Index

academic spin-off 109, 111, 113–14
activity
added value 19, 33
based framework 16
business 108, 190–91
cancer-related nanotechnology 153
collaborative 143
development 209
economic and social 4
entrepreneurial 102, 104, 111–12
high risk 18
industrial 208
knowledge-based 100
knowledge creation 9
innovation 5, 7–10, 16, 19, 102
manufacturing 55
networking 130
public sector 195, 201
R&D 10, 34, 59, 208
RTD 185
scientific 142
see also research activity
administrative process 63–4
Advanced Technology Program (ATP) 6, 118, 128, 136–45, 201, 219
Africa 34
agenda-setting process 168
America see Latin American, North America, South America, United States, US / USA
American Competitiveness Initiative (ACI) 195
anti-monopoly legislation (AML) 64
applied industrial research 57
Asia 7, 9–10, 16, 25, 54, 56, 195, 211
see also China, India, Hong Kong, Indonesia, Japan, Korea, Philippines, Singapore, Taiwan
Aspray, William 5, 24
Association For Computing Machinery (ACM) 5
asymmetric
information 123
opportunities 93, 96
atomic force microscope (AFM) 162
Audretsch, David B. 5, 77, 81, 89, 91, 94, 190
Australia 26, 40, 166
Australian Computer Society (ACS) 36
Austria 78, 210
award programme 5, 118–33
Belgium 105
bits, atoms, neurons, genes (BANG) 148
Bologna Declaration, process, initiative 39
Borrás, Susana 4, 7
Brazil 41, 85, 152, 166
budget/budgetary
account 153
allocation 152, 180
process 127
procurement 202
R&D 128
request 153
research 95, 153
share in life sciences 178
Bureau of Economic Analysis (BEA) 42
business
activity 190–91, 208
formation 6, 132, 193, 197–201, 203–6, 211–12, 217–20
model 192
office process 27
process 2, 25, 46, 118–19
process offshoring 32
business reporting system (BRS) 143
California NanoSystems Institute (CNSI) 156
Canada 26, 40, 149, 205
see also North America

cancer-related nanotechnology activity 153
capital burn rate 26, 46
Center for Biological and Environmental Nanotechnology (CBEN) 155
Center for Nanotechnology (CNT) 156
Central America see Mexico

critical formation process 193, 200
Currens, Christopher J. 6, 136
current population survey (CPS) 45
Czech Republic 26, 85

Defense Advanced Research Projects Agency (DARPA) 141
Denmark 17
Department of Defense (DOD) 138
Department of Energy (DOE) 138
deregulation process 193, 202
design and developmental activity 51
dimensions of innovation policy 190–215
Doha Round of multilateral trade negotiations 52, 67,
Dow Jones industrial average 157, 159
downsizing 84–6
economic globalization 1–2, 8–9
Edquist, Charles 4, 7
Electronics Research and Service Organization (ERSO) 56
embedded process 7, 13
employment
in China 60
decrease and increase/growth 84–5,
119, 143
domestic 86
electrical engineering 86
generation 102
and growth 78–9, 83, 88, 90, 92–4,
97, 140, 219
manufacturing 86–7
opportunity 141
private 112
security 103
strategy 97
in the United States 43
see also IT employment; job; work

England 79
entrepreneurial activity
general 111–12
high expectation 104
level of 94, 103, 112
national 102
total 104
entrepreneurship
academic 96, 219
Index

