Index

Abelard, Pierre 5, 6
academia, medieval introduction of
academic freedom 17–18, 31
academics 225
accelerators, see incubators
Acorn Computers 24
Addenbrooke’s hospital 25
admittance/entrance exams 40, 159; see also CUNY
Alexander III, Pope 6
Alisyahbana, Iskander 48
American Research and Development (ARD) 107
Analysys 25
angel capital 105
Angel Kunchev University of Rousse, see University of Rousse
angels, see business angels
appellation system 225
applied innovations 180
applied science 11, 20, 72, 167, 225
ARC 24
ARD (American Research and Development) 107
Arenberg Science Park 142
Atkinson, Adrian 91
Babraham Bioincubator 27
Balliol College 9
BankBoston Report 96
basic innovations 179
basic research 225
Bay Angels 107
Bernard of Clairveaux, Saint 5
Bharti Group 92
Biocompost 60–61
Birkinshaw, J. 218
board of management, 3GUs 120–23
Boeing 85
Bologna process 19; see also University of Bologna
book printing 180
Boulton, Matthew 107
Bowen, W.G. 216
BP Amoco 26
BPC (Business Plan Competitions) 28, 57
Bright, D.F. 216
Bright, J.R. 218
Broers, Sir Alec 26
Brown, Gordon 27
Buckland, W. 218
Buller, J.L. 216
business angels 28, 104–8, 225
University of Rousse business angels club 56
business plan 225–6
Business Plan Competitions (BPC) 28, 57
business unit management 119
buyout capital 105
C-Fix 78
Calvin, John 11
Cambridge Angels 28, 107
Cambridge Capital Group 28
Cambridge Consultants 25, 27
Cambridge Enterprise 27, 34
Cambridge Instruments 24
Cambridge Phenomenon 24–30, 226
Cambridge Research Park 27
Cambridge Science Park 27
Cambridge Technopole Group 25, 28
Cambridge University, see University of Cambridge
Cambridge University Entrepreneurs (CUE) 28
Cambridge University Technical Services Ltd 27
Campbell, A. 218
capital, see venture capital
carry/carried value 108, 226
cascade model 192–3, 226; see also funnel model
Casimir, Hendrik 68
Catholic University of Leuven (K.U.Leuven) xiii, 34, 110, 141–4
Cavendish Laboratory 24, 25
Celestine II, Pope 6
Celestine III, Pope 6
Centre for Entrepreneurial Learning 28
Centre for European Reform report 20–21
Centre for Venture Research 107
CEO (chief executive officer) 187–94, 226
CERN xiv, 20
CFO (chief financial officer) 122, 226
chancellors 8, 10, 15, 226
change management 148–53
Chesbrough, Henry 213
choice of change strategy 151
Choir of Angels 28
Christianity, adoption in Europe 3–5
Ciko 50–51
City University of New York (CUNY) 39–41
Clarysse, B. 216
Closed Innovation 86
closing of a deal 227
coaching 146
collaboration and the commercialisation of know-how 226
collaboration with industry 21–2
University of Cambridge 26–7
college structure, see university colleges
Collegium Doctorum 8
commercial spinouts of scientific projects 226
commercialisation of know-how xiv, 27, 65, 226–7
market of 134–9
Common Services 120, 122–3
Compayré, Gabriel 209
Conference of the International Academy of Science (1918) 14
consilience 37–8, 227
contract research 138
Control Communications 48
corporate culture 227
Corporate Office 120, 122–3
cosmopolitan universities 41
cost, of Type 4 university 45
course 227; see also graduate course
Cox, J. 214
creative destruction 165
Crick, Francis 25
cross-faculty teams 117–18, 227
CUE (Cambridge University Entrepreneurs) 28
culture, see corporate culture
CUNY (City University of New York) 39–41
Dartek 61–2
Darwin, Charles 25, 217
Darwin, Horace 24
deal-making 111, 227
deans 15, 130–31, 227
decline phase 227–8
deductive learning 228
defensive innovation 163
Delft University of Technology 40
Denifle, Père 5
design phase (of an enterprise) 101, 228
development 228
development phase 101, 228
Digital Era 44
disruptive innovation 228
domus scholarium (university colleges) 9, 14, 240
Doni Tirtana 52–3
Doriot, Georges F. 107
Douwe Egberts 38
d.schule 37–8
DSP Valley 142
Duderstadt, J.J. 210
Durham University Business School 57
Dyson, James 212
Ecohumus 60–61
ecole polytechnique 13
Edison, Thomas 67, 174–5
EFER (European Foundation for Entrepreneurship Research) 43
effort obligations 136
elite 228
embedded research 26, 137, 228
employee attitudes to change 148–9
Index

