

Index

- Abou Zeid, Perihan, 410
- Abrahams, Lucienne, 407, 408, 409
- Abundance model in open access, 146–147, 183
- Access, 61–64, 143–152
- abundance in, 146–147, 183
 - in access to knowledge movement, 29t, 34–35, 36, 44–45nn11–12
 - affective economy in, 148
 - barriers to, 5, 8, 62, 434
 - bureaucracy in, 148–149
 - costs in, 5, 35, 41, 62, 63
 - in crowdsourcing, 384–385
 - to data, open, 66, 67, 251, 253, 255, 283, 433
 - and definition of openness, 24, 53, 62, 184, 185, 211n1
 - diversity of, 434–435
 - ecologies of, 143–152
 - to educational resources and practices, 63–65, 143–152, 317, 322, 323, 326–336, 347–348, 432
 - enclosure movement affecting, 12, 13, 35, 36, 150
 - gender issues in, 5, 8, 89, 92–93
 - government role in, 440
 - and inclusion, 322, 323, 326–336, 347–348, 386, 432
 - inequality in, 7–8, 9, 14, 146–147
 - to information, open, 120, 433
 - to information and communication technologies. *See* ICT access
 - to intellectual property. *See* Intellectual property
 - to knowledge commons, 36
 - legal issues in, 63, 147–151
 - nondiscrimination in, 39, 41, 184–185, 190, 193, 211n2
 - and participation, 9, 41, 92, 95–97, 434–435
 - piracy cultures in, 147–148, 153n3
 - quiet encroachment in, 148
 - scarcity model of, 146
 - to scholarly publishing, 9–10, 12, 63, 68, 143, 144, 147, 411
 - to science, 68–72, 143
 - socioeconomic status affecting, 326–329. *See also* Socioeconomic status
 - threats to, 12, 13, 35, 150
- Access to knowledge (A2K) movement, 29t, 34–35, 36, 44–45nn11–12
- Accountability in open data, 6, 8, 444
- exclusion from, 89, 284
 - Moss Committee on, 44n6
 - in open distribution, 38
 - in open government, 5, 8, 29–30, 44n6, 157, 164, 253, 254
 - in open health data, 164, 279, 293, 297, 304–305
- Action arenas, 297
- in open health data, 297, 300–301, 303–304, 306–307
- Action orientation of open development, 28, 432

- Adaptation phase in open education, 319, 320f, 321
- Adewopo, Adebambo, 409
- Advertising revenue, 439
- Affective economy, 148
- Afghanistan, open education in, 3, 107, 163, 318, 328
 - availability of appropriate materials for, 334
 - awareness of, 335
 - collaboration in, 342
 - gender issues in, 436
 - infrastructure in, 332
 - language used in, 348, 437
 - local initiatives in, 442
 - pedagogical practices affecting, 341
- Africa. *See also specific countries.*
 - commons-based approach to telecommunications in, 207
 - cost of Internet access in, 208
 - as emerging, 412
 - forces driving change in, 413–416
 - geography of information in, 123, 127, 129, 130, 132, 136, 436
 - GitHub users in, 127, 436
 - high-tech hubs model in. *See* High-tech hubs model in Africa
 - Indigenous entrepreneurship model in. *See* Indigenous entrepreneurship model in Africa
 - informal economy in, 73, 409, 440
 - informal innovation model in. *See* Informal innovation model in Africa
 - intellectual property in, 403–424
 - knowledge governance models for multiple futures of, 412–423
 - mandatory open access telecommunications in, 192–193, 196
 - mobile technology in, 209
 - Open African Innovation Research (Open AIR), 71, 403–425
 - open data projects in, 259t, 260t, 262t
 - open education in, 318, 334, 340
 - open innovation in, 403–425
 - open science in, 71
 - OpenStreetMap content on, 132
 - Ubuntu concept in, 360
 - voluntary open access networks in, 197–198, 206
 - Wi-Fi in, free public, 208
 - Wikipedia contributors from, 129, 130, 131f, 436
 - zero-rating in, 209
- African Minds, 259t
- African Network of Centre for Investigative Reporting, 259t
- After Access: Inclusion, Development, and a More Mobile Internet* (Donner), 389
- After Access Survey, 220, 226, 230
 - on access devices, 230t, 231t, 232t
 - on access locations, 227t, 228t, 229t, 234f
 - on probability of digital tasks, 237t–238t
- Age
 - of crowdsourcing participants, 385
 - and devices used for Internet access, 229, 230, 231t, 232t
 - and location of Internet access, 226, 227, 228t, 229t
 - and participation, 432
 - and uses of Internet access, 237t, 239, 240
- Agency, 177, 432, 433
 - in access and participation, 255, 436, 437
 - in human development and capability approach, 168, 177
 - and inclusion, 432, 437, 442
 - in knowledge creation and adaptation, 435
- Agriculture, crowdsourcing initiatives on, 384t, 385
- Air quality in Latin America, open data project on, 258t, 264
- Akinsanmi, Titilayo, 407, 408, 409
- Albania, 258t, 264
- Ama, Njoku Ola, 407, 408
- Amazon Turk microwork platform, 400n4
- American University of Beirut–Nature Conservation Center, 4

- Analog initiatives. *See* Offline resources and processes in openness
- Andrason, Alexander, 270, 271, 286n7
- Apache web server, 160
- Appadurai, Arjun, 360
- Application level of governance, 13
- Application programming interface, 192, 193
- Appropriation process in ICT use, 222, 223f, 224
- Arcos, Beatriz de los, 92
- Argentina
- income in, 220
 - mobile phones in, 92
 - open science projects in, 365t, 366, 369–370, 371, 372
- Argentinian Project of Monitoring and Prospecting the Aquatic Environment, 366
- Arinto, Patricia B., 326
- Armstrong, Chris, 175
- Arrow, Kenneth, 68
- Artificial intelligence, 7, 176
- Arup, open data approach in, 67
- Asia
- GeoNames content on, 134
 - GitHub users in, 127
 - informal economy in, 73
 - open science hardware for development in, 362t, 363
- Asia, open education in, 318
- educator use of, 327, 327t, 329, 330f
 - learner use of, 328, 328t, 330f
- A Tu Servicio (Uruguay), 291, 297, 305–308, 310t
- accountability in, 164, 273t
 - action arena in, 306–307
 - background environment in, 305, 310t
 - change theory analysis of, 258t, 285n5
 - community members in, 305–306, 311
 - decision-making processes in, 311
 - description of, 258t, 261t, 298t
 - engagement in, 310t, 311
 - goals and objectives in, 305–306, 307
 - government response to, 308
 - inclusion in, 280–281
 - information included in, 306–307
 - institutional form and rules in, 310t
 - opportune niches in, 273t, 276
 - outcomes of, 261t, 285n5, 308, 309t
 - resources in, 305–306
 - standardization of data in, 301, 307
 - users of, 264–265, 305, 306, 307, 308
 - value of data in, 277, 279–280
- Augmented geography, 121, 122, 138n1
- Australia, 127, 193
- Austria, 135
- Authoritarianism, 6, 10
- Automotive mechanics in Uganda, open innovations of, 409, 411
- Awad, Bassem, 410
- Backhaul portion of network, 190, 198, 211n6
- Bailur, Savita, 396
- Banda Aceh, Indonesia, open data project in, 262t–263t, 269
- Bangalore, India, 261t, 276
- Barrantes, Roxana, 240
- Bayh-Dole Act, 69, 70, 71, 408–409
- BC Open Textbooks project, 174
- Bear, Julia B., 97
- Beijing Platform for Action, 111n5
- Belete, Wondwossen, 407, 408, 409
- Belgium, 132
- Benefits of open consumption, personal characteristics affecting, 219–246
- Benkler, Yochai, 33, 34, 59, 60, 166, 175
- Bentley, Caitlin M., 254
- Berlin Declaration on Open Access to Knowledge in Science and Humanities, 45n11, 62
- Besley, Tina A. C., 321
- Bethesda Statement on Open Access Publishing, 62
- Bhoomi Program in India, 261t, 268–269, 273t
- Bias
- gender-related, 87, 91, 97, 99, 109–110, 436
 - in open data, 9

- Bias (cont.)
 patriarchal, 91
 in scholarly publishing, 10, 63
- Bing, 134
- Bonami, Beatrice, 321
- Books
 cost of, 144, 152n2
 and ebook piracy, 153n3
 in open education, 10, 144, 163, 173, 174, 329, 334, 338, 341, 348
- Bossu, Carina, 323
- Botany of Brazil, open access database on, 365–366
- Botswana
 open access broadband networks in, 193, 203
 open science in, 71
 patents on research in, 408
- Bottom-up approaches, 11, 44n9
- Boyd, Drew, 391, 395
- Boyle, James, 12
- Branding of intellectual property, 422
- Brazil
 Cuidando do Meu Bairro project in.
 See Cuidando do Meu Bairro
 GitHub users in, 127
 open government in, 11
 open science projects in, 365–366, 367t, 368–369, 371, 372, 373
- Brazil, open education in, 318
 educator use of, 327, 327t, 330f
 learner use of, 328, 328t, 330f
 MOOC participants in, 9
- Broadband, 6, 7–8, 41, 42, 183–210
 and free public Wi-Fi, 184, 199–201
 inequalities in access to, 8, 183
 infrastructure for, 7–8, 41, 193–194, 206
 mobile, 7, 206. *See also* Mobile technology
 national networks in, 193–194, 203–207
 wholesale networks in, 203–207
- Broadband Infraco (BBI), 193–194, 196, 206, 212n13
- Budapest Open Access Initiative, 44–45n11, 62, 146
- Budgets, open, 5, 27, 258t, 265–266
- Budi Odgovoran Montenegro, 258t, 265
- Bullying, online, 93
- Bureaucracy in legal access, 148–149
- Burkina Faso elections, open data in, 3, 14n3, 261t, 269, 274t
- Buskens, Ineke, 101, 108
- Cambodia, Open Development Cambodia project in, 261t, 269, 274t, 276
- Canada
 copyright laws in, 337
 open education in, 164, 174
 OpenStreetMap content on, 132
- Canadian Women for Women in Afghanistan, 163
- Cañares, Michael, 385
- Capability
 in human development and capability approach, 168, 360
 and ICT access, 5, 8, 332–333, 348
 and inclusion, 433
- Cape Town Open Education Declaration, 146
- Cape Town telecommunications initiatives, 199, 200, 201
- Cardoso, Gustavo, 147
- Caribbean, 130, 131f, 368, 371
- Cartmill, Tess, 328t, 330f
- Casserly, Catherine M., 382
- Castells, Manuel, 147, 252, 253, 255, 256, 257, 276, 280, 282, 283, 285
- Catch-up economies, innovation in, 57
- Censorship, 137
- Center for Agricultural Bio-Science International (CABI), 384t
- Center for Innovation Policy and Governance, 259t
- Center for Local and Regional Governance, 259t
- Certification of open educational resources, 319, 320f, 320–321
- Chagas disease, open science project on, 369

- Chambers, Robert, 31, 44n10
- Change
 social. *See* Social change
 theory of, in *Open Data for Development*, 257, 285n4
- Chennai, India, open data projects in, 263t, 275t, 276
- Chesbrough, Henry, 33, 34, 58, 60, 65
- Chiao, Rebecca, 389, 392, 396
- Chib, Arul, 254
- Chile, open education in, 318
 availability of appropriate materials in, 333
 educator use of, 327, 327t, 330f
 infrastructure in, 329, 331
 learner use of, 328, 328t, 329, 330f
- China
 GitHub users in, 127
 MOOC participants in, 9, 10
 patent and citation maps on, 143
- Christensen, Gayle, 9
- Chuma-Okoro, Helen, 409
- Circulation phase in open education, 319, 320, 320f
- Citizen science, 358, 361–364
 in Argentina, 370
 crowdsourcing in, 4, 375n11
 definition of, 362
 in water quality monitoring, 4, 102, 362, 363, 435
 women in, 373
- Citizensourcing, 13, 159t, 161–162
 government responsiveness to, 9, 164
- Civil society organizations (CSOs) in open health data projects, 296, 305–308
- Climate change, 363
 Indigenous knowledge in South Africa on, 106, 367t, 368, 374
- Closed innovations, 33, 57, 72
- Club goods, 170t, 171, 172t
- Cocchiaro, Gino, 409
- Codeando Mexico, 301
- Cognitive justice, 102, 360–361, 370–371, 372, 437
- Collaboration
 in crowdsourcing, 33–34
 in definition of openness, 24
 in interdisciplinary research, 373
 networked, 411
 in open development, 5
 in open education, 319, 341–342, 343, 348, 435
 in open health data, 292
 in open science, 357–374
 peer, 9, 32, 33, 59, 405
- Collaboration on International ICT Policy for East and Southern Africa (CIPESA), 262t, 275t
- Collaborative innovation, 58, 59
 in Africa, Open AIR research on, 405, 407, 409, 411, 424–425
 definitions of, 58, 425
 user-centered, 33
- Collier, Benjamin, 97
- Colombia
 community-driven environmental conservation in, 362t, 363, 371
 income in, 220, 330f
 language and Internet use in, 240, 246n7
 mobile phones in, 92
- Colombia, open education in, 107, 318, 344–345
 educator use of, 327, 327t, 329, 330f
 empowerment in, 344–345
 institutional support of, 339
 learner use of, 328, 328t, 329, 330f
 MOOCs in, 10
- Commission Électorale Nationale Indépendante (CENI) in Burkina Faso, 3, 261t
- Common goods. *See* Public goods
- Commons
 cultural, 151, 294
 governance of, 36, 151
 knowledge. *See* Knowledge commons
 natural, 36, 151, 171, 294, 296, 359
 scientific, 70, 71

