Japan (SICJ) 205
 Standard International Trade
 Classification (UN) 358
 standardized definitions, of EETs 352
 standards and guidelines (OECD)
 218–20
 state dependence, persistence of
 innovation 165, 166, 168
 stated preference methods 422, 427
*The State of Science and Technology in
 Canada* 457
 statistic(s) 6
 Statistical Classification of Economic
 Activities in the European
 Community (NACE) 57, 153, 255,
 360, 408
 statistical data 5, 6, 10, 200–201, 294,
 342
 statistical indicator 6
 statistical systems 199–201, 209, 349,
 371–2
 statistical units 57, 179, 184, 407, 416
 Statistics Act (Japan) 199, 201
 Statistics Canada 17, 50, 57, 64, 75, 91,
 123, 409, 446
 Statistics Commission (Japan) 199, 200
 Statistics Finland 328
 Statistics Norway 179, 182, 189

- Statistics Sweden 250, 262
 Statlinks 223
 Stead, H. 64, 65
 STI indicators 217
 and foresight
 contribution of 397–9
 integration 399–400
 interrelations 381–2
 monitoring of 387–96
 use in process of 384–7
 production and use at OECD
 218–26
 relevance of economic insight 444
 standards and guidelines 218–20
 see also Working Party of National
 Experts on Science and
 Technology Indicators (NESTI)
 sticky information 112, 113
 stimulus packages 305, 336
 structural learning 269, 271–2
 subject-based innovation surveys
 64–72, 73, 88, 238, 408; *see also*
 Community Innovation Surveys;
 Tasmanian Innovation Census
 subsidy-based support 240
 successful innovation 155–7, 165, 294
 supply and demand, social value and
 429–30
 supply-side approach 304, 321–2, 335,
 336
 survey design 6, 9, 60, 89, 104, 130,
 144, 234
 Survey of Electronic Commerce and
 Technology (2000) 410
 Survey of Innovation and Business
 Strategy (SIBS) 50
 survey methodologies
 best practice in 89
 CIS
 criticisms 89
 differences and lack of
 international comparability
 89
 Japan 202, 205, 210–14
 Norway 179–82, 187
 public sector innovation 406–8, 416
 qualitative 229
 Tasmanian Innovation Census 92–4
 survival rates, persistence of
 innovation 161–3

 Sweden 72, 307, 310, 313, 329, 330,
 369, 414, 415
 Swedish employer survey 262–73
 System of National Accounts (SNA) 7,
 56, 232, 233, 311, 458
 systems/systemic approach 46, 47, 49,
 302, 327

 tabulations 444
 tacit knowledge 370, 384, 397, 452
 target population
 Japanese surveys 213
 Norwegian surveys 179–80
 public sector surveys 407, 414, 416
 Task Force (CIS) 76, 83, 84, 90
 Tasmanian Innovation Census
 conclusions 103–5
 methodology 92–4
 questionnaire 107–8
 results 94–101
 technical capability 116
 technical knowledge 357, 366
 Technik 359
 technological attractiveness 388
 technological innovation 43, 46
 technological product and process
 (TPP) 46–7
 Technological Revolution 358
 technological uncertainty 74, 387,
 388
 technology(ies)
 Finland
 and innovation 324–8
 national policy 322–4
 innovation indicators as a 15–16
 opportunity and persistence of
 innovation 165
 see also emerging and enabling
 technologies; information and
 communication technologies;
 science and technology
 technology adoption 45, 49, 50, 116,
 225, 450
 technology balance of payments
 218–19, 357
 Technology Balance of Payments
 Manual (OECD) 357, 358
 technology development 116, 123, 357,
 450
 technology diffusion 47, 71, 321, 359

- Technology Economy Programme (TEP) 73, 302, 303
- technology emergence 354, 367
- technology modification 45, 49, 50, 116, 123, 450
- technology modifiers 225, 451
- technology production 71
- technology transfer 235–6, 321
- technology use surveys 45, 47, 50; *see also* use and planned use of technologies
- telephone surveys 64, 92, 124, 125, 130, 140, 417
- three-dimensional classification 366, 367, 372
- three-year transition probabilities, persistence of innovation 163–4
- time horizons 386, 391–2, 396
- time scale 8
- time-series 136, 169, 187, 188, 383, 398
- tinkering 127
- topic statements, foresight exercises 390
- total factor productivity (TFP) 340, 455
- total quality management (TQM) 252
- toxic financial products 45
- transformation pressures, in public sector 254
- transnational networks 236
- transparency 254, 336, 342, 398, 404
- trend exploration 385, 392
- triadic patent 344
- triple helix 398
- trust 404
- Uhrbach, M. 49, 50, 120, 123
- UN City Group 46, 57
- UNESCO 42, 51, 59, 287, 292
- United Kingdom 62, 63, 75, 118, 119, 121, 125, 126, 234, 313, 356, 410, 414, 424, 432
- United Nations 57, 289
- United States 62, 65, 68, 72, 126, 228, 229, 286, 290, 292, 306, 310, 356, 369, 409, 425
- concept of technology 359
- economic development 337
- industry classification 57, 58
- innovation
- BRDIS 10, 338–9, 340, 341, 343, 457
 - diffusion 121, 122
 - first statistics 6
 - see also* innovation indicators; innovation strategy
 - public policy 337
 - stimulus package 305, 336
 - use of IPRs 117, 118
- unobserved firm heterogeneity 165, 166, 168
- UNU-MERIT 81, 82, 91, 288
- use and planned use of business practices 17, 451
- use and planned use of technologies 47, 49, 50, 356, 450–51
- use-context information 113
- user innovation 45, 109–30, 450
- compared with producer innovation 110–14
 - diffusion 49, 113–14, 119–22, 127–8, 129
 - empirical scope 114–22
 - frequency 115, 116, 117
 - in innovation surveys 50–51
 - measurement 122–8
 - openness 117–19
- user innovators, *see* consumers; firms
- user modification 45, 47
- user-centered innovation 109, 110
- user-driven innovation 51, 127
- user-need information 113
- value for money assessment 422–3
- ‘value-added’ measures 423
- values, public division over 427
- Verspagen, B. 23
- ‘vignette’ technique 229
- visioning, Foresight Maturity Model 387
- voluntary surveys, Japan 201
- Voorburg Group 46
- Wamae, W. 52
- web survey tools 126
- Web and Videotex competition 352
- Weissenberger-Eible, M. 279

- 'who developed' innovation 64, 69, 71, 72, 76, 79, 81, 83
- whole-of-government perspective 218, 304, 306
- Wiesbaden Group on Business Registers 57
- Williams, B.R. 63
- willingness to pay, social value as 429
- Wooldridge, J.M. 166
- work organization
 - employee-level questions 266–8
 - organizational structure and 252–3
 - successful 247–8
- Working Party on Indicators for the Information Society (WPIIS) 50, 451
- Working Party of Industry Analysis 223
- Working Party of National Experts on Science and Technology Indicators (NESTI) 4–5, 16, 41–2, 50, 73, 205, 229, 234, 441–2, 451
- workplace employment relations survey (WERS) 259
- World Bank 52, 286, 287, 289, 292, 293
- World Economic Forum 287, 289, 291
- World Intellectual Property Organization 287
- 'world-first' 83, 84
- Worldwide Patent Statistics Database (PATSTAT) 220
- Yale Survey 201–2
- Young, A. 302
- Young Foundation 423, 460
- Zabala, J.M. 294
- Zita, J. 125