English, use of 18, 41
Enlightenment university 13; see also Humboldt model universities
Enterprisers 92
Enterprisers programme (MIT) 207
entrance/admittance exams 40, 159; see also CUNY
trepreneurs 92, 228
and innovation 164–7
entrepreneurship, challenges posed by 21
Entrepreneurship Centres 27
entrepreneurship education
compatibility with scientific education 196–7
‘Fundamentals of Entrepreneurship’ courses 199–201
funnel model 192–6, 229–30
‘Introduction to Entrepreneurship’ courses 197–8
as a minor subject 204–8
starting the company 203–4
‘Turning Technology into Business’ course 198–9
‘Writing your Company’s Business Plan’ courses 201–3
entrepreneurship instruments 160
Erasmus, Desiderius 11
European Foundation for Entrepreneurship Research (EFER) 43
European Space Agency 20
executive directors 228
executive managers 228
exit 228
exit interviews 132
exploratory research 229
facilities 229
course 7, 229
Faculty of Business and Management (University of Rousse) 55–6
failure, entrepreneurial 29
fees, see tuition fees
Fermentech 50–51
finance
of start-ups 100–104
of university created companies 48
see also investment funds; venture capital
first flow of finance 124, 229
first generation R&D management, see Technology-Push regime
first generation university 229; see also medieval universities
first-movers 163–4
Fisher–Pry formula 173–4
FMC (Fund Management Company) 109, 229
‘Food Valley’ 34
Food Valley Innovation Link 143
Food Valley Society 143
Ford, Henry 67–8
Foundation for Young Entrepreneurs 108
Foundation Network Young Entrepreneurs Delft 146, 202–3
founders 229
course 42, 124, 229
course 4, 124, 229
course 4, 124, 229
course 4, 124, 229
fund, definitions 108, 229
Fund Management Company (FMC) 109, 229
fundamental research, see basic research
funnel model 192–6, 229–30
Galileo Galilei 9, 11
GameChanger programme 77–8, 93
Garvin, David 190
Gaule, A. 219
GEM (Global Entrepreneurship Monitoring) 94–5
Gemma Frisius investment funds 141, 145
Genti Setiyaningrum 51–2
German, use of 14
Gieysztor, A. 209
gifts, for the man who has it all 42–3
Glaxo 26
Global Entrepreneurship Monitoring (GEM) 94–5
globalisation xiii, 18–19
Goold, M. 218
Index

graduate course 230

graduation 230

grande écoles 40, 230

Granta Park 27

Great Eastern Investment Forum 28

growth phase 101–2, 230

Gutenberg, Johannes Gensfleisch zum 180

Haasrode Science Park 142

HAKI (IPR Unit, Bandung University of Technology Research Centre) 47

Harcourt (university college) 9

Hardymon, F. 215

Hariff 48

Harvard Business School, number of students starting own business 91

Harvard University 42

Harvard–MIT Division of Health Sciences and Technology 33

Hatcher, A. 218

hautes écoles 12

HEIF (Higher Education Innovation Fund) 27

Heloise 5

HEROBC (Higher Education Reach-Out to Business and the Community Fund) 27

Higher Education Innovation Fund (HEIF) 27

Higher Education Reach-Out to Business and the Community Fund (HEROBC) 27

Hilty, J.W. 216

Hitachi 26

Hoechst 26

Holst, Gilles 68

Honours classes 40

Humanism 11

Humboldt model universities 13–17, 236

characteristics 30–31

limitations 17–22

Humboldt-Universität 40

Humboldt, Wilhelm von 13

hurdle rate 110, 230

IBM 84, 87, 178

ICEF Moscow workshop 18

IFS (Investment Fund for Starters) 108, 232

IMEC (Interuniversity MicroElectronics Centre) 142

Imperial College, spinouts 138

incapability to change 149, 230

inclination to change 148–9, 230

incubators 27–8, 146, 230; see also PIB Indonesia

third university objective 33, 47–8

venture capital 49–50

inductive learning 231

informal investors, see business angels innovation

definitions 90, 168, 231

and entrepreneurs 164–7

reasons for 163–4

see also disruptive innovation;