- Commons (cont.)
 - telecommunications in, 188, 189, 190f, 199–202, 207–209, 210
- Commons-based peer production, 32–33, 34, 160–161
 - contributions of, 29t
 - free and nondiscriminatory practices in, 41t
- Communities of practice in education, 341–342, 435
- Competition in open access
 - telecommunications, 193, 198, 209
- Comprehensive and Progressive Trans-Pacific Partnership, 150
- Computer and Communications Industry Association, 157
- Confidence, gender differences in, 97, 105
- Confidentiality agreements, 422
- Convening effect in open data, 266, 282, 283
- Convention on Biological Diversity, 423
- Conversion model of open educational resources, 64
- Cooper, David, 322
- Co-operation in open development, 5
- Copyleft license, 25, 32–33, 34
- Copyright issues, 25, 148, 175, 176
 - and copyleft, 25, 32–33, 34
 - in data, 66
 - in education, 148, 336, 337, 338, 409–410
 - in innovations, 33, 405, 422
 - in music, 409
 - in open access, 62, 63, 148–151
 - in science, 341
 - in software, open-source, 61
- Cornwall, Andrea, 95
- Costa Rica, 362t, 363, 371
- Costs
 - of books, inequalities in, 144, 152n2
 - crowdfunding and crowdlending for, 5
 - in ICT access, 5, 7–8, 39, 41, 184–186, 199–202, 207, 208, 230, 232
 - in knowledge access, 35
 - in literature access, 62, 63
 - in open distribution, 146
 - in open education, 5, 64–65, 144, 146, 157, 163, 174, 444
 - in open health data, 301, 304
 - in open innovations, 410
 - in open knowledge resources, 38
 - in open provision, 158, 166, 167t
 - in open science, 70, 439
 - transparency on, 41, 184
- Coughlan, Tony, 324
- Counterpower, 256, 282
- Coursera, 329, 334
- Cox, Glenda, 332, 338
- Craveiro, Gisele, 394, 396
- Creation phase in open education, 319–320
 - cocreation with students in, 345, 348
 - empowerment in, 324, 342–343
 - facilitation of inclusion in, 443
 - institutional policies on, 337
- Creative Commons licensing, 33, 63–64, 318, 320, 336
- Creativity and innovations in Africa, 404, 405, 407, 411
- Crisis and disaster management, 173
 - crowdsourcing in, 161
 - geography of information in, 135
 - open data project in Nepal on, 263t, 268, 275t
 - open science initiatives on, 367t, 368, 371
- Cronin, Catherine, 319
- Crowdfunding and crowdlending, 5
- Crowdseeding, 383, 388t, 395, 397t, 398
- Crowdsourcing, 38, 39t, 59–60, 157, 381–399
 - benefits and costs in, 167t
 - characteristics of, 382–383
 - in citizen science, 4, 375n11
 - citizensourcing, 9, 161–162, 164
 - compared to outsourcing, 33, 383
 - definitions of, 59–60, 382–383
 - device types for access in, 384–385
 - external environment affecting, 387, 387f, 392
 - firm-centric approach to, 60
 - free and nondiscriminatory practices in, 41t

- geography of information in, 392
- government use of, 174
- in HarassMap project. *See* HarassMap project
- human capital in, 386, 387f, 390–391
- incentives in, 393, 396
- inclusivity of, 381–399
- infrastructure for, 386, 387f, 389–390
- of innovations, 33–34, 60, 61, 381
- linkages and trust required for, 386, 387f, 391–392
- motivation in, 385, 387, 395–396
- nonopen practices in, 162t, 163t
- in open education, 319
- in open provision, 159, 159t, 160, 161–162, 167t
- participation in, 34, 59, 60, 100, 383, 384, 385, 396, 398
- passive, 383, 388t, 397t, 398
- in private sector, 159t, 162, 163t
- research interviews on, 387–388, 399
- success factors in, 386–387
- in TripAdvisor, 162
- vision and strategy in, 387, 392–395, 398
- Cuidados Intensivos (Peru), 291, 302–305, 310t
 - action arena in, 303–304
 - background environment in, 302, 310t
 - community members in, 302, 311
 - data formatting in, 302
 - description of, 298t
 - engagement in, 310t, 311
 - goals and objectives in, 302
 - government response to, 308
 - institutional form and rules in, 310t
 - operational risk in, 304
 - outcomes in, 304–305
 - resources in, 302
- Cuidando do Meu Bairro (Brazil), 258t, 265–266, 381, 388t
 - human capital in, 391
 - inclusion in, 397t
 - infrastructure in, 390
 - motivation in, 396
 - vision and strategy in, 394
- Cultural commons, 151, 294
- Curation phase in open education, 319, 320, 320f
- Cybercrime, 108, 177
- Czech Republic, 132
- Dagne, Teshager, 409
- Darakht-e Danesh Library, open educational resources from, 3, 163, 334, 437, 442
- Dark Fibre Africa, 198
- Dasgupta, Partha, 68
- Data, open, 51, 52, 61, 62, 65–68, 72
 - access to, 66, 67, 251, 253, 255, 283, 433
 - accountability in. *See* Accountability in open data
 - bias in, 9
 - on Brazilian botany, 365–366
 - on Burkina Faso elections, 3, 14n3, 261t, 269, 274t
 - comparison of network and social inclusion in, 280–281, 284
 - convening effect in, 266, 282, 283
 - definitions of, 24–25, 27, 66, 253, 292–293
 - democratized participation in, 255
 - disruption of data flows in, 267–270, 282, 284
 - economic impact of, 66–67, 253
 - enclosure movement affecting, 12, 283, 284
 - in evidence-based decisions, 67
 - exclusion in, 281–282
 - freedom of information requests in, 300, 301
 - gender of users, 8, 102
 - global assessment of, 299
 - governance of, 13, 292
 - of government. *See* Government data, open in HarassMap, 161
 - on health services, 291–313. *See also* Health data, open
 - inclusion in, 251–285, 433
 - indicators of success in, 265
 - and innovation, 66, 72
 - intermediaries in, 271, 276, 277, 281–282, 443

- Data, open (cont.)
 knowledge commons in, 292, 294–297, 298
 nonopen practices in provision cycle, 165t
 and open access, 62
 in Open Data for Development projects,
 257–285
 opportune niches in, 270–276, 278, 282, 284
 power in, 251, 278, 280, 281, 284, 285
 privacy rights in, 9
 as public good, 173, 174, 253, 433
 in science, 68
 sustainability of initiatives in, 313
 switchers in, 256, 267, 269, 270, 278–279,
 280
 transparency in. *See* Transparency in open
 data
 in Uruguay, 305–308
 value of, 253, 268–269, 270, 276–280, 284
- Data, proprietary, 66, 253
- Data flow disruption from open data, 267–
 270, 282, 284
 opportune niches and intermediaries
 affecting, 270–276
- Data revolution, 124
- Data scraping, 260t, 269, 286n6, 302, 308,
 312, 314n6
- DATA Uruguay, 305–308
- David, Paul A., 68
- Davies, Tim, 56
- de Beer, Jeremy, 28, 175, 386
- Decolonization, 30–31
- Demand-side value in ICT access, 175, 183,
 188, 189, 190f, 198, 201
- Dengue fever project in Paraguay, 260t–261t,
 273t, 276
 value of data in, 277, 278, 279
- Denmark, 135
- de Oliveira Neto, José D., 326, 327, 327t, 328t,
 329, 330f
- Department for International Development
 (UK), 358
- De Sabbata, Stefano, 95, 386, 392
- Design, gender issues in use of term, 101, 102
- Desktop computers, access to Internet with,
 226, 389
- Development, concept of, 2–3, 41
- Development 2.0, ICT in, 32
- Device types for Internet access, 225, 226,
 229–230, 235, 245–246
 benefits of open resources conditioned by,
 434–435
 combinations of devices available, 229, 230t
 in crowdsourcing, 384–385, 389, 390
 for education-related activities, 236f, 241–
 242, 331–332
 for government-related activities, 236f,
 244f
 for job searching, 236f, 243–244, 243f
 marginal average effects of, 242f, 243f, 244f
 multivariate analysis of, 238t, 241–245
 and probability of carrying out open
 activities, 236f, 238t, 242–245, 434–435
 and socioeconomic profile of users, 229,
 231t, 232t
- Digital age, 124, 152
- Digital divide, 8, 67, 225, 346, 422
- Digital inequality, 41, 183, 189
- Digital poverty, 8, 9
- Digital rights management, 150
- DIRSI, 220, 246n1, 381
- Disaster management. *See* Crisis and disaster
 management
- Disciplinary norms in education, 336–337
- Discoverability, 175, 438
- Discrimination, gender-related, 89, 92, 98,
 106, 107, 436
- Disinformation, spread of, 6–7, 177–178
- Distribution of content/knowledge, 4, 41, 433
 in access to knowledge movement, 34
 in affective economy, 148
 barriers to, 434, 444
 in commons-based peer production, 33
 costs in, 146
 in crowdsourcing, 34, 398
 in definition of openness, 14, 25–26, 27, 28,
 38, 158, 219

- discoverability in, 438
- facilitation of inclusion in, 442
- gender issues in, 88, 94t, 98, 109, 110
- government role in, 440
- in informal economy, 409
- in knowledge commons, 36
- in open access, 63, 146
- in open development as inclusion, 441f
- in open education, 38, 39t, 40t, 146, 152, 162–165, 443
- in open information, 120
- in openness as praxis, 37, 38
- in open provision, 158–159, 160
- in open science, 70, 370–371
- in open telecommunications, 201
- open WiFi in, 41
- policy and practice in, 10–11
- practices and characteristics of open process in, 39t
- in scholarly publishing, 9–10, 438
- in trade secrets, 409
- DIY repairs, iFixIt website for, 161
- Dodel, Matias, 222, 223f, 224
- Donaldson v. Becket*, 150
- Donner, Jonathan, 226, 389
- dos Santos, Fernando, 410
- Downes, Stephen, 64
- Doyle, Arthur Conan, 150
- Drugs
 - Medicine Price Registry project on, 260t, 268, 272t, 276, 277, 281
 - open and collaborative approach to development of, 161
- Dumps, illegal, open data projects on, 258t, 266
- Durban (South Africa) open data projects, 259t
- Earthquakes, open data projects on, 263t, 268, 271, 275t, 276
- Eassy, 195, 206
- e-Bird Argentina, 366
- Ebook piracy, 153n3
- Economics of open provision, 157–158, 166–173, 178
 - employment and social protection issues in, 176–177
 - in informal economy, 175
 - in science, 68–72
 - in telecommunications, 188–189
- Economy
 - affective, 148
 - inequality in, 7
 - informal, 60, 72–73, 175, 409, 440
 - knowledge, 99, 151–152, 403, 442
 - political, of information, 122, 124, 137
- Ecosystems
 - access, 144, 145, 146–149, 150, 151
 - ICT, 53
 - information, 122, 136, 137, 437
 - innovation, 403
 - knowledge, 143, 438
 - open data, 270, 292–293, 311, 433
 - open development, 11, 13, 14, 25
 - open education, 72
 - open provision, 165
- Education
 - exclusion from, 323
 - in Mexico, open data project on, 165
 - public expenditures on, 144, 173, 174
 - as public good, 146, 173, 174, 323
 - scarcity model of, 146
 - in Tanzania, open data project on, 260t, 268, 272t, 277
 - university–community partnerships in, 322
- Education, levels of, 5
 - of crowdsourcing participants, 385
 - and device types in Internet access, 229, 230, 231t, 232t
 - and locations of Internet access, 226, 228t, 229t
 - and MOOC use, 9
 - of open government data users, 8
 - and use of Internet access, 237t, 239, 245
 - and use of open activities, 220, 435, 436

- Educational resources and practices, open,
 64–65, 317–349
 abundance model of, 146–147
 access to, 63–65, 143–152, 317, 322, 323,
 326–336, 347–348, 432
 adaptation phase of, 319, 320f, 321
 in Afghanistan. *See* Afghanistan, open
 education in
 availability of appropriate materials in, 333–
 334, 347
 awareness of, 335–336, 347
 business models of, 64
 certification in, 319, 320f, 320–321
 circulation phase in, 319, 320, 320f
 collaboration in, 319, 341–342, 348, 435
 communities of practice in, 341–342, 435
 costs in, 5, 64–65, 144, 146, 157, 163, 174,
 444
 creation phase in. *See* Creation phase in
 open education
 critique of, 319, 320f, 321
 curation phase in, 319, 320, 320f
 definition of open in, 24–25, 65
 definitions of, 318, 319
 device types used, 241–242, 331–332
 disciplinary norms in, 336–337
 educator use of, 327t, 327–328, 329, 330f
 electricity supply for, 331, 434
 empowerment in, 322, 324, 325f, 342–347,
 349, 432
 fair use of, 148, 335, 347
 5 Rs in, 38–39, 40t, 319, 438
 4 Rs in, 318–319
 free and nondiscriminatory, 41t
 funding of, 344, 345, 348
 gender issues in, 10, 103–105, 107, 436
 Global North values in, 11, 346, 437
 government role in, 174
 hardware needs in, 331–332
 inclusion in, 317–349, 382, 432, 443
 informal sharing in, 340
 infrastructure conditions affecting, 329–333,
 347–348, 434
 and innovation, 52, 61, 65, 72
 institutional policies on, 337–339, 443
 intellectual property in. *See* Intellectual
 property in education
 Internet connectivity for, 332
 knowledge commons in, 152
 knowledge valued in, 346, 349
 language used in, 334, 343, 348, 437, 439
 learner use of, 328, 328t, 329, 330f
 licensing in, 148, 162–163, 174, 318, 320,
 336, 340, 342, 347, 349, 409–410
 locations of Internet access for, 242
 metasynthesis of research on, 324–326
 MOOCs in. *See* Massive open online courses
 nonopen practices in provision cycle, 164t
 Open CourseWare in, 64, 163, 334
 participation in, 9, 10, 103–105, 107, 319,
 322, 323–324, 336–342, 348–349, 432
 pedagogical practices in, 339–341, 435
 peer review in, 319, 435
 personal fulfillment in, 344
 reputation enhancement in, 343–344
 research-led teaching praxis in, 344–345
 ROER4D project in, 103–105, 107, 148,
 318
 sharing and republishing in, 38–39, 162–
 164, 317
 socioeconomic status affecting use of, 326–
 329, 436–437
 technical skills required for, 332–333
 10 Cs in, 319–321, 438
 textbooks in, 10, 144, 163, 173, 174, 329,
 334, 338, 341, 348
 UNESCO declaration on, 152
 use of, 9, 10, 38–39, 40t, 319, 320f, 321, 327–
 329, 342–343
 user-generated content in, 5, 146
- Educational setting, access to Internet from,
 225, 226, 227t, 245
 benefits of open resources in, 434, 435
- Education-related activities, Internet access
 for, 220, 221, 230, 232, 235, 246
 availability and quality of, 332