encouraging/promoting 37, 78, 97
as growth engine 78
innovative 100–117
leader 77
level of 32
as missing link 91–2
policy 78, 93–5, 183
role 90, 191
and small business 82
university 96
see also innovation and entrepreneurship
Environmental Protection Agency (EPA) 153
era
of globalization 50, 88–9
of the managed economy 84
post-World War II 77–83, 88
Soviet 34
erosion, technology and concentration (ETC) 147
EU see Europe, US
EuroCreativity index 105
Europe
7th Framework Programme 154
absence of large-scale systems 203
and academic spin-off 111
agenda for 150
after Bologna Declaration 39
challenges for 6
cluster initiative in 209
deregulation processes in 202
and graduate education 27
historic advantages 48
innovation systems in 201
IT education across 39
and Lisbon Agenda 105
major concern 210
networking in 209
R&D performing agents in 209
small countries in 16
spending and fund allocation 152
university-based investment 204
work offshored from 34
European Commission (EC) 77, 100,
131, 149, 175
European innovation scoreboard (EIS) 102
European Molecular Biology Laboratory (EMBL) 186
European Molecular Biology
Organization (EMBO) 186
European Organization for Astronomical Research in the Southern Hemisphere (ESO) 186
European Organization for Nuclear Research (CERN) 186
European paradox 77–99
European research area (ERA) concept of 176
continuation of 180
objectives for 186
process 185
progressing toward 187
promotion of 177
European Research Council (ERC) 180, 186–7
European research framework programmes 174–89
Finland 17, 106, 195, 205, 210
forces of globalization 174, 216
foreign direct investment (FDI) 10, 58, 80
framework programme (FP) 6, 154,
174–89, 209–10
France 40, 82–3, 196, 201, 210
Friedman, Thomas 42, 88
gazelle 102–3, 105, 107, 111–13
General Agreement on Tariffs and Trade (GATT) 51–3, 61, 67
Germany 26, 30, 35, 40, 82, 84–7, 90, 94, 196, 203, 205,
globalization challenge 7–23
consequence of 86
economic 1–2, 8–9
of converging nanotechnologies 146–73
era 50
force of 174
of innovation activities 10
of IT research 41
and offshoring 24–49
opportunity 91
process 2–3, 7, 13, 19
of research activity 24
response to 83–4
risk extinction 50
of software 25, 28, 31
strategic choice 7–23
and technological change 68
government procurement agreement (GPA) 63
growth rate of IT
jobs 45
wage 42
high-expectation entrepreneurial activity (HEA) 104
Hong Kong 17
Howell, Thomas R. 5, 50, 208
India 9–10, 25–41, 46, 48, 91, 118–19, 152, 166, 216
indirect university spin-off (ISO) 108–11
Indonesia 41
industrial activity 208
change 110
commitment 185
development objectives 64
development 54
employee 108
entity 158
firms 34, 37
hollowing out 50
needs 205
park 56–7
policy 55, 57, 59, 66
prowess 25
renewal 100, 107, 197–8, 206, 218
research 57, 105, 210
RTD 177
scientist 142
sector 100, 146
standard 65
structure 81
system 58, 199
technology 177
trajectory 192, 218
Industrial Technology Research Institute (ITRI) 57
industry consortium 158
information and communication technology (ICT) 154, 160
information society technologies (IST) 178–9
initial public offering (IPO) 139
innovation activity 7–9, 10, 16, 112
award programmes 118–33
and entrepreneurship 92, 102, 105, 182–3, 191, 218,
globalization 8
patterns 8, 13
policy 4, 6, 7–21, 100–101, 103, 105, 113, 183, 190–215
process 8, 10–15, 17–18, 122, 126, 184, 190–92, 196, 200, 202–4, 209, 213, 216, 218
system 5, 11, 14, 19–20, 101, 131, 182, 185, 196, 201, 211
Institute for Soldier Nanotechnologies (ISN) 158
intellectual property rights (IPR) 13, 19, 52, 59, 63–5, 183–4
International Monetary Fund (IMF) 51
International Trade Organization (ITO) 52
Ireland 17, 30, 105
Israel 26, 30, 40, 201
IT company/firm 33
education 39
employment in 24, 28, 37–8, 41–3, 45, 47
environment 48
industry 24, 40, 160
knowledge 27
market 24
and neuroscience 146
offshore 25
outsource 26
process 30
research 25, 40–41
sector 24, 35, 37–8, 45, 47,
service 25, 27–30, 32, 34, 36
system 36
see also job
Italy 40, 121
Japan 9, 26, 30–34, 53, 55, 104, 158, 166, 184
job creation 29, 77, 102–4, 176, 193, 195, 198
Index

displacement 86
downsizing 86
future 105
good paying 81
high-end 25
high-technology 221
high-value 32, 46–7
loss of 37, 41
lost to India and China 28
lower quality 83
in manufacturing 25, 84, 86
old 77
opportunity 209
process 27
relocation 86
at risk 47
skill-intensive 55, 67
source of 81
standardized 47
suppression 25
training 163–4
see also employment generation and employment opportunity, IT employment
joint technology initiative (JTI) 185–6
joint venture
and the ATP 136
as industry consortium 158
Japan and China 33
support for 129
US and China 157

knowledge to innovation: solving European paradox 77–99
knowledge-based
activity 100
competition 176
economy 175–7, 186–7
entrepreneurial firm 95
newly recreated firm 112
knowledge-intensive
industry 107
manufacturing 51
Korea 17, 26, 152

Latin America 34
see also Mexico and South America
Lindholm Dahlstrand, Åsa 5, 100, 108–10

Lisbon Accord 92
agenda 105, 182, 195–6, 210
objective 181, 184
process 175
Proclamation 77
strategy 183

manufacturing
activity 55
advanced 51, 220
capability 149
chip 56
cost 61
employment in 84, 87
employment in 86
enterprise 55
environment/facilities 61
environmentally safe 131
firms/companies 36, 55
foundry 55
functions 50, 55
high technology 54
industry/sector 100
knowledge-intensive 51
operations 53
partners 57
pilot facility 45
process technology 55
process 55, 143
sector 25
semiconductor 55–60, 158
system 221
traditional 83
see also job in manufacturing 86

market formation
innovation-based 201
institutions of 5
mechanism 198
process 6, 193, 200–202, 211, 217
procurement for 201
target 212
Marklund, Göran 1, 6, 190, 216
Marx, Karl 86, 88
Mayadas, Frank 5, 24
Mexico 36, 38, 41, 85, 91
Michelson, Evan S. 6, 146
Morocco 34
multilateral
bodies, agreements, codes 51–3
codes/rules 53–9, 67
Doha Round, trade negotiations 52, 67
economic institutions 52
negotiations 52
and the OECD 68
and Taiwan 57
trading system 50–76
Uruguay Round 52
and the World Trade Organization (WTO) 52

nano-bio-info-cogni (NBIC) 148–50
Nanobiotechnology Center (NBTC) 155
nanoscience and technology studies program (NSTS) 156
nanotechnology
cancer-related 153
convergence 6, 146–73
dangers 149
field of 146
globalization of 146–73
and government spending 152
indicators of 151
industry participation in 178
innovation 147
as key research driver 154
research 146, 152
see also R&D
National Cancer Institute (NCI) 153
National Institute of Standards and Technology (NIST) 136, 138
National Institutes of Health (NIH) 138
National Nanotechnology Initiative (NNI) 152–3
National Science Foundation (NSF) 147, 165
national system of innovation (NSI) 16–17, 174
Netherlands 17, 40, 82, 105, 165, 203, 210
networking 118, 130, 132, 179, 184, 209
NNI budget 153
see also National Nanotechnology Initiative
North America 31, 82–3, 89
see also United States, US, and Canada
Norway 17
occupational employment statistics (OES) 45
offshoring
of business process 32
in German manufacturing, post-Berlin Wall 86
of software 24–49
from US and UK 25
patent
as anti-competitive 64
Chinese 63
citation 161–3, 165
European 183–4
filing 138, 162
government owned 95
higher quality 119
issued or pending 143
lack of 183
nanotechnology 163
per number of inhabitants 121
and offshoring 27
owners 65–6
protection 13
and public policy 94
regulations 12
rights 66
Patent and Trademark Office, US 161
patterns of innovation 8, 13
phenomenon
asymmetric information 123
converging technology 169
of globalization 51
of high technology moving westward 60
innovation-based entrepreneurship 100
of multilateral institution lag 52
offshoring 29
of Shanghai fever 60
Philippines 26
Poland 84–5, 91
policy
challenges and opportunities 2
innovation 4, 6, 7–21, 100–101, 103, 105, 113, 183, 190–215
measures 2
political and social valuation, US 83
power 2
see also public policy
policy-making process 146, 164
political and social valuation policy, US 83
post-World War II
abundance of physical capital 79
era 77–83, 88
process
administrative 63–4
agenda-setting 168
Bologna 39
budget 127
business 2, 25, 32, 46, 118–19
business formation 203, 211
business office 27
commercialization 209
critical formation 193, 200
deregulation 193, 202
embedded 7, 13
ERA 185
globalization 2–3, 7, 13, 19
improvements 29
innovation 8, 10–15, 17–18, 122, 126, 184, 190–92, 196, 200, 202–4, 209, 213, 216, 218
IT 30
Lisbon 175
manufacturing 55, 143
market formation 201–2
nanotechnology convergence 147
offshoring 32
policy-making 146, 164
procurement 123, 128
production 15, 190
transformation 202
value generation 200, 212
work 26, 32, 46
procurement
Agreement, WTO Government 63
budget 202
government 63
innovation, public 199, 201–2, 212, 219
markets 123
policies 59
preferences 59, 63
preferential 62–3
procedure 123
process 128
public technology 16–17
public 182, 199, 201–2, 212, 219
production process 15, 190
public policy 3, 4, 15, 77–8, 80, 82–3, 91–2, 94, 96, 122, 164, 193–4, 197, 202, 204
public sector activity 195, 201
pull strategy 217
purchasing power parity (PPP) 40–41
push strategy 197
R&D
activity 10, 59, 63
and the Advanced Technology Program 136–45
agency, major 95
applied 147
award scheme for 199, 203–4
budget 128
capability 32
centre 205
in China 59, 63
and converging technology 146–73
expenditure 105, 119, 132, 178
foreign direct investment project 10
GDP ratio 93
in Germany 90
government funding of 31, 127, 207
gross domestic expenditure on 9
and innovation activity 9
and innovation policy 190–215
as instrument for competitiveness 182
investment in 6, 48, 88, 91, 106, 118, 124, 131, 204–7, 220
Lisbon investment objective 196
performing agents 209
policy instrument 16
preferred location 10
private sector 176
and production 5
project 18, 136, 206–7
resources 19
in Russia 35
in Taiwan 54

tax credit scheme 195, 205–7

see also research

rate of

globalization 193
growth, economic 80
growth, IT jobs 45
growth, IT wages 42
innovation 121
success for Framework Programme for Research 183
refined manufacturing process technology 55
renewal

business 190–94, 197–201, 211–12
economic 113, 196, 200, 204, 211–13
industrial 100, 107, 197–8, 206, 218
to maintain or increase profitability

3

project 203

research

activity 18, 24, 140, 178
budget 95, 153
collaborative 180, 185
IT 25, 40–41
to maintain or increase profitability

3

mechanism 154

see also R&D

research and technological development (RTD) 175–9, 182–6
resolving the European paradox 77–99
risk

averse 125
business 199–200, 217
capital 106
for customers 38
environmental 167
and exposure 24
extinction 50
of failure 199
high 18, 128, 136, 138, 140–43, 178, 194, 211, 218
investment 55, 192
of nanotechnology 149
to privacy 27
reward ratio 199–200
sharing 130
taking 31, 181
technical 137