inside-the-box innovation; Open Innovation; outside-the-box innovation; substitutive innovation

innovation infrastructure, see know-how infrastructure

Innovation Pentagon 186–91

innovative culture 190–91

Insead, number of students starting own business 91

inside-the-box innovation 171, 231

Institut Teknologi Bandung (Bandung University of Technology, ITB)

incubator (Pulsat Inkubator Bisnis) 49–50

know-how commercialisation and technostarters 47–8

overview 46–7

School of Business and Management 48–9

see also Fermentech; Yayasan Sumber Daya Hayati

Intel 85

interactive research 231

interdisciplinary R&D 19, 231

interdisciplinary research 26–7

international competition 33–7

International Geological Congress (Florence, 2004) 21

Interuniversity MicroElectronics Centre (IMEC) 142

intervention models 153–7
lingua franca 10, 232–3; see also
English, use of
Linux 85–6
LiveWire programme 93
loans 112
location, importance of 35
Lockett, A. 216
Lorco Multimedia & Software
Development 52–3
LPPM (Research Centre, Bandung
University of Technology) 47
Lundstrom, A. 215
Luther, Martin 11
Mackay, J. 210
Maister, D.H. 216
Maksimov, Svilen 59–60
Malaysian University (Kuala Lumpur) 49
Management and Business
Development Centre Ltd (Rousse) 56
management companies (fund
management) 108–11
management structure, 3GUs 121–3;
see also Marketing Team; Support
Team; Technology Team;
Technopark Team; Technostart
Team
Manchester University, spinouts 138
mandatory/required courses 49, 233
Mann, Alfred E. 42
Mann, Horace 236
Market-Pull regime 69–71
Marketing Team 139–40
matchmaking 233
matrix structures 117
mature phase 102, 233
MBA (Bandung University of
Technology) 48–9
MBA Biomedical Enterprise
Programme 33
McCrae, Norman 25
McKenna, P.J. 216
McNerney, Jim 85
medieval universities 3–10
Melbourn Science Park 27
Merton College 9
Microsoft 25, 26, 184
Minzberg, H. 217
mission of a 3GU 158
MIT (Massachusetts Institute of Technology) xiii, 34
importing entrepreneurs 96
number of students starting own business 91
Mittal, Sunil 92
monodisciplinary R&D 19, 233
Moore's Law 171–2
Motorola 25
Mowery, D.C. 216
multidisciplinary R&D 19, 233
Mustar, P. 216
NASA xiv, 20
nascent entrepreneurs 95
National University of Singapore (NUS) 34, 49
nationes 7–8, 14, 233
Natural Resource Foundation (Yayasan Sumber Daya Hayati) 51–2
necessity entrepreneurs 91
Nelson, R.R. 218
networks, in a 3GU 160–61
Networx 59–60
Newcastle University, spinouts 138
Newton, Isaac 11, 25
Nicolis, G. 217
NIS (national innovation system) 181–2; see also know-how infrastructure
Nobel Prizes 14, 20, 25, 34
Nokia 25
non-executive directors 129, 233
Normann, R. 217
Norwegian School of Management BI 207
Novartis 25
NTBF (new technology-based firm) 233
NUS (National University of Singapore) 34, 49

organisation (innovation pentagon) 188
Otterspeer, W. 209
outside-the-box innovation 171, 234