- device types used in, 236f, 241–242, 242f, 331–332
 - location of, 234f, 242, 242f
 - multivariate analysis of, 235, 239, 240, 241–242
 - tasks in, 233t
- Egypt
- HarassMap project in, 41, 161, 388t, 392
 - OpenStreetMap content on, 132
- Ekurhuleni (South Africa) telecommunications initiatives, 199, 200
- Elahi, Shirin, 419f
- Elections
- crowdsourcing project on, in Kenya, 388t, 390, 397t
 - GotToVote project on, in Kenya, 260t, 269, 272t
 - and movements away from openness, 6
 - open data on, in Burkina Faso, 3, 261t, 269, 274t
- Electricity supply
- for educational resource access, 331, 434
 - load shedding affecting, 331
 - monitoring of, in India, 262t, 269, 274t, 276
- Elsevier Publishing, 63
- Employment
- impact of open provision on, 176–177
 - Internet access for activities related to, 230, 232, 233t, 235, 246
 - job searching for. *See* Job searching, crowdsourcing projects on; Job searching, Internet access for
 - occupation in, and devices used for Internet access, 231t, 232t
 - occupation in, and location of Internet access, 226, 228t, 229t
 - and workplace as location of Internet access. *See* Workplace, access to Internet from
- Empowerment, 432
- in creative activities, 342–343, 345
 - in digitally mediated participation, 433
 - in inclusion, 256, 322, 324, 325f, 342–347, 386
 - in knowledge acquisition, 431
 - in knowledge production and sharing, 435
 - in open education, 322, 324, 325f, 342–347, 349, 432
 - in open science, 372
 - in personal fulfillment, 344
 - power to, 102, 105, 109
 - in reputation enhancement, 343–344
 - in research-led teaching praxis, 344–345
 - in water testing project, 435
 - of women, 91–92, 102, 105, 108, 109, 110
- Enclosure movement, 444
- access in, 12, 13, 35, 36, 150
 - data in, 12, 283, 284
- Endowment model of open education, 64
- Engineering, gender issues in use of term, 101
- Entertainment, ICT use in, 220, 221
- Environmental factors affecting
- crowdsourcing, 387, 387f, 392
- Esoko project in Ghana, 260t, 272t, 276, 277, 280
- EsSalud, 302, 303
- Estellés-Arolas, Enrique, 59, 382
- Ethiopia
- iCow crowdsourcing platform in, 384t
 - intellectual property rights in, 408, 409
 - open science in, 71
 - Science, Technology and Innovation Policy in, 408
- Europe
- GeoNames content on, 134, 135
 - GitHub users in, 127
 - net neutrality in, 202
 - OpenStreetMap content on, 132
 - patent and citation maps on, 143
 - public-sector information in, 66
 - telecommunications in, 186, 191, 202, 203
 - Wikipedia contributors from, 130, 131f
- European Association of Distance Teaching Universities (EADTU), 323
- European Telecommunications Network Operators' Association, 186

- Exclusion, 88–89, 111n4, 432
 definition of, 321
 in digital technology, 89, 92, 109, 147
 educational, 323
 in geography of information, 137
 in network society, 256, 257
 in open access, 147
 in open data, 281–282
 in public and private goods, 170, 170t, 171, 172t
 in scarcity model, 146
- Extended Massive Open Online Courses (xMOOCs), 349
- Facebook, 6, 134, 165, 187
 Free Basics of, 186
 number of friends on, 240
 as zero-rating service, 202, 208, 209
- Fair use of educational resources, 148, 335, 347
- Fake news, 177–178
- Federal Communications Commission (US), 211n4
- Fees, price transparency on, 41, 184
- Feminist Internet, 109
- FibreCo, 198
- Financial crisis (2008), 6
- Financial sector, open practices in, 162
- Firm-centric approach to innovations, 33, 34, 58, 59, 60, 66, 175, 406
- Fisher, Lauren, 381, 383, 384, 385, 386
- 5G networks, 208, 212n14
- 5 Rs in open education, 38–39, 40t, 319, 438
- FixMyStreet civic application, 96, 400n5
- Flickr, 64
- Florida, Richard, 143
- Forero-Pineda, Clemente, 69
- 4G networks, 196, 212n14
- 4 Rs, 159, 159t, 318–319
- Fox, Jonathan, 9, 164, 286n8, 291, 311
- France, OpenStreetMap content on, 132
- Free Basics zero-rated product, 202, 202t, 208, 209
- Freedom of information, 165
 in Mexico, 300, 301
 in Peru, 303, 308
 in Sweden, 43n4
 in United States, 30, 44n6
- Freedoms in open provision, 158–159, 169–170, 173, 177
- Freelancer.com, 388t, 397t
- Free riding, 36
- Free to use/participate, 41t
 in definition of openness, 39, 93, 219
 and freemium options, 64
 and geography of information, 120, 125, 128, 132, 134, 136
 in ICT access, 41, 184, 185, 186, 187–188, 199–201, 207, 211n3
 and illegal sharing, 38, 42, 147–148
 in open access, 62, 63, 145, 146, 147–148, 150, 151, 211n3
 in open education, 5, 64, 65
 in open innovations, 33, 60, 61
 in open provision, 158, 159, 165, 166
 in open-source software, 96, 108
 privacy and security in, 165, 187–188
 in Wi-Fi, free public, 41, 184, 199–201, 207, 211n3
 in Wikipedia, 60, 108, 128
- Freire, Paulo, 44n9
- Friends of OjoPúblico, 303
- Friends using ICTs, 240–241
- Frischmann, Brett M., 183, 187, 188, 189, 292, 294, 295t, 297, 313, 359
- Frontier technologies, 406
- Functionings, in human development and capability approach, 168
- FutureLearn, 329, 334
- Galperin, Hernan, 98, 388t, 391, 393
- Garrido, Maria, 10
- Gauteng, South Africa, free public Wi-Fi in, 199, 200
- Gaventa, John, 95

- Gender, 5, 7, 87–110
bias related to, 87, 91, 97, 99, 109–110, 436
and confidence, 97, 105
and conflict avoidance, 445n3
and crowdsourcing, 385, 390, 396
and cultural attitudes toward women and girls, 5, 87, 98
and devices used for Internet access, 92–93, 229, 230, 231t, 232t
and digital gender gap, 8
framework for analysis of, 101–107
and inclusion, 87–88, 89, 92, 98, 99, 108, 442–443
and knowledge, 99–101, 106–107
and location of Internet access, 226–227, 228t, 229t
and microwork, 98, 390
and open data use, 8, 102
and open education, 10, 103–105, 107, 436
and participation, 9, 87–110, 364, 436, 442–443, 445n3
and peer production, 9
and power, 95–96, 98, 99, 101–102, 103–105, 106, 107, 108, 109
sexual identity compared to, 110–111n1
and uses of Internet access, 93, 235, 237t, 239, 245
in water quality monitoring, 102
of Wikipedia contributors, 97, 108, 436
- Gender Analysis Framework for Openness (GAFO), 101–107, 109
- Gender-blind results, 91f, 92
- Gender equality, 89, 111n1
- Gender equity, 90–91, 110
importance of, 87–88
intersectionalities in, 91, 92
use of term, 111n1
- Gender gap, 8, 87
- Gender-negative results, 90f
- Gender Research in Africa and Arab Countries into ICTs for Empowerment (GRACE), 108
- Gender-responsive results, 90, 90f, 91
- Gender Results Effectiveness Scale (GRES), 90f, 90–91, 105, 106
- Gender roles, 89, 92, 111n3
household and childcare responsibilities in, 89, 105, 107
and knowledge, 106–107
and value of participation, 95
- Gender targeting, 90, 90f, 105
- Gender-transformative change, 90, 90f, 91, 98, 105, 106
- Geography of information, 6, 119–137, 437–439
after information revolution, 124–125
augmented, 121, 122, 138n1
in crowdsourcing, 392
and discoverability, 438
dominance of Global North in, 437–438
exclusion in, 432
and GitHub contributions, 119, 125–127, 436
and Internet connection, 119, 125
and participation, 9, 95, 119, 124, 125–130, 136, 137, 326, 432
predigital, 122–123
and representation, 119, 125, 132–136, 137
and Wikipedia contributions, 9, 119, 127–130, 136, 436
- GeoNames, 119, 132, 134–136
- Gerak Aceh, 262t–263t, 269, 271, 275t, 276, 278
- Germany, 132, 135
- Ghana
anticorruption crowdsourcing platform in, 384t
educational uses of Internet access in, 92–93
online bullying complaints in, 93
open data projects in, 260t, 272t, 276, 277, 280
open education in, 318, 327, 327t, 328, 328t, 330f
- Gidley, Jennifer, 321, 322, 325f
- Gillwald, Allison, 202t
- Gini coefficient, 7, 15n6
- GitHub, 97, 119, 125–127, 436

- Gjakovo (Albania) open data project on illegal dumps, 258t, 264
- The Global Gender Gap Report* (2017), 87
- Global North, 2–3, 11
- dominance of knowledge from, 143, 147, 437–438
 - and geography of information, 123, 135, 136, 437–439
 - intellectual property in, 35, 153n3
 - open access in, 145
 - participation in digital content production in, 130
 - piracy of ebooks in, 153n3
 - power of, 99
 - scholarly publishing in, 147, 438
 - values of, in education, 11, 346, 437
- Global South, 1, 6, 10–11
- definition of openness in, 24–25
 - gender differences in mobile phone access in, 92
 - and geography of information, 123, 135, 136, 137, 437
 - Internet access in, 39, 199
 - knowledge from, 143
 - net neutrality in, 186
 - open access in, 184
 - open education in, 25, 103, 144, 148, 163, 317–349, 443
 - open government data and inclusive development in, 251–285
 - open health data in, 291–313
 - participation in digital content production in, 130
 - scholarly publishing in, 9, 147, 438
- Global System for Mobile Communications (GSM), 208
- Goethe, Johann Wolfgang, 150
- González-Ladrón-de-Guevara, Fernando, 59, 382
- Good Growth Plan, 67
- Goods
- and bads, 173, 174, 177
 - nonopen, 172t
 - open, 158, 159, 168, 170, 171, 172t, 173
 - private, 158
 - public. *See* Public goods
 - social, 183, 198
- Google, 6, 124, 134, 165, 175
- knowledge graph of, 133
 - as zero-rating service, 202
- Google X, 176
- GotToVote project in Kenya, 260t, 269, 272t
- Governance
- adaptive, 255
 - of knowledge. *See* Knowledge governance
 - levels of, 13, 36
 - of natural resource commons, 36
- Government data, open, 251–285
- access to e-services in, 435
 - accountability in, 5, 8, 29–30, 44n6, 157, 164, 253, 254
 - bias in, 9
 - in Burkina Faso, 3, 14n3, 261t, 269, 274t
 - contributing schools of thought on, 29t
 - cost-effectiveness of, 5
 - definition of open in, 24–25
 - devices and locations of Internet access for, 244–245
 - education levels of users, 8
 - free and nondiscriminatory practices in, 41t
 - freedom of information in, 29t, 30, 43n4, 44n6, 165, 300, 301
 - gender of users, 8
 - global assessment of, 299
 - Global North values in, 11
 - history of, 29–30, 43–44nn4–7
 - for inclusive development, 251–285
 - indicators of success in, 265
 - in Mexico, 165
 - misuse of, 9
 - Moss Committee on, 44n6
 - movement away from, 6, 8, 12, 44n7
 - NGOs using, 164–165
 - nonopen practices in provision cycle, 165t
 - offline initiatives in, 27

- in Open Data for Development projects, 257–285
- in Peru, 302, 303
- policies and practice in, 11, 30
- potential benefits of, 4
- private sector benefits of, 9, 174
- as public good, 173, 174, 253
- and public participation, 174
- in service delivery, 164, 174
- transparency in, 5, 8, 29, 30, 44n6, 253, 254
- in Uruguay, 164
- Government-related activities, Internet access
 - for, 220, 230, 232, 235, 246
 - device types used in, 236f, 244f
 - locations of, 234f, 244f
 - multivariate analysis of, 239, 240, 241, 244–245
 - tasks in, 233t
- Government role in public goods, 35, 169–170, 173, 174, 440, 442
- Graham, Mark, 95, 99, 386, 392
- Grassroots development, open science in, 361–364
- Green, Cable, 318
- Greppi, Catrihel, 388f, 391, 393
- Gross domestic product, 2
 - informal economy in, 73, 440
 - and Internet activities, 240
 - and open activities, 157, 176
 - and open education, 327, 329, 330f, 436–437
 - public goods in, 168
 - and research and development spending, 144
- Guatemala, 220, 240, 246n7
- Gupta, Joyeeta, 255
- Gurstein, Michael, 253–254, 255
- Hacker communities, 363
- Hacklabs, 303
- Haiti
 - GeoNames content on, 135
 - OCSDNet projects in, 102, 367t, 370–371
- Hall, Bronwyn, 68
- Hamara Internet—Ending Online Violence against Women* conference, 108
- HarassMap project, 39, 41, 110, 161, 381, 388t, 399n1
 - external environment in, 392
 - human capital in, 390–391
 - inclusion in, 394, 395, 397t
 - infrastructure in, 389
 - motivation in, 396
 - participation fatigue in, 396
 - vision and strategy in, 394, 395
- Harassment
 - HarassMap project on. *See* HarassMap project online, 99, 108
- Harding, Sandra, 99
- Hardware
 - for Internet access. *See* Device types for Internet access
 - for open educational resource access, 331–332
- Harvard University, MOOCs offered by, 9
- Hay, Katherine, 91
- Health data, open, 291–313
 - action arenas in, 297, 300–301, 303–304, 306–307
 - in A Tu Servicio (Uruguay). *See* A Tu Servicio
 - background environment in, 295t, 296, 298, 299, 302, 305
 - community members in, 295t, 296, 300, 302, 306
 - costs in preparation of, 301, 304
 - in Cuidados Intensivos (Peru). *See* Cuidados Intensivos
 - goals and objectives in, 295t, 296–297, 298, 299–300, 302, 305–306, 312
 - governance of, 295t, 297, 300–301, 308–312
 - government involvement in, 308, 311
 - in iParticipate (Uganda), 262t, 275t, 276
 - knowledge commons in, 292, 294–297, 298, 308–312
 - in La Rebelión de los Enfermos (Mexico). *See* La Rebelión de los Enfermos
 - operational risk in, 304

- Health data (cont.)
 outcomes in, 295t, 297, 301, 304–305, 308
 politics affecting, 311–312
 research methods on, 297–299
 standardization of, 301, 307
- Health insurance system in Peru, 302, 303
- Herbarium, virtual, in Brazil, 365–366, 371, 372
- Herring, Susan, 108
- Hess, Charlotte, 36
- Hidalgo, David, 304
- High-tech hubs model in Africa, 414
 core tensions affecting open innovation in, 415, 417t
 indicators of success in, 415t
 intellectual property protection in, 421–422
 knowledge of value in, 421t
 scalability in, 424
 technological and social aspects of trust in, 416t
 winners and losers in, 415–416, 418t
- Hill, Benjamin Mako, 34
- Hillyer, Rebecca, 382
- Himanen, Pekka, 252, 253, 283, 285
- Hodgkinson-Williams, Cheryl, 38, 40t, 319, 320f, 324, 326, 382, 385, 386
- Home, access to Internet from, 225, 226, 227t, 232, 245–246
 benefits of open resources in, 434, 435
 for education-related activities, 234f, 242f
 for government-related activities, 234f, 244f
 for job searching, 234f, 243f
 marginal average effects of, 242f, 243f, 244f
 multivariate analysis of, 238t, 241, 242, 243, 245
 socioeconomic characteristics in, 228t, 229t
- Household, position in
 and devices used for Internet access, 229, 231t, 232t
 and location of Internet access, 226, 228t, 229t
- Howe, Jeff, 59, 383
- Hulu, 171
- Human development and capability approach (HDCA), 158, 166, 168–169, 173, 360
 agency in, 168, 177
 compared to normative welfare economics, 168–169, 169t
 terminology in, 168
- Human Genome Project, 313n3
- Hungary, 6
- Hurlbert, Margot, 255
- Iceland, 127, 132
- iCow crowdsourcing platform, 384t
- ICT access, 41, 183–246
 availability and quality of, 187, 332
 backhaul in, 190, 198, 211n6
 broadband networks in, 7–8, 193–194, 203–207
 capabilities required for, 5, 8, 332–333, 348
 commons-based approach in, 188, 189, 190f, 199–202, 207–209, 210
 costs in, 5, 7–8, 39, 41, 166, 184–186, 199–202, 207, 208, 230, 232
 definition of, 184
 demand-side value in, 175, 183, 188, 189, 190f, 198, 201
 device types for. *See* Device types for Internet access
 digital poverty affecting, 8
 economic analysis of, 188–189
 for education-related activities. *See* Education-related activities, Internet access for
 exclusion from, 89, 147
 functional and structural separation of services in, 192–193, 198
 gender differences in, 5, 8, 89, 92–93, 99, 110
 geographic differences in, 5, 7–8, 119, 124–125, 136, 199
 for government-related activities. *See* Government-related activities, Internet access for
 infrastructure required for, 5, 41, 331–332, 347, 434

- innovation and competition in, 187
- intellectual property in, 62–64, 148. *See also* Intellectual property
- for job searching. *See* Job searching, Internet access for
- local loop unbundling in, 191–192, 212n8
- locations of. *See* Location of Internet access
- long-term evolution (LTE) spectrum in, 195, 197, 199
- mandatory, 185, 189–197, 203, 204t–205t
- mobile technology for. *See* Mobile technology
- national networks in, 193–197, 203–207
- net neutrality in, 12, 185–186, 187, 202, 208, 211n4
- nondiscrimination in, 41, 184–185, 190, 193, 211n2
- personal factors affecting benefits of, 219–246
- price transparency in, 41, 184
- regulation of, 41, 184–188, 202, 203, 210, 211n7, 211nn3–4
- social and private value of, 186, 187
- supply-side value in, 188, 189, 190f, 198, 201
- universal, 184, 187, 194, 199
- voluntary, 189, 190f, 197–198, 204t–205t, 206, 207
- Wi-Fi in, free public, 41, 41t, 42, 184, 199–201, 207, 211n3
- wireless networks in, 192–193, 194–197, 203, 206
- zero-rating in, 184, 186, 187, 201–202, 208–209
- ICT Appropriation Model, 222, 223f
- iFixIt, 161
- iHub, 358, 381
- Immutable mobiles, 120–121
- Improve Your School (Mexico), 165
- Incentives in open practices, 443
 - in crowdsourcing, 393, 396
 - in science, 68, 69
- Inclusion, 431–445
 - in abundance model, 146
 - access in, 322, 323, 326–336, 347–348, 386, 432
 - concept of, 2–3
 - convening effect in, 266
 - core values and norms of, 432
 - in crowdsourcing, 381–399
 - definitions of, 254–255, 256, 280, 382, 385, 432
 - diversity in, 432
 - empowerment in, 256, 322, 324, 325f, 342–347, 386
 - and exclusion, 88–89, 111n4, 256, 281–282, 432
 - as explicit goal, 442
 - facilitation of, 440–443
 - gender issues in, 87–88, 89, 92, 98, 99, 108, 442–443
 - in innovation, 51
 - in local initiatives, 442
 - in open data, 251–285, 433
 - in open education, 317–349, 382, 432, 443
 - in open science, 357–374, 382
 - and participation, 31, 253–254, 255, 322, 323–324, 336–342, 386, 432, 435
 - in public and private goods, 171, 172t
 - representative, 385–386, 393, 398–399, 432
 - sameness concept in, 89
 - social. *See* Social inclusion
- Independent Communications Authority of South Africa, 191–192
- India, 6
 - electricity supply in, 262t, 269, 274t, 276, 331
 - GeoNames content on, 134, 135
 - GitHub users in, 127
 - informal economy and innovations in, 73, 440
 - Ipaidabribe crowdsourcing platform in, 384t
 - mobile phone ownership in, 92
 - open science in, 71
 - Open Source Drug Discovery in, 161
 - telecommunications regulation in, 186, 202

- India, open data projects in, 261t, 262t, 263t, 268–269, 276
- Bhoomi Program, 261t, 268–269, 273t
 - Electricity Supply Monitoring Initiative, 262t, 269, 274t, 276
 - Transparent Chennai, 263t, 275t, 276
- India, open education in, 318
- availability of appropriate materials for, 334
 - awareness of, 335
 - educator use of, 327, 327t, 330f
 - empowerment in, 343, 344
 - GAFO analysis of, 103–105
 - infrastructure in, 329, 331–332, 333
 - institutional policies on, 338
 - language used in, 348
 - learner use of, 328, 328t, 329, 330f
 - MOOC participants in, 9
 - pedagogical practices affecting, 341
- Indigenous entrepreneurship model in Africa, 414
- core tensions affecting open innovation in, 415, 417t
 - indicators of success in, 415t
 - intellectual property protection in, 422–423
 - knowledge of value in, 421t
 - scalability in, 424
 - technological and social aspects of trust in, 416t
 - winners and losers in, 416, 418t
- Indigenous knowledge
- balance of open and restricted access to, 411
 - buen vivir (good living) tradition in, 360
 - on climate in South Africa, 106, 367t, 368, 374
 - gender issues in, 100, 106–107
 - and innovation in Africa, 405, 409
 - intellectual property in, 100, 422–423
 - knowledge commons in, 36, 411
 - misappropriation of, 423
 - value of, 99, 100, 421t
- Indigenous languages, 240
- Indonesia, open data projects in, 259t, 262t–263t, 268, 271, 275t, 278
- on mining governance, 262t–263t, 269, 271, 275t, 278
 - smart city initiative in, 259t
 - value transfer in, 278
- Indonesia, open education in, 318
- educator use of, 327, 327t, 330f
 - learner use of, 328, 328t, 330f
- Infectious diseases
- open data project on dengue fever, 260t–261t, 268, 273t, 276, 277, 278, 279
 - open science project on Chagas disease, 369
- infoDev organization, 212–213n18
- Infomediaries, 277
- Informal economy, 60, 72–73, 175, 409, 440
- Informal innovation model in Africa, 414
- core tensions affecting open innovation in, 415, 417t
 - indicators of success in, 415t
 - intellectual property protection in, 422
 - knowledge of value in, 421t
 - scalability in, 424
 - technological and social aspects of trust in, 416t
 - winners and losers in, 416, 418t
- Information
- access to, 120, 433
 - augmentation of, 121, 122, 132
 - centralized flow of, 6
 - definitions of, 119, 120
 - enclosure movement on, 12, 13, 35, 36, 150
 - geography of, 119–137. *See also* Geography of information
 - and immutable mobiles, 120–121
 - and misinformation, 6–7, 177–178, 433
 - mobility of, 120, 123
 - mutability of, 120
 - political economy of, 122, 124, 137
 - and power, 120, 123, 435
- Informational development, 252
- and human development, 252, 253, 257, 285
 - value of data in, 253

- Information and communication technologies (ICTs), 31–32, 144
- access to, 183–246. *See also* ICT access
- appropriation process in, 222, 223f, 224
- in entertainment, 220, 221
- friends using, 240–241
- gender issues in, 5, 8, 89, 91–93, 111n5. *See also* Gender
- and geography of information, 121. *See also* Geography of information
- information systems approach to study of, 37
- mobile. *See* Mobile technology
- in open data, 66, 67, 68. *See also* Data, open
- in open development, 52–55, 434
- in open innovations, 59
- in open provision, 159
- in open science, 71
- in open sourcing, 60
- personal factors in use and benefits of, 219–246
- social factors affecting use of, 240–241
- social organizational models in, 37
- Information and communication technologies for development (ICT4D), 37
- access to knowledge in, 73
- contributions of, 29t, 37
- definition of openness in, 27, 37
- gender issues in, 92, 93
- open development in, 53, 54f, 54–55, 55f, 73, 74
- Information networking, 24, 27, 53
- Information revolution, geographies of information after, 124–125
- Information society, 5, 53, 151
- market-led, 5, 151
- open or commons-led, 151
- structural inequality and development in, 252–253
- Information systems (IS), 37, 53
- Infrastructure, 14, 209–210, 434
- backhaul portion of, 190, 193, 211n6
- for broadband access, 7–8, 41, 193–194, 206
- computer hardware in, 331–332
- for crowdsourcing, 386, 387f, 389–390
- demand-side value of, 175, 183, 188, 189
- electricity in, 331, 434
- functional and structural separation of operations in, 192–193
- gender issues in use of term, 102
- geographic differences in, 5, 92, 119, 137
- Internet connectivity in, 332
- last mile challenge in, 7, 15n7, 191
- local loop unbundling of, 191–192, 212n8
- mandatory open access to, 190
- in modernization approach to development, 31
- national networks in, 193–197
- nonneutrality of, 175
- nonopen proprietary market practices in, 159
- in open access, 41, 184–185
- in open education, 329–333, 347–348, 434
- in open provision ecosystem, 165
- state coordination and regulation of, 189
- supply-side value of, 188, 189
- technical capacity in, 332–333
- voluntary sharing of, 208
- for Wi-Fi, free public, 199–201
- wireless networks in, 192–193, 194–197
- Iniciativa Latinoamericana por los Datos Abiertos (ILDA), 298, 301
- Innovations, 4, 5, 51–74
- in access to knowledge movement, 35, 36
- in Africa, 403–425
- closed, 33, 57, 72
- collaborative, 33, 58, 59, 405, 407, 409, 411, 424–425
- confidentiality agreements on, 422
- copyrights in, 33, 405, 422
- costs in, 410
- in crowdsourcing, 33–34, 60, 61, 381
- for development, 51, 52–57
- education for, 65
- firm-centric approach, 33, 34, 58, 59, 60, 66, 175, 406
- Global North values affecting, 11

- Innovations (cont.)
- in high-tech hub model, 414. *See also* High-tech hubs model in Africa
 - inclusive, 51
 - in Indigenous entrepreneurship model, 414. *See also* Indigenous entrepreneurship model in Africa
 - inequalities in, 8, 9
 - informal appropriation of, 405, 409
 - in informal economy, 60, 73, 175, 409, 440
 - in informal innovation model, 414. *See also* Informal innovation model in Africa
 - information networking for, 53
 - intellectual property in, 34, 55–56, 58, 175, 403–424, 440
 - knowledge appropriation matrix on, 417–419, 419f
 - knowledge commons in, 36, 73
 - knowledge flow in, 57, 58, 73
 - knowledge governance in, 55–56, 73–74, 411, 412–423
 - open, 29t, 33–34, 42, 51–74, 403–425
 - and open data, 66, 72
 - and open development, 55
 - and open education, 52, 61, 65, 72
 - and openness, 56–59
 - in open provision, 158, 160, 175
 - and open science, 51, 52, 61, 62, 71–72
 - patents on, 33, 405, 406, 407–410, 422
 - and peer production, 33, 59, 60
 - policy and practice in, 11
 - in publicly funded research, 405, 406, 407–409
 - scalability of, 424–425
 - social change in, 28
 - trademarks on, 405
 - trade secrets in, 409, 422
- Institutional Analysis and Development (IAD) framework, 294, 359
- Institutional level of governance, 13
- Institutional model of open education, 64
- Institutional policies on open education, 337–339, 443
- Integrated Land Management Project in Argentina, 366
- Intellectual property, 13, 28, 175–176, 440
 - in access to knowledge movement, 35, 36
 - and copyleft licenses, 25, 32–33, 34
 - copyright protection of. *See* Copyright issues in Indigenous knowledge, 100, 422–423
 - in innovations, 34, 55–56, 58, 175, 403–424, 440
 - knowledge appropriation matrix on, 417–419, 419f
 - in music, 175, 409
 - in open access, 62–64, 148–151
 - in open data, 66, 67
 - in open science, 63, 68–72
 - trade agreements on, 13, 150
- Intellectual property in education, 162–163
 - and access ecosystem, 150
 - copyrights on, 148, 336, 337, 338, 409–410
 - disciplinary norms on, 337
 - free use and repurposing of, 148, 318
 - institutional policies on, 13, 337, 338
 - licensing and fair use of, 148, 318, 320, 336, 340, 342, 347, 349, 409–410
 - used and shared without license, 25, 336
- Intellectual Property Rights from Publicly Financed Research and Development Act (2008), 407–408
- Intelligent network design, 186, 187
- Intermediaries in open data, 271, 276, 277
 - adding value to data, 277, 281
 - and exclusion, 281–282
 - and inclusion, 281, 443
 - infomediary type of, 277
- International aid, open, 43n2
- International Center for Journalists (ICFJ), 297, 303
- International Development Research Centre (IDRC), 1
 - crowdsourcing case studies and analysis, 386, 387, 389, 393, 394
 - gender analysis framework for openness of, 103–107

- on inclusion and development, 2
- Open and Collaborative Science in
 - Development Network funded by, 358
- Open Data for Development research program supported by, 297
- on open development, 23, 24, 27, 42
- open education research supported by, 65
- International Open Data Conference, 102
- International Telecommunications Union (ITU), 7, 124, 125, 191
- Internet
 - access to. *See* ICT access
 - commons-based peer production on, 32
 - crowdsourcing on, 34, 60, 383, 386, 389.
 - See also* Crowdsourcing
 - decentralized architecture of, 6
 - democratic power of, 124
 - discoverability of information on, 438
 - educational resources on, 148. *See also*
 - Educational resources and practices, open
 - end-to-end architecture in, 185, 187
 - feminist, 109
 - free and open, 41, 185, 186, 187–188
 - geography of information on. *See* Geography of information
 - in informational and human development, 252
 - intellectual property protection on, 62–64, 148, 175. *See also* Intellectual property
 - intelligent network design in, 186, 187
 - knowledge governance on, 13
 - open data on, 266. *See also* Data, open
 - open information on, 2, 120, 125
 - open provision practices on, 165–166, 171, 177
 - over-the-top applications on, 186, 211n5
 - and participation in open activities, 219
 - privacy and security on, 177
 - replicating and distributing content on, 27, 38, 62–64
 - social value of, 186, 187, 207
 - total amount of data on, 146
 - Trans-Pacific Partnership provisions on, 150
 - user-generated content on, 6, 146
 - walled gardens on, 186
 - zero-rating of services on, 184, 186, 187, 201–202, 202t, 208–209
- Internet Service Providers, 186
- Ipaidabribe crowdsourcing platform, 384t
- iParticipate (Uganda), 262t, 275t, 276
- Iran, GeoNames content on, 135
- Islamic State of Iraq and Syria, 6
- Island states, open science in, 367t
- ISSSTESON, 300, 301
- Jáchal-Veladero mining controversy, 369–370
- Jaffrey, Shumaila, 108
- Jaguar conservation in Argentina, open science project on, 370
- Jakarta, Indonesia, smart city initiative in, 259t
- Jamaica, open mapping project in, 259t, 266
- Janssen, Marijn, 265, 276
- Job searching, crowdsourcing projects on
 - gender issues in, 390
 - inclusion in, 397t
 - infrastructure for, 390
 - linkages and trust in, 391
 - Nubelo. *See* Nubelo crowdsourcing project in Sri Lanka, 388t, 392, 393, 397t
 - vision and strategy in, 393
- Job searching, Internet access for, 220, 221, 230, 232, 235, 246
 - device types used in, 236f, 243, 243f
 - location of, 234f, 235, 243–244, 243f
 - multivariate analysis of, 239, 241, 243–244
 - tasks in, 233t
- Johannesburg (South Africa)
 - telecommunications initiatives, 199, 200
- Johnson, Jeffrey A., 266
- Journal articles
 - information geography of, 136, 138n9
 - scholarly open access, 9–10, 63
- Justice
 - cognitive, 102, 360–361, 370–371, 372, 437
 - social, 322, 325f

- Kabeer, Naila, 112n14
- KakaoTalk, 202
- Karnataka, India
 Bhoomi Program in, 261t, 268–269, 273t
 electricity supply in, 331
 open education in, 329, 331, 332, 334
 ROER4D project in, 103–105, 107
- Karnataka Open Educational Resources (KOER), 329, 334
- Kasinathan, Gurumurthy, 329
- Kathmandu Living Labs, 268, 271
 earthquake mapping initiative, 263t, 268, 271, 275t, 276
- Kawooya, Dick, 409
- Kenya
 Internet use of women in, 92, 93
 open access scholarly publishing in, 411
 open access telecommunications in, 194, 195, 203, 207
 open government data in, 8, 260t, 269, 272t, 276
 open science in, 367t, 368, 371, 373
 Wikipedia contributors from, 130, 436
- Kenya, crowdsourcing in, 381, 384t, 385, 388t, 389
 for election monitoring, 388t, 390, 397t
 external environment in, 392
 human capital in, 390, 391
 iCow platform in, 384t
 inclusion in, 397t
 infrastructure in, 390
 Ipaidabiribe, 384t
 Twitter analysis in, 381, 388t, 390
 Una Hakika, 381, 388t, 389, 391–392
 Ushahidi, 161, 384t
- Kenya, open education in, 318
 educator use of, 327, 327t, 330f
 learner use of, 328, 328t, 329, 330f
- Khan Academy (Chile), 329, 333
- Knight Foundation, 303
- Knowledge, 28, 37–39
 in access to knowledge movement, 29t, 34–35, 36, 44–45nn11–12
 creation and adaptation of, 435–436
 definition of, 43n3
 in definition of openness, 27, 28
 discoverability of, 438
 distribution of. *See* Distribution of content/
 knowledge
 and empowerment, 431
 enclosure of, 12, 13, 35
 equity in, 433
 e-structure of, 419f, 420f
 and gender, 99–101, 106–107
 and geography of information, 119–125
 governance of. *See* Knowledge governance
 Indigenous. *See* Indigenous knowledge
 legal formality of, 417, 419f, 420f
 modern, 99
 object of, 417, 419f, 420f
 open, 38
 in openness as praxis, 37–39
 and power, 99, 100, 106, 357, 435
 production of. *See* Production of content/
 knowledge
 as public good, 35, 151, 152, 431, 439–440, 441–442
 scientific, 100–101
 situatedness of, 99–101
 specificity of, 417, 419f, 420f
 use of. *See* Use of open content and
 knowledge
- Knowledge appropriation matrix, 417–419, 419f
- Knowledge broker artifact, 368
- Knowledge commons, 36, 151–152, 172t
 in access to knowledge movement, 36
 action arenas in, 297
 background environment of, 295t, 296
 basic attributes of, 295t, 296–297
 community members in, 295t, 296, 300, 302, 306
 compared to natural resource commons, 36, 151, 171, 296, 359
 digital, 23, 38, 151–152, 294, 441–442
 dominance of Global North affecting, 437

- in education, 152
- enclosure movement affecting, 12, 13
- facilitation of inclusion in, 441–442
- goals and objectives in, 295t, 296–297
- governance of. *See* Knowledge governance
- in health data, 292, 294–297, 298, 308–313
- in innovations, 36, 73
- nonrivalry in use of, 171, 313n2
- open access to, 152
- in open development, 23, 29t, 38, 73, 440, 441f
- open practices contributing to, 431
- outcomes in, 295t, 297
- rapid growth of, 171
- research framework on, 294–297, 295t, 359
- in science, 70, 71, 73
- shared infrastructure in, 311, 313
- traditional, in South Africa, 411
- use of term, 36, 38, 294
- in Wikipedia, 294, 313n3
- Knowledge economy, 99, 151–152, 403, 442
- Knowledge flow in innovations, 57, 58, 73
- Knowledge governance
 - access, equity, and sustainability as goals in, 36
 - in Africa, 411, 412–423
 - community in, 13, 29t, 36
 - in high-tech hubs, 421–422
 - in innovations, 55–56, 73–74, 411, 412–423
 - intellectual property rights in. *See* Intellectual property
 - legal tools in, 54, 55–56
 - levels of, 13, 36
 - need for new models of, 439–440
 - in open access, 151
 - in open data, 292, 294, 295t, 297, 300–301, 308–312
 - in open development, 54, 55–56
 - in open education, 13, 61, 65, 151
- Knowledge graph of Google, 133
- Knowledge society, 27, 151–152, 442
- Knox, Jeremy, 324
- Kosovo, open data projects in, 258t–259t, 264, 265, 266
- Krämer, Jan, 185
- Kuechler, Victor, 96
- Kyrgyzstan, OCSDNet projects in, 102, 364, 372, 373
 - on water quality, 362t, 363
- Labor
 - gender issues in, 97, 98, 99
 - in knowledge economy, 99
 - in microwork, 98
 - in open innovations, 58
 - of Wikipedia contributors, 97
- Lam, Shyong T. K., 97
- Land records in India, digitization of, 261t, 268–269, 273t
- Lane, Andy, 96
- Language
 - of educational materials, 334, 343, 348, 437, 439
 - gender issues in, 101, 102, 436
- Indigenous, 240
- and Internet use, 237t, 240
- Laptop computers, access to Internet with, 226, 229, 230t, 241–242, 243, 245
- La Rebelión de los Enfermos (Mexico), 291, 297, 299–301
 - background environment in, 299, 310t
 - community members in, 300, 311
 - data scraping in, 312
 - description of, 298t, 310t
 - engagement in, 310t
 - goals and objectives in, 299–300
 - governance and action arena in, 300–301
 - government response to, 308
 - institutional form and rules in, 310t
 - outcomes in, 301
 - resources in, 300
 - standardization of data in, 301
 - user contributions in, 311
- Last mile challenge, 7, 15n7, 191

- Latin America. *See also specific countries.*
 air quality data in, 258t, 264
 buen vivir (good living) tradition in, 360
 ICT access and benefits of open models in,
 219–246, 434, 436
 microwork in, 9, 98
 mobile technology in, 229–230
 open government activities in, 435
 open health data in, 291–313
 open science in, 71, 367t, 369
 OpenStreetMap content on, 132
 Wikipedia contributors from, 130, 131f
- Latin American Open Data Initiative, 298
- Latour, Bruno, 120
- Lebanon, OCSDNet projects in, 102, 364,
 374
 on water quality, 4, 102, 362t, 363, 435
- Lee, Robin, 186
- Legal issues, 54, 55–56
 in copyrights. *See* Copyright issues
 definition of open in, 56
 in free and illegal sharing, 38, 42, 147–148
 in knowledge appropriation, 417–419
 in open access, 63, 147–151
 in open data, 66
 in open education, 318, 336, 337
 in open-source software, 61
- Lemos, Renaldo, 175
- Lessig, Lawrence, 98, 124, 187
- Liang, Lawrence, 152n2
- Libraries, 171
 Darakht-e Danesh, open educational
 resources from, 3, 163, 334, 437, 442
- Licensing, 148
 copyleft, 25, 32–33, 34
 in high-tech hubs model, 421
 in open access, 63–64
 in open data, 66
 in open education, 148, 162–163, 174, 318,
 320, 336, 340, 342, 347, 349, 409–410
 in openness, 56
 in open-source software, 61
 in science, 69
- Linkages and trust required for crowdsourcing,
 386, 387f, 391–392
- LIRNEAsia, 381, 389, 390, 392, 393
- Literature. *See also* Books
 open access to, 62–64
 scholarly. *See* Scholarly publishing
- Local loop unbundling, 191–192, 212n8
- Location, and geography of information.
See Geography of information
- Location of Internet access, 225, 226–227, 235,
 245–246
 benefits of open resources conditioned by,
 434–435
 for education-related activities, 234f, 242,
 242f
 for government-related activities, 234f, 244f
 for job searching, 234f, 235, 243–244, 243f
 marginal average effects of, 242f, 243f, 244f
 multivariate analysis of, 238t, 241, 242–245
 and socioeconomic characteristics of users,
 226–227, 228t, 229t
- Lokanathan, Sriganesh, 390, 393
- Long-term evolution (LTE) spectrum, 195,
 197, 199
- Macaulay, Thomas B., 149
- Machine-learning techniques in targeted
 propaganda, 6
- Madison, Michael J., 292, 308, 359
- Maitland, Carleen, 10
- Maji Matone (Tanzania), 396
- Makerere University, 409
- Maker movement, 363
- Malaysia, open data projects in, 259t,
 266–267
- Malaysia, open education in, 318
 educator use of, 327, 327t, 330f
 infrastructure in, 333
 institutional policies on, 338–339
 learner use of, 328, 328t, 329, 330f
- Mandatory open access telecommunications,
 189–197, 203
 broadband networks in, 193–194

- compared to voluntary open access, 190f, 204t–205t
 - functional and structural separation of services in, 192–193
 - local loop unbundling in, 191–192, 212n8
 - national networks in, 193–197
 - wireless networks in, 194–197
- Mandela, Nelson, 412
- Mansell, Robin, 5, 34, 383, 384, 386
- Marginalized populations, 7
- engagement of, 443
 - in open data initiatives, 67
 - in participatory development, 31
- Market institutions in open innovation, 58
- Market-led information society, 5, 151
- Masika, Rachel, 396
- Massachusetts Institute of Technology, 9, 64, 163, 334
- Massive open online courses (MOOCs), 163
- availability of appropriate materials for, 333, 334
 - awareness of, 335, 336
 - business models of, 64
 - collaboration in, 341–342, 343
 - copyright issues in, 336
 - costs in, 64–65
 - development-focused, 10
 - empowerment in, 346, 349
 - extended (xMOOCs), 349
 - institutional support of, 338
 - learner-centered approach in, 348–349
 - licensing of materials in, 349
 - participant characteristics, 9, 10
- Mastropieri, Margo A., 324
- Matthew Effect, 10
- Mauritius, open education in, 318
- awareness of, 335
 - educator use of, 328
 - empowerment in, 346
 - infrastructure in, 331, 332
 - institutional policies on, 338, 339
- Mazimpaka, Jean Damascène, 226
- McDuffie, Kimberley A., 324
- McKinsey Institute, 67
- McMahon, Rob, 53
- McPherson, Maggie A., 323
- Medical records, electronic, 160
- Medicine Price Registry (South Africa), 268, 276
- description of, 260t
 - inclusion in, 281
 - opportune niches in, 272t
 - value of data in, 277
- Medic Mobile, 384t
- Mejora Tu Escuela (Mexico), 165
- Merton, Robert K., 68
- Metasynthesis of ROER4D studies, 324–326
- Mexico
- La Rebelión de los Enfermos in. *See* La Rebelión de los Enfermos
 - Mejora Tu Escuela in, 165
 - open access telecommunications in, 194–195, 197, 206–207
 - open government data on education in, 165
 - open science project on migrant issues in, 370
- Mgbeoji, Ikechi, 408
- Microwork
- crowdsourcing in, 381, 383, 385, 388t, 398, 400n4
 - external environment in, 392
 - gender in, 98, 390
 - human capital in, 390
 - inclusion in, 385, 389, 391, 393, 395, 397t, 398
 - infrastructure in, 389
 - in Latin America, 9, 98
 - linkages and trust in, 391
 - vision and strategy in, 393
- Middle East, 6
- GitHub users in, 127, 436
 - Wikipedia contributors from, 130, 131f
- Migrant issues in Mexico, open science project on, 370
- Mizukami, Pedro N., 175
- Millennium Development Goals, 91–92, 323

- Minde, Arnold, 260t, 272t
- “Mind-the-Gap” OER self-study guides, 334
- Mining activities
- open data project in Indonesia on, 262t–263t, 269, 271, 275t, 278
 - open science project on Jáchal-Veladero controversy in, 369–370
- Mishra, Sanjaya, 331
- Misinformation, 6–7, 177–178, 433
- Mobile technology, 31–32
- affordability of, 229, 245
 - After Access Survey on use of, 230, 230t, 231t, 232t, 238t, 245
 - application programming interface in, 192, 193
 - benefits of open resources conditioned by, 434–435
 - broadband investment for, 206
 - in crowdsourcing, 385, 389, 390, 394
 - design of platforms for, 226
 - and digital poverty, 8
 - in educational activities, 236f, 242, 242f
 - fifth generation (5G), 208, 212n14
 - fourth generation (4G), 196, 212n14
 - gender differences in use of, 92–93
 - global population without use of, 7
 - and Global System for Mobile Communications (GSM), 208
 - in government-related activities, 236f, 244f
 - increasing use of, 6, 7, 229–230
 - infrastructure for, 5, 7, 206
 - in job searching activities, 236f, 243, 243f
 - mandatory open access in, 192–193, 194–197, 203, 207
 - marginal average effects of, 242f, 243f, 244f
 - national open access wireless networks in, 194–197
 - as only Internet access device, 231t, 232t, 235, 238t
 - probability of carrying out open activities with, 236f, 238t, 242, 243, 245, 434–435
 - sociodemographic characteristics of users, 230, 231t, 232t
 - third generation (3G), 199
 - and Wi-Fi, free public, 199–201
 - zero-rating services in, 201–202, 202t, 209
- Model Forests approach to sustainable development, 363, 375n13
- Moldova, open government data in, 258t
- Mongolia, open education in, 318, 328
- awareness of, 335, 336
 - disciplinary norms in, 337
 - empowerment in, 343
 - institutional policies on, 338
- Monopolies
- in copyright protection, 149
 - in scholarly publishing, 10
 - in telecommunications, 175, 183, 188, 189, 191, 192, 197, 206
- Montenegro, open government data in, 258t, 265
- MOOCs. *See* Massive open online courses
- Moss Committee, 44n6
- Motivation in crowdsourcing, 385, 387, 395–396
- Mozambique, 93
- Mozilla Equal Rating, 202t
- Mozilla Firefox, 160
- MTN Group Limited, 196, 212n13
- Mugiraneza, Théodomir, 226
- Music, intellectual property in, 175, 409
- Myanmar, crowdsourcing in, 391
- external environment in, 392
 - human capital in, 391
 - linkages and trust in, 391
 - Peaceful Truth project. *See* Peaceful Truth crowdsourcing project
- mySociety open-source software, 96
- Nagoya Protocol on Access and Benefit Sharing, 423
- Nam, Taewoo, 241
- National Geospatial-Intelligence Agency, 135
- National Health Surveillance Department (Paraguay), 260t–261t, 268
- Nationalism, 6, 283

- National level of governance, 13
- Natural commons, 36, 151, 171, 294, 296, 359
- Ncube, Caroline B., 407, 408, 409
- Nelson, Richard R., 68
- Neoliberalism
 - access in, 322, 325f, 347
 - economic policies in, 44n8
 - participation in, 322
 - social inclusion in, 321, 322
- Neotel, 193, 196, 201, 212n13
- Nepal
 - GeoNames content on, 135
 - open data projects in, 263t, 268, 269, 275t
- Netflix, 171
- Netherlands
 - GitHub users in, 127
 - OpenStreetMap content on, 132
 - piracy of ebooks in, 153n3
 - Wikipedia contributors from, 129
- Net neutrality, 12, 185–186, 187, 211n4
 - and zero-rating practices, 202, 208
- Networked power, 256, 280
 - redistribution of, 281
- Network inclusion, compared to social inclusion, 280–281, 284
- Networking power, 256, 281
- Network-making power, 256
- Network power, 256
- Network society, 27, 282, 285
 - counterpower in, 256, 282
 - definition of openness in, 27
 - exclusion in, 257
 - and knowledge society, 27
 - piracy cultures in, 148
 - power in, 251, 256–257, 264, 276, 280
 - social order of, 252
 - value in, 276
- New Argentinian Virtual Observatory (NOVA), 366
- Newton, Isaac, 150
- New Zealand, GitHub users in, 127
- Nigeria
 - access to textile designs in, 411
 - film industry in, 421–422
- gender differences in Internet use in, 92, 93
- open access telecommunications in, 194, 203
- Wikipedia contributors from, 130, 436
- Nondiscrimination
 - in definition of openness, 39, 41
 - gender issues in, 88, 93, 94t, 98
 - in telecommunications access, 41, 184–185, 190, 193, 211n2
- Nonexclusive goods, 170t, 171, 172t
- Nongovernmental organizations, 439
 - and open government data, 164–165
 - and open health data, 299–301
- Nonopen goods, 172t
- Nonprofit sector, open practices in, 157–158, 171, 173
 - compared to public and private sectors, 159t
 - economics of, 166, 169
 - in education, 163–164
 - nonexclusive goods in, 171
- Nonproprietary characteristic in open provision, 159
- Normative welfare economics, 158, 166–168
 - compared to human development and capability approach, 168–169, 169t
 - public goods in, 167, 168, 169, 173
- Norms
 - equity concern in, 35
 - gender issues in, 88, 92, 96
 - on inclusion and development, 2, 13, 31
 - on intellectual property, 25
 - in knowledge access and use, 25, 36, 38, 54, 56
 - in open innovations, 54
- North Africa, 6, 130, 131f
- North America, 130, 131f, 135
- North Korea, GeoNames content on, 135
- Nubelo crowdsourcing project, 388t
 - inclusion in, 397t
 - infrastructure in, 390
 - linkages and trust in, 391
 - vision and strategy in, 393
- Nussbaum, Martha C., 53

- Oates, Lauryn, 107
- Obama, Barack, 44n7, 63
- Obeyskare, Eric, 10
- Occupation
 and devices used for Internet access, 231t, 232t
 and location of Internet access, 226, 228t, 229t
- Oceania, Wikipedia contributors from, 130, 131f
- OCSDNet. *See* Open and Collaborative Science in Development Network
- OCSDNet Manifesto*, 360, 372, 375n16
- OD4Environment Gjakovo (Albania), 258t
- OER and OEP. *See* Educational resources and practices, open
- OER-integrated Teaching and Learning (OERTL) system, 334
- Offline resources and processes in openness, 27, 54
 in informal economy, 60
 in open data, 66
 in open education, 105
 in open government, 27
- Oguamanam, Chidi, 409
- OjoPúblico open health data initiative, 302–305
- Open access, 62–64, 143–152. *See also* Access
- Open African Innovation Research (Open AIR), 71, 403–425
- Open and Collaborative Science in Development Network (OCSDNet), 100–101, 102, 357–374
 in Argentina, 365t, 366, 369–370, 371, 372
 in Brazil, 365–366, 368–369, 371, 372, 373
 in Caribbean, 368
 cognitive justice in, 102, 360–361
 in Colombia, 362t, 363, 371
 conceptual framework and research methodologies of, 359–361, 372
 in Costa Rica, 362t, 363, 371
 findings from, 361–371
 on gendered barriers, 436
 in Haiti, 102, 367t, 370–371
 on Indigenous knowledge and climate change adaptation, 106, 367t, 368, 374
 in Kenya, 367t, 368, 371, 373
 in Kyrgyzstan, 102, 362t, 363, 364, 372, 373
 in Latin America, 367t, 369
 in Lebanon, 102, 362t, 363, 364, 374, 435
 in Mexico, 370
 Project SOHA of, 370–371
 in Small Island Developing States, 367t, 368, 371
 in South Africa, 367t, 367–368, 371, 372, 374
 in Southeast Asia, 362t, 363
 in West Africa, 367t, 370–371, 373
- Open and openness
 abundance model of, 146–147, 183
 in access, 143–152
 barriers to, 436–437, 444
 concepts of, 2, 61–62, 410–411
 in data. *See* Data, open
 definitions of, 23–28, 41–43, 53, 56, 62, 158, 219, 221
 digital, 25, 27, 434
 in education. *See* Educational resources and practices, open
 enclosure movement affecting, 12, 13, 35, 150, 283, 284, 444
 free use in. *See* Free to use/participate
 gender issues in, 87–110
 and geography of information, 119–137
 inequality in, 5–12
 legal issues in, 56. *See also* Legal issues
 multiple interpretations of, 42–43, 52, 56, 57, 65, 72
 nondiscrimination in. *See* Nondiscrimination
 offline resources and processes in, 27, 54. *See also* Offline resources and processes in openness
 personal factors affecting benefits of, 219–246
 policy and practice dynamics in, 10–12
 as praxis, 23, 28, 37–42, 43n1
 in provision, 157–178

- in science. *See* Science, open
- social norms in, 56
- in telecommunications, 183–210
- Open CourseWare of MIT, 64, 163, 334
- Open data. *See* Data, open
- Open Data Barometer, 8, 299
- Open Data Durban, 259t
- Open Data for Development (OD4D), 257, 285nn3–5, 297
 - analysis of projects of, 257–285
 - change theories in, 257, 285n4
- Open Data Handbook*, 66
- Open Data Index (2017), 299
- Open Data Institute, 3, 67
- Open Data Kosovo, 258t
- Open development
 - action orientation of, 28, 432
 - contributing schools of thought on, 28–37
 - definitions of, 23–28, 42, 43n2, 434, 445n2
 - foundational assumptions of, 431–432
 - inclusive potential of, 431–445
 - in information and communication technologies, 52–55
 - in international aid, 43n2
 - knowledge commons in, 23, 29t, 38, 73, 440, 441f
 - knowledge governance in, 55–56
 - and open innovation, 52
- Open Development Cambodia, 261t, 269, 274t, 276
- Open Development: Networked Innovations in International Development*, 1
- Open education. *See* Educational resources and practices, open
- Open Educational Resources Declaration (2012), 45n11
- Open Education Dashboards (Tanzania), 260t, 272t, 277
- Open government data. *See* Government data, open
- Open Government Declaration, 44n7
- Open Government Partnership, 6, 11, 44n7, 302
- Open Heroines, 102
- Open innovation, 29t, 33–34, 42, 51–74, 403–425
- Open Knowledge Foundation, 299
- Open Knowledge International, 38
- Open Medical Records System, 160
- Open Office, 160
- Open procurement Kosovo, 258t–259t
- Open provision, 157–178
- Open science. *See* Science, open
- Open Source Drug Discovery, 161
- Open sourcing, 59
 - of software. *See* Software, open-source
- OpenStreetMap, 119, 132, 138n6
- Openwashing, 12, 15n9, 65, 72
- Opportune niches in open data, 270–276, 282, 284
 - and value transfer, 278
- Organisation for Economic Development (OECD), 51, 132, 144, 191, 299
- Ostrom, Elinor, 36, 73, 188, 292, 294, 297, 359
- Ostrom, Vincent, 36
- Ouma, Marisella, 409
- Outsourcing, compared to crowdsourcing, 33, 383
- Over-the-top (OTT) applications, 186, 211n5
- Oyewunmi, Adejoke, 409
- Pakistan
 - online harassment in, 108
 - open education in, 318, 334, 345
- Pallais, Amanda, 393
- Palmer Development Group, 259t
- Paraguay
 - gender and Internet use in, 93
 - income in, 220
 - language and Internet use in, 240
 - mobile phones in, 92
- Paraguay, open data project on dengue fever in, 268
 - description of, 260t–261t
 - opportune niches in, 273t
 - value of data in, 277, 278, 279

- Participation
 and access, 9, 41, 92, 95–97, 434–435
 application level governance of, 13
 in collaboration and communities of
 practice, 341–342, 348
 in crowdsourcing, 34, 59, 60, 100, 383, 384,
 385, 396, 398
 in definition of openness, 24, 28, 39, 41, 56
 in digital age, 124
 in digital poverty, 8
 disciplinary norms affecting, 336–337
 empowerment in, 432, 433, 435
 exclusion affecting, 432
 gender issues in, 9, 87–110, 364, 436, 442–
 443, 445n3
 geography affecting, 9, 95, 119, 124, 125–
 130, 136, 137, 432, 436
 in GitHub, 125–127, 436
 incentives for, 393, 396
 and inclusion, 31, 253–254, 255, 322, 323–
 324, 336–342, 386, 432, 435
 in information and communication
 technologies, 31, 32, 92
 institutional policies affecting, 337–339
 language affecting, 101, 102, 436
 in open data, 8, 30, 251, 253–254, 283–284,
 433
 in open education, 9, 10, 103–105, 107, 319,
 322, 323–324, 336–342, 348–349, 432
 in open science, 101, 102, 357
 pedagogical practices affecting, 339–341
 in peer production, 100
 and power, 95–96, 107, 111n8, 357, 398
 spaces for, 95–96, 102, 107–109
 theory and practice of, 31
 in Wikipedia, 9, 119, 127–130, 136, 436
- Participation fatigue in crowdsourcing, 396,
 398
- Participatory action research, 375n12
 on education in Colombia, 344–345
 on open science at grassroots level, 362–363
- Participatory development, 12, 29t, 30–31,
 44nn9–10
- Paskevicius, Michael, 324
- Patents, 405, 406, 407–410
 in firm-centric innovation, 33
 in high-tech hubs model, 422
 in informal innovation model, 422
 in open-source software, 61
 in science, 69, 70
- PayPal, 389
- PC computers, access to Internet with, 230t,
 241–243, 245
 for education-related activities, 236f, 242f
 for government-related activities, 236f, 244f
 for job searching, 236f, 243f
 marginal average effects in, 242f, 243f, 244f
 probability and number of tasks in, 238t
 socioeconomic profile in, 231t, 232t
- Peaceful Truth crowdsourcing project, 381,
 388t
 external environment in, 392
 inclusion in, 395, 397t
 infrastructure in, 389
 linkages and trust in, 391
 vision and strategy in, 395
- Pedagogical practices affecting participation in
 open education, 339–341, 435
- Peer production, 9, 38, 39t, 433
 benefits and costs in, 167t
 collaborative, 9, 32, 33, 59, 405
 commons-based, 29t, 32–33, 34, 41t,
 160–161
 and crowdsourcing, 34, 60
 firm-based, 178n8
 and innovation, 33, 59, 60
 nonopen practices in, 161t
 in nonprofit, public, and private sectors,
 159t
 in open provision, 159, 159t, 160–161, 161t,
 167t
 of open-source software, 32–33, 60–61
 participation in, 100
 of Wikipedia, 9, 33, 60, 161
- Peer review in open education, 319, 435
- Peixoto, Tiago, 9, 164, 254, 286n8, 291, 311

- Pelembe, Simão, 410
- Perampalam, S., 393
- Permanent Identification (Permid) system, 67
- Perryman, Leigh-Anne, 92, 324
- Peru
- Cuidados Intensivos in. *See* Cuidados Intensivos
 - income in, 220
 - language and Internet use in, 240, 246n7
 - open government efforts in, 302, 303
- Peters, Michael A., 321
- Philippines, open education in, 10, 318
- Piracy cultures, 147–148, 153n3
- Plagiarism, 148
- Plantwise initiative, 384t
- Political economy of information, 122, 124, 137
- Power
- categories of, 102, 104t, 105, 106, 109
 - and counterpower, 256, 282
 - disruption of data flows affecting, 267, 268
 - exclusion from, 256
 - and gender, 95–96, 98, 99, 101–102, 103–105, 106, 107, 108, 109
 - in human development and capability approach, 169
 - and inclusion in political participation, 255, 256
 - and information, 120, 123, 435
 - and knowledge, 99, 100, 106, 357, 435
 - in network society, 251, 256–257, 264, 276, 280
 - nodes of, 255, 267, 268, 276, 278, 280, 281, 284, 285n2
 - and open data, 251, 278, 280, 281, 284, 285
 - and participation, 95–96, 107, 111n8, 357, 398
 - value as expression of, 276
 - visible, invisible, and hidden types of, 96, 111n8
- Power Cube, 96, 111n8
- Praxis, openness as, 23, 28, 37–42, 43n1
- Prayas Energy Group, 262t, 274t
- Predigital geographies of information, 122–123
- Premise microwork platform, 400n4
- Pretty, Jules N., 255
- Privacy and security, 7, 14
- in crowdsourcing, 386, 391
 - in free services, 165, 187–188
 - in information and communication technologies, 32
 - in open data, 9, 67
 - in open provision, 165, 166, 174, 177, 187–188
 - right to, 32
 - social value of, 187
- Private sector
- crowdsourcing initiatives in, 162, 163t
 - economic value of open provision for, 157, 158, 174
 - nonexclusive goods provided by, 171
 - open data used by, 9, 67, 174
 - open practices of, 159t, 162, 163t, 169
 - in open science, 439
 - open-source software developed by, 160
 - in telecommunications, 188, 189
- Product complexity, and open innovation, 58–59
- Production of content/knowledge, 4, 13, 433, 435–436
- in access to knowledge movement, 34, 88
 - barriers to, 444
 - crowdsourcing in. *See* Crowdsourcing
 - in definition of openness, 14, 25–26, 27, 28, 38, 158, 219
 - in education, 152
 - facilitation of inclusion in, 442
 - gender issues in, 88, 94t, 98, 109, 110
 - geography of, 121–122, 125–130
 - in GitHub, 125–127
 - government role in, 440
 - in information age, 124
 - in knowledge commons, 36
 - in open development as inclusion, 441f
 - in open information, 120

- Production of content/knowledge (cont.)
 in openness as praxis, 37, 38
 in open provision, 158–159, 160–161
 in open science, 357, 358
 in open telecommunications, 201
 peer production in. *See* Peer production
 policy and practice in, 10–11
 in Wikipedia, 127–130
- Project Isizwe, 200
- Project SOHA, 370–371
- Promise Tracker crowdsourcing tool, 394
- Propaganda, 6–7
- Proprietary, compared to open, 56
- Proprietary data, 66
- Proprietary science, 68–69, 71
- Provision of goods and services, open,
 157–178
 and bads, 173, 174, 177
 benefits and costs in, 166, 167t
 crowdsourcing in, 159, 161–162, 167t
 definitions of, 158–159
 in digital world, 170–173
 economics of, 158, 166–173, 175, 176, 178
 employment and social protection issues in,
 176–177
 government role in, 174
 human development and capability
 approach, 158, 166, 168–169, 173, 177
 intellectual property protection in, 175–176
 peer production in, 159, 160–161, 167t
 platforms in, 165
 policy and research implications of, 173–178
 privacy and security in, 177
 public and private goods in, 158, 169–173
 sharing and republishing in, 159, 162–165
- Public funding
 of education, 144, 173, 174
 intellectual property rights in, 69, 405, 406,
 407–409
 and open access to literature, 63
 of open science, 69, 71, 72, 407
- Public goods, 169–173, 183
 in digital world, 170–173
 education as, 146, 173, 174, 323
 excludability in, 170, 170t, 171
 government role in, 35, 169–170, 173, 174,
 440, 442
 knowledge as, 35, 151, 152, 431, 439–440,
 441–442
 in normative welfare economics, 167, 168,
 169, 173
 open data as, 173, 174, 253, 433
 rivalry in, 170, 170t, 171
 telecommunications as, 188, 210
- Public spaces, access to Internet from, 226,
 227t, 232, 246
 benefits of open resources in, 435
 marginal average effects of, 242f, 243f,
 244f
 multivariate analysis of, 238t, 241, 242, 243
 socioeconomic profile in, 228t, 229t
 tasks in, 234f
- Publishing, 145, 334
 business models in, 145
 open access in, 62–64
 and republishing, 159, 159t, 162–165
 scholarly. *See* Scholarly publishing
- Quakemap initiative, 263t, 275t
- Rabab'ah, Ghaleb, 226
- Ranganathan, Sriranjani, 329
- Reagle, Joseph M., 108
- Real estate, open practices in, 162
- Red Compartida, 195
- Redistribution, 33
 of open educational resources, 38, 40t, 103,
 319, 335
 of open health data, 293
 of open-source software, 61
 of power, 281, 284
- Regulation of telecommunications, 41, 184–
 188, 210, 211n7, 211nn3–4
 in mandatory open access, 189–197, 203
 in zero-rating services, 202
- Reilly, Katherine M. A., 53, 255

- Remix, in open practices, 159, 435
in affective economy, 148
benefits and costs in, 167t
in Creative Commons license, 33, 63
in education, 38, 40t, 103, 318, 319, 335
in nonprofit, public, and private sectors, 159t
and use-as-remix, 435, 443
- Representation
geographies of, 119, 125, 132–136, 137
in inclusion, 385–386, 393, 398–399, 432
- Republishing, in open provision, 159, 159t, 162–165
- Research and development
gross domestic spending on, 144
innovations in, 33, 403, 406
intellectual property protection in, 175
open and collaborative, 161, 360
- Research ICT Africa (RIA), 209
- Research on Open Educational Resources for Development (ROER4D), 317–349, 375n14, 438
on access, 326–336
on empowerment, 342–347
GAFO analysis of, 103–105
on licensing and fair use of materials, 148
metasynthesis approach in, 324–326
on participation, 336–342
on social inclusion, 321
on spaces for gendered participation, 107
- Respiraciudad.org project in Latin America, 258t
- Retain, in open practices, 159
in education, 38, 40t, 319
in nonprofit, public, and private sectors, 159t
- Reuse, in open practices, 159
benefits and costs in, 167t
in education, 38, 40t, 318
in nonprofit, public, and private sectors, 159t
in peer production, 161
- Revise, in open practices, 159
benefits and costs in, 167t
in education, 38, 40t, 318
in nonprofit, public, and private sectors, 159t
- Richter, Thomas, 323
- Right to Research, 360
- RISE Moldova, 258t
- Rivalry in public and private goods, 170, 170t, 171
- Rizk, Nagla, 409
- Roberts, Tony, 89, 109
- ROER4D. *See* Research on Open Educational Resources for Development
- Rubinstein, Mor, 102
- Rules-in-use of commons, 297
- Rumbul, Rebecca, 8, 385
- Rumie Initiative, 163–164
- Rural areas, 7
last mile challenge in, 7, 15n7
open education access in, 332, 347
uses of Internet access in, 237t, 240
- Russia
misinformation campaigns of, 177–178
MOOC participants in, 9
OpenStreetMap content on, 132
piracy of ebooks in, 153n3
- Rwanda, 93
open access telecommunications in, 199, 207
open data project in, 259t, 266
- SA Connect, 195, 198, 199, 200
- Saenz Rodriguez, Maria Pilar, 107
- Safaricom, 194
- Sambuli, Nanjira, 383, 395, 396
- Sameness concept in gender equality and inclusion, 89
- Sangakoya, Dave, 308, 309t
- Scalability, 424–425
- Scarcity model of education, 146
- Schnurr, Daniel, 185

- Scholarly publishing
 access to, 9–10, 12, 63, 68, 143, 144, 147, 411
 bias in, 10, 63
 discoverability of, 438
 of Global South research, 9, 147
- School setting, access to Internet from, 225, 226, 227t, 246
- Science, open, 68–72, 357–374
 in Argentina, 365t, 366, 369–370, 371, 372
 in Brazil, 365–366, 367t, 368–369, 371, 372, 373
 in Caribbean, 368
 in citizen science initiatives, 361–364. *See also* Citizen science
 cognitive justice in, 437
 in Colombia, 362t, 363, 371
 conceptual framework and methodologies in
 research on, 359–361, 372
 in Costa Rica, 362t, 363, 371
 economics of, 68–72
 empowerment in, 372
 funding of, 69, 72, 372–373, 407
 at grassroots level, 361–364
 in Haiti, 367t, 370–371
 inclusion in, 357–374, 382
 and innovation, 51, 52, 61, 62, 71–72
 intellectual property in, 63, 68–72
 interdisciplinary research in, 373
 in Kenya, 367t, 368, 371, 373
 knowledge commons in, 70, 71, 73
 in Kyrgyzstan, 362t, 363, 364, 372, 373
 language affecting participation in, 101, 102
 in Latin America, 71, 367t, 369
 in Lebanon, 4, 102, 362t, 363, 364, 374, 435
 in Mexico, 370
 and open access, 62, 63, 68, 143
 and open data, 68
 potential benefit to society, 4
 private sector partnerships in, 439
 in Small Island Developing States, 367t, 368, 371
 in South Africa, 71, 367t, 367–368, 371, 372, 374
 in Southeast Asia, 362t, 363
 timelines of projects in, 372–373
 in water quality monitoring, 4, 102, 362t, 363, 435
 in West Africa, 367t, 370–371, 373
- Science, proprietary, 68–69, 71
- Scientific method, 100
- Sci-Hub site, 63
- Scrollini, Fabrizio, 293, 308, 309t, 314n4
- Scruggs, Thomas E., 324
- Seacom, 197, 206
- Security. *See* Privacy and security
- Selwyn, Neil, 221, 223f, 224
- Semantic Web, 132–136
- Sen, Amartya, 53, 89, 168, 360
- Sentinel Project, 381, 391, 395
- Seward, Ruhiya, 221, 386
- Sexual harassment, HarassMap project on. *See* HarassMap project
- Sexual identity, compared to gender, 110–111n1
- Sharing, in open practices, 159, 160, 162–165
 benefits and costs in, 167t
 in nonprofit, public, and private sectors, 159t
 in peer production, 161
- Sharma, Ankit, 382, 386, 387f, 393, 396
- Shaver, Lea, 34
- Shaw, Aaron, 34
- Shirky, Clay, 124, 176
- Short message service (SMS)/text messages, 202, 389
- Shule, 260t, 272t, 276, 277
- Sihanya, Ben., 409
- Sillitoe, Paul, 374
- Silversmith, A., 384, 389
- Sinar Project, 259t
- Singapore, GitHub users in, 127
- Singh, Alka, 331
- Siyavula Education, 163, 334
- Skype, 186
- Small Island Developing States, 367t, 368, 371
- Smartphones, 229–230, 245, 434–435. *See also* Mobile technology

- Smile for Education and Development Foundation, 391
- Smith, Matthew L., 53, 56, 167, 221, 255, 382, 386
- Snijder, R., 10
- Soares, Louis, 318
- Social change
 - information and communication technology in, 37
 - information and knowledge in, 4
 - open development in, 1, 28
 - technology in, 8, 37
- Social goods, 183, 198
- Social inclusion
 - access in, 322, 326–336, 347–348
 - compared to network inclusion, 280–281, 284
 - definition of, 321, 385, 445n1
 - degrees of, 321–322, 325f
 - empowerment in, 322, 342–347
 - and exclusion, 88–89, 111n4
 - factors affecting, 321
 - history of concept, 321
 - in open data, 251–285
 - in open education, 317–349, 432
 - and participation, 253–254, 322, 336–342
- Social justice, 322, 325f
- Social media, 6, 31
 - free access to, 186, 187
 - gender differences in use of, 93
 - misinformation on, 6–7, 177–178
 - number of friends on, 240–241
 - Project SOHA using, 370–371
- Social protection, 176
- Socioeconomic status
 - and Internet access, 220, 226, 227, 228t–229t, 232t, 240, 245, 434–435
 - and open educational resource use, 9, 326–329, 436–437
 - and representation in inclusion, 432
- Software, open-source, 27, 30, 53, 59
 - copyleft license in, 32–33
 - gender bias in, 99
 - gender differences in use of, 96, 108
 - origins of open data in, 292
 - peer production of, 32–33, 60–61, 160
- Somalia, open education in, 318
- Sonora Ciudadana, La Rebelión de los Enfermos developed by, 299–301, 308
- Soundcloud, 64
- South Africa
 - cost of books in, 152n2
 - crowdsourcing in, 385
 - GitHub users in, 127
 - gross domestic spending on research and development in, 144
 - Indigenous knowledge on climate in, 106, 367t, 368, 374
 - Integrated ICT White Paper in, 195
 - intellectual property rights in, 407–408, 409
 - Internet use of women in, 92
 - local loop unbundling of
 - telecommunications in, 191–192, 212n9
 - mandatory open access telecommunications in, 191–192, 193–194, 195–197, 203
 - migration to digital television in, 206
 - mobile technology in, 92, 203, 206
 - national open access broadband networks in, 193–194, 198, 203, 206
 - national open access wireless networks in, 195–197
 - online bullying in, 93
 - open access in, 148
 - open science in, 71, 367t, 367–368, 371, 372, 374
 - traditional knowledge commons in, 411
 - voluntary open access networks in, 197–198, 207
 - Wi-Fi in, free public, 199–201
- South Africa, open data projects in, 8, 259t, 260t, 266, 268, 272t
- inclusion in, 281
- Medicine Price Registry, 260t, 268, 272t, 276, 277, 281
- value of data in, 277

- South Africa, open education in, 148, 163, 318, 324
 - availability of appropriate materials for, 334
 - awareness of, 335, 336
 - creation activities in, 343
 - disciplinary norms in, 337
 - educator use of, 327, 327t, 330f
 - empowerment in, 343, 346
 - infrastructure in, 329, 331, 332, 333
 - institutional policies on, 337, 338
 - learner use of, 328, 328t, 329, 330f
 - MOOCs in, 9, 10, 334, 338, 341–342, 343, 346
 - pedagogical practices affecting, 340
- South African Research Chair in Innovation, 407
- South America, geography of information in, 136
- South America, open education in, 318
 - educator use of, 327, 327t, 329, 330f
 - learner use of, 328, 328t, 330f
- South Atlantic 3 submarine cable, 197
- Southeast Asia
 - informal economy in, 73
 - open science hardware for development in, 362t, 363
- South Sudan, 6
- Spaces for gendered participation, 95–96, 102, 107–109
- Spain, Nubelo crowdsourcing project in, 388t, 391
- Sri Lanka
 - GeoNames content on, 135
 - open education in, 107, 318, 334, 335, 340, 348
- Sri Lanka, crowdsourcing and microwork in, 388t, 390
 - external environment in, 392
 - inclusion in, 397t
 - Ipaidabrike platform in, 384t
 - vision and strategy in, 393
- Stalder, Felix, 285n2
- State level of governance, 13, 14
- Strandburg, Katherine J., 292, 359
- Street Bump app, 390
- Sub-Saharan Africa
 - GitHub users in, 127
 - informal economy and innovations in, 73, 175, 440
 - local loop unbundling in, 191
 - Wikipedia contributors from, 130, 131f
- Sub-Saharan Africa, open education in, 318
 - availability of appropriate materials for, 334
 - educator use of, 327, 327t, 329, 330f
 - learner use of, 328, 328t, 330f
- Supply-side value in ICT access, 188, 189, 190f, 198, 201
- Surveillance capabilities, 7, 14
- SuSalud (Peru), 303, 304
- Sustainability
 - Model Forest approach to, 363, 375n13
 - of open data initiatives, 313
- Sustainable Development Goals, 91–92, 374
- Swan, Anthony, 385, 392
- Sweden, 43n4, 127
- Swedish Program for ICT in Developing Regions (SPIDER), 262t
- Switchers in open data, 256, 267, 269, 270, 278–279, 280
 - power of, 256, 278
 - and value transfer, 278
- Switzerland, 127, 132, 436
- Syngenta, 67
- Syria, 6
- Tablets, access to Internet with, 229, 230t, 434, 435
- Taiwan, 127
- Tanzania
 - crowdsourcing in, 384t, 396
 - movement away from open government in, 6
 - online bullying of women in, 93
 - open access state-owned broadband networks in, 193, 203, 269
 - open data projects in, 260t, 268, 272t, 277

- Tanzania, open education in, 318
awareness of, 335
educator use of, 328
empowerment in, 346
infrastructure in, 331, 332
institutional policies on, 338, 339
- Tapscott, Don, 124
- Teacher Education in Sub-Saharan Africa (TESSA), 334
- Technological protection measures (TPMs), 66
- Telecommunications, open access in, 41, 183–210. *See also* ICT access
- Telecom Regulatory Authority of India, 202
- Television
annual viewing hours in US, 176
digital, in South Africa, 206
free-to-air, 171
- Telkom, 191, 192, 193, 198
- Temporada de Pases initiative (Uruguay), 305–306
- 10 Cs in open education, 319–321, 438
- Terrell, Josh, 97
- Terrorism, 177
- Thioune, Ramata Molo, 226
- Thomson Reuters, 67
- 3G networks, 199
- Thrun, Sebastian, 176
- Torres, Fabiola L., 304
- Touré, Hamadoun, 124
- Trade agreements on intellectual property, 13, 150
- Trademarks, 405
- Trade secrets, 409, 422
- Traditional knowledge. *See* Indigenous knowledge
- Trans-Pacific Partnership, 150
- Transparency in open data, 5, 8, 67
and accountability, 5, 38
benefits and costs of, 167t
on fees, 41, 184
offline initiatives in, 27
in open government, 5, 8, 29, 30, 44n6, 253, 254
in open health data, 293, 297, 301, 302, 303
in science, 357
- Transparent Chennai (India), 263t, 275t, 276
- TripAdvisor, 162, 178n8
- Trotter, Henry, 332, 338, 382, 385, 386
- Trust
and linkages in crowdsourcing, 386, 387f, 391–392
in open innovations, technological and social aspects of, 415, 416t
- Tshwane (South Africa) telecommunications initiatives, 199, 200, 201, 201t
- Tubio, Maria L., 321
- Tuckwood, Christopher, 394, 395
- Tulchin, D., 384, 389
- Tunisia, 6
- Turkey, 6
- Twitter, 99, 165, 187
crowdsourcing analysis of, 381, 388t, 390, 396
in Kenya, 381, 388t, 390
as zero-rating service, 202
- U4 Anti-Corruption Resource Centre, 298, 314n4
- Ubatuba, Brazil, open science in, 368–369, 372, 373
- Ubuntu concept, 360
- Uganda
intellectual property rights in, 409
iParticipate project in, 262t, 275t, 276
open access state-owned broadband networks in, 193
open innovations of automotive mechanics in, 409, 411
- Uganda, open education in, 318
awareness of, 335
educator use of, 328
empowerment in, 346
infrastructure in, 331, 332
institutional policies on, 338, 339
- Ukraine, open budgets project in, 258t, 265
- Ullman, Ellen, 99

- Una Hakika crowdsourcing project, 381, 388t
 - captive subscriber base in, 394
 - external environment in, 392
 - inclusion in, 394, 395, 397t
 - infrastructure in, 389
 - linkages and trust in, 391–392
 - motivation in, 395
 - vision and strategy in, 394, 395
- Underdeveloped populations, participatory development in, 30–31, 44n9
- Understanding Open Hardware and Citizen Science, 101
- UNESCO declaration on open education, 152
- Unfreedoms, 252
- United Kingdom
 - GeoNames content on, 135
 - Open Access Implementation Group in, 63
 - piracy of ebooks in, 153n3
 - public-sector information in, 67
 - Wikipedia contributors from, 130
- United Nations Development Programme, 7, 258t, 266
- United Nations Sustainable Development Goals, 91–92, 374
- United States
 - cost of books in, 152n2
 - freedom of information in, 30, 44n6
 - GeoNames content on, 134
 - GitHub users in, 127
 - gross domestic spending on research and development in, 144
 - intellectual property rights in, 69, 70, 337, 408–409
 - net neutrality in, 12, 185, 202, 211n4
 - open access to federally funded research in, 63
 - open activities in economic production of, 157
 - open government in, 29–30, 43–44nn4–7
 - OpenStreetMap content on, 132
 - patent and citation maps on, 143
 - presidential election of 2016 in, 6
 - Wikipedia contributors from, 130
- Universal Declaration of Human Rights, 35, 45n12
- Universal ICT access, 184, 187, 194, 199
- University of Cape Town, 407–408
- University of the Witwatersrand, 407–408
- University of Toronto, 358
- Unlocking the Value of Open Data through Problem-focused Sub-national Networks (South Africa), 259t, 266
- Upwork microwork platform, 400n4
- Urban areas, access to open education in, 332, 347
- U-Report civic reporting tool, 385
- Uruguay, open data projects in, 11, 164, 258t, 261t, 264–265, 266
 - A Tu Servicio. *See* A Tu Servicio
 - inclusion in, 280–281
 - value of data in, 277, 278, 279–280
- Uruguay, open education in, 318, 337–338
- Use-as-remix, 435, 443
- Use of open content and knowledge, 4
 - annual time spent on, 176
 - barriers to, 444
 - in crowdsourcing, 398
 - in definition of openness, 14, 25–26, 27, 28, 38–39, 158, 219, 221
 - engagement in, 443
 - facilitation of inclusion in, 442
 - gender issues in, 88, 94t, 98, 109, 110
 - government role in, 440
 - ICT access for. *See* ICT access
 - in open access, 63
 - in open data, 66, 254, 265, 266, 276–277
 - in open development as inclusion, 441f
 - in open education, 9, 10, 38–39, 40t, 319, 320f, 321, 327–329, 342–343
 - in open information, 120
 - in openness as praxis, 37, 38
 - in open provision, 158–159, 160, 176
 - in open science, 70
 - in open telecommunications, 201
 - personal factors affecting benefits in, 219–246

- policy and practice in, 10–11
- in use-as-remix, 435, 443
- value created in, 276–280
- User data, 176, 187–188
 - privacy and security of. *See* Privacy and security
- User-generated content, 6, 146
- User innovation, 58, 59
- Ushahidi, 157, 161, 177, 383, 384t
- Using Open Data to Create Transparent Value Chains (Rwanda), 259t, 266

- Value of open data, 253, 268–269, 270
 - creation and transfer of, 276–280, 284
 - definition of, 278
 - economic impact of, 66–67, 253
- Van Deursen, Alexander, 224, 225
- Van Dijk, Jan A. G. M., 224, 224f, 225
- van Schalkwyk, François, 270, 271, 286n7, 385
- Vargas, Eduardo, 240
- Viber, 389
- Vision and strategy in crowdsourcing projects, 387, 387f, 392–395, 398
- Vodacom, 196, 212n13
- Voluntary open access networks, 189, 197–198, 206, 207
 - commercial models, 207
 - compared to mandatory open access, 190f, 204t–205t
- von Hippel, Eric, 33, 58, 59

- Wales, Jimmy, 124
- Walji, Sukaina, 320f
- Walled gardens, 186
- Walton, Marion, 255
- Warschauer, Mark, 95
- Washington Consensus, 44n8
- Water quality monitoring, 4, 102, 362t, 363, 435
- Wawasan Open University (Malaysia), 338
- Wealth distribution, Gini coefficient on, 7, 15n6
- WeChat, 202

- Weiner, Ann, 99
- Welfare economics, normative, 158, 166–168
 - compared to human development and capability approach, 168–169, 169t
 - public goods in, 167, 168, 169, 173
- West, Joel, 58
- West Africa, open science projects in, 367t, 370–371, 373
- West Africa Cable System (WACS), 194, 197, 206, 212n12
- Western Cape (South Africa)
 - telecommunications initiatives, 199, 200–201, 201t
- WhatsApp, 6, 186, 202, 240, 389
- Wi-Fi, free public, 41, 184, 199–201, 207
- Wikibooks, 331, 333
- Wikipedia, 33, 60, 64, 124
 - gender of contributors in, 9, 97, 108–109, 436
 - geography of participation in, 9, 119, 127–130, 136, 436
 - knowledge commons in, 294, 313n3
 - peer production in, 9, 33, 60, 161
- Wikipedia Zero, 202t, 208
- Wiley, David, 65, 318
- Willems, Julie A., 323
- Williams, Anthony D., 124
- Wireless open access networks, 192–193, 203, 206
 - national, 194–197
- Workplace, access to Internet from, 225, 226, 227t, 232, 246
 - benefits of open resources in, 435
 - for education-related activities, 234f, 242f
 - for government-related activities, 234f, 244f
 - for job searching, 234f, 243f
 - marginal average effects of, 242f, 243f, 244f
 - multivariate analysis of, 238t, 241, 245
 - socioeconomic characteristics in, 228t, 229t
- Work-related activities, Internet access for, 230, 232, 233t, 235, 246
- World Bank
 - on increase in global inequality, 7
 - infoDev organization, 212–213n18

- World Bank (cont.)
 - on local loop unbundling, 191
 - on microwork, 98
 - on potential of open data, 67
 - on social inclusion, 321, 385
- World Conference on International Telecommunications, 186
- World Economic Forum, 87, 144
- World Health Organization, 321
- World Intellectual Property Organization, 421
- World Trade Organization, 69, 421
- World Wide Web, 31–32
 - and Web 2.0, 31
- Wu, Tim, 186, 187

- Yelp, 162, 178n8
- YouTube, 64, 146, 171

- Zambia, open education in, 318
- Zaveri, Sonal, 386
- Zero-rating of Internet services, 184, 186, 187,
201–202, 202t, 208–209
 - and net neutrality, 202, 208
- Zimbabwe, open education in, 318
- ZooGalaxy, 313n3