Romania 34, 91
RTD activity 185

see also R&D activity; research activity

Russia 31, 34–8, 41, 152
SBIR see Small Business Innovation Research programme
scientific activity 142
seed
capital 18, 139
efforts 151
financing 105
funding 107, 200, 204
investing, post 140
stage 139, 125, 138
semiconductor
capital equipment 157
and China 58–62
imported 60
industry 31, 56, 61–2
investment 60
manufacturing 56–62, 158
market 60–61
preferential 68
production 56–61
and Taiwan 54–58
work sent offshore 25
Semiconductor Manufacturing International Corporation (SMIC) 59–62
Shanghai fever 60
Singapore 17
small and medium enterprises (SME) 100–101, 112–13
small business
development 192
and entrepreneurship 82
finance 95
formation 132
innovation 5, 122, 198, 213
participation 144
R&D 205, 207
Small Business Act 83
Small Business Administration 83, 143
Small Business Innovation Development Act 126
Small Business Innovation Research programme 95, 118, 204, 219
Index

software 25
industry 10
offshoring 24–49
R&D 5
South Africa 152, 166
South America 91
Soviet era 34
Spain 85
specific targeted research project (STReP) 179
Standards Administration of China (SAC) 65
Stanley, Marc G. 6, 136
strategic choices for innovation policy 7–23
state administration of industry and commerce (SAIC) 65
State Intellectual Property Organization (SIPO) 65
strategic alliance 8, 151, 157–8, 168
strategy
acquisition 119
competitive 169, 195
economic growth 77
employment 97
essential for business and public policy 3
exit 129, 139
future 175
for innovation policy 7–23
innovation 106
investment 140
IT consulting and business 25
Lisbon 183
national 195
offshoring 46
outsourcing 37
policy 4, 6, 78, 190, 193, 211, 216–20
post-war growth 97
production 55
for prosperity 88
pull 217
push 197, 211
Sweden
academic spin-off in 109
centre of IT research 40
challenges for 190–215
emphasis on market and business formation 6
entrepreneurial level 103–5, 112
government ownership of private business 82–3
growth of new firms 105–7
and NSI 17
research investment ranking 93
role of innovation award programmes in 118–35
technology-based firms 5, 107, 179
Switzerland 40
Taiwan 17, 54–62
tariff 51–2, 58, 60
technology see commercialization; converging; globalization; industrial; IT; manufacturing; nanotechnology; process; procurement; R&D; Sweden
total entrepreneurial activity (TEA) 104
trade-related aspects of intellectual property rights (TRIPS) 13, 52, 64, 66
trading countries 29
partners 29–30
system 50–76
trajectory
career 96
industrial 192, 199, 218
technology 192
transformation process 202
transnational

UN Educational, Scientific and Cultural Organization (UNESCO) 167
United States
Bayh-Dole Act of 1980 94
boom in 92
and credit gap for seed and start-up capital 140
Department of Agriculture (USDA) 154
employment in 43
Patent and Trademark Office 161–3
and prosperity 120
university entrepreneurship 96
university spin off (USO) 108–12
Uruguay Round of Multilateral Trade
Negotiations 52–4
see also multilateral
US/USA
and academic spin-off 111
administration 195
Advanced Technology Program 6,
118, 128, 136–45, 201, 219
and anti-trust 82
business community 52
and China, joint venture 157
Congress 94–5
and converging technologies 166
defence needs 201
defence policy 17
downsizing in 84
government 61
GDP expenditure ranking 9
and globalization of software 24–49
government 61, 153
and interdisciplinary programmes
152, 155
joint venture 157
military 158
and new high-tech innovation systems 17
and offshoring of software 24–49
Patent and Trademark Office 161
patent filing 162
and post-war abundance of physical capital 79
preferred R&D location 10
public policy on political and social valuation 83
R&D investments 220
R&D tax credit schemes 205
rejoining UNESCO 167
and research mechanism 154
and seed capital 18
shift in work experience 86
and Sweden 5, 104–6, 118–35
as trading power 61
and the WTO system 53–4, 62, 64, 68
see also US government, US military
value generation 191, 200, 212
Vardi, Moshe Y. 5, 24
Vonortas, Nicholas S. 1, 6, 174, 216
Wessner, Charles W. 1, 5, 118, 136
work process 26, 32, 46
see also employment; job
World Economic Forum (WEF) 106
World Trade Organization (WTO) 5,
24, 52–4, 58, 59, 61–4, 67–8, 208