PA Technology 25
participation 234
partners (innovation pentagon) 188–90
patents 136, 167–8, 234
PE (private equity) 105, 234
people (innovation pentagon) 190–91
Peterhouse College 9
Peterhouse Technology Park 27
Petkov, Ivan 60–61
Petrarch 11
Philip I, landgrave of Hesse 12
Philips Electronics 24, 25, 36, 38, 93, 178; see also Holst, Gilles
philosophy of a 3GU 158
PIB (Pulsat Inkubator Bisnis) 49–50
Pinchot, G. 214, 218
Platform, the 145
polytechnics 14–15
popes, influence over universities 6, 8, 11
post-experience course 234
postgraduate course 234
potential for change 234
pre-competitive research 136–7, 234
pre-seed phase, see design phase
Prigogine, I. 217
private equity (PE) 105, 234
process innovations, and product innovations 182–3
product life cycle 235
professional managers 18
professional support 146, 235
programme (educational) 235
publicity 147
Pulsat Inkubator Bisnis (PIB) 49–50
pure science 235
Putrasamporo Fund 49
Pye Radio 24–5
Quartier Latin 3
Quinn, J.B. 217
R&D, definitions 235
R&D management generations 72
1st, see Technology-Push regime
2nd, see Market-Pull regime
3rd, see Strategy-Steer regime
4th, see Open Innovation
overview 87
see also interdisciplinary R&D;
monodisciplinary R&D;
multidisciplinary R&D;
Technology-Push regime;
transdisciplinary research
R&D (Research & Development Sector) 56–7
Radice, B. 209
Radio Frequency Communication plc 48
Ramus, Petrus 11
Rational Era 43–4
rector magnificus 8, 15, 121, 235
reductionism, see consilience
remuneration 132
required/mandatory course 49, 233
research regimes 67
1st, see Trial and Error regime
2nd, see Technology-Push regime
3rd, see Market-Pull regime
4th, see Strategy-Steer regime
5th, see Tech-Business regime
rising cost of 19
separated from development 85
specialised institutes 20–21
see also basic research; embedded research; exploratory research; interactive research; interdisciplinary R&D;
transdisciplinary research
R&D (Research & Development Sector) 56–7
research-on-demand 136, 235
result obligations 136
Richards, M.P. 216
right of first refusal 109, 235
Robbins report (1963) 17
Robinson, R.J. 215
Roddick, Dame Anita 197
Rogers, E.M. 218, 219
Rolls-Royce 26
Royal Dutch Shell, see Shell
Ruma Herba 51
Rutherford, Ernest 25
SA (Academic Unit, Bandung University of Technology) 46–7
Sarkozy, Nicolas 42
Schleiermacher, Friedrich Daniel Ernst 13
scholastic university, see medieval universities
School of Business and Management (Bandung University of Technology) 48–9
Schramm, C.J. 214
Schrempp, Jürgen 177
Schretlen & Co. 108
Schumpeter, Joseph 165
Scientific Generics 25
scientific method 12–13, 40
Scott, M.C. 216
second flow of finance 124, 235–6
second generation R&D management,
see Market-Pull regime
second generation university, see Humboldt model universities
second period of transition 22–3, 126
seed funds 27
seed phase, see development phase
Seiko 26
self-employment, reasons for 93
Senate (Humboldt university) 15
serendipity 236
serial entrepreneurs 25
seven-pointed star 43–4
Shane, S. 215
Shapiro, H.T. 216
shared accommodation 29, 140, 156, 160, 194, 236
Shell (Royal Dutch Shell)
collaboration with universities 78–9
IPR retention 79
organisation 75–6
overview 80
research as business opportunity 76–8
see also LiveWire programme
Shell Global Solutions International 77–8
Shell Research Foundation 78–9
Silicon Valley 34
Sinclair Research Ltd 24
Sinclair, Sir Clive 25
SKD (Endowment Unit, Bandung University of Technology) 46–7
Sloan School of Management 33
SMEs (small and medium-sized enterprises) 236
Smith, Adam 164
SmithKline Beecham 26
Soete, L. 218, 219
Sohl, Jeffrey 107
Sony 178, 184
specialised research institutes 20–21
Spencer, Herbert 164
spinout, see university spinouts
St John’s Innovation Centre 27–8
staff selection 159–60
Staffordshire University, spinouts 138
standardisation 237
standards 183–6
start-up 237
start-up phase 101, 237
steamships 176–7
Stel, A. van 215
step-by-step change strategy 152
Stevens, H. 214
Stevenson, L.A. 215
strategic gap 151
strategic R&D management, see Strategy-Steer regime
strategic stretch 152
strategy (innovation pentagon) 187–8
strategy-driven technology management 72, 237; see also Strategy-Steer regime
Strategy-Steer regime 71–5, 237; see also Shell
structure 237
student numbers, explosion in xiv, 17–18
students, medieval protection of 6–7
studium generale 6
subjects 237
substitutive innovation 237
SUK (Unit for Innovation and Enterprise Development, Bandung University of Technology) 46–7
Sukarno, President of Indonesia 46
Support Team 110
surveys 132
synchronised education 237
Tasev, Asen 61–2
TEA (Total Entrepreneurial Activity) 94
Tech-Business regime 81–4
technical sciences 167, 238
technical standards 185
technical support 147
technicians 238
technological development, see applied science
technological diffusion 181
technological dynamics 169–71
technological escalation 170, 171–5, 238

technological proliferation 169, 179–82, 238
technological stretch 238

technological substitution 169–70, 175–9, 238

technological succession 238

technological surprise 169, 238

technology 167–8, 238

technology (innovation pentagon) 190

technology-Push regime 68–9, 82, 238

technology Team 140

technology Transfer Offices 27

techopark Team 140–41
techopreneurs 238
techostart Team 140, 144–7
techostarters

benefits for universities 138

caracteristics 91–4

definitions 89–91, 238

impact of 94–5

overview 65, 98–9

role of universities 95–8

Telkom (Indonesia), venture capital fund 50

Texas Instruments 178

third flow of finance 124, 239

Third Generation R&D: Managing the Link to Corporate Strategy

(Roussel, Saad and Erickson) 72

third generation R&D management, see Strategy-Steer regime

third generation university, see 3GU

third university objective 27, 31, 239

Indonesia 33, 47–8

K. U. Leuven 142

Third Wave (Toffler) xv, 216
Index

universities
classification of 45–6, 239–40
as cradles of new economic activity 21
development stages 62–3
historical development
1st generation (medieval) 3–10
1st transition period 10–12
2nd generation, see Humboldt model universities
2nd transition period 22–3, 126
3rd generation, see 3GU
overview 3
IPR policy 112–13
numbers of 13, 15
oldest 9
pressures for change xiii–xv
student numbers explosion xiv, 17–18
technostarters, value of 95–8
see also two-track universities
University Challenge Funds 27
University College (Oxford) 9
university colleges (domus scholarium) 9, 14, 240
university institutes 240
university management 127–33
University of Arrezo 9
University of Bologna
Frederic I granting of privileges 6–7
medieval organisation 7–9
University of Bonn 11
University of Cambridge
collaboration with industry 26–7
medieval colleges 9, 26
prevented establishment of other
UK universities 12
seeking non-state funding 19
see also Cambridge Phenomenon
University of Cracow 12
University of Groningen 49
University of Leiden 12
University of Ljubljana 38
University of Napoli 9
University of Oxford 9, 12, 138
University of Padua 9
University of Palencia 9
University of Paris
and Abelard 5
establishment of 9

universitas magistrorum et scholarium 6
universitas studii 6

universities
classification of 45–6, 239–40
as cradles of new economic activity 21
development stages 62–3
historical development
1st generation (medieval) 3–10
1st transition period 10–12
2nd generation, see Humboldt model universities
2nd transition period 22–3, 126
3rd generation, see 3GU
overview 3
IPR policy 112–13
numbers of 13, 15
oldest 9
pressures for change xiii–xv
student numbers explosion xiv, 17–18
technostarters, value of 95–8
see also two-track universities
University Challenge Funds 27
University College (Oxford) 9
university colleges (domus scholarium) 9, 14, 240
university institutes 240
university management 127–33
University of Arrezo 9
University of Bologna
Frederic I granting of privileges 6–7
medieval organisation 7–9
University of Bonn 11
University of Cambridge
collaboration with industry 26–7
medieval colleges 9, 26
prevented establishment of other
UK universities 12
seeking non-state funding 19
see also Cambridge Phenomenon
University of Cracow 12
University of Groningen 49
University of Leiden 12
University of Ljubljana 38
University of Napoli 9
University of Oxford 9, 12, 138
University of Padua 9
University of Palencia 9
University of Paris
and Abelard 5
establishment of 9

universitas magistrorum et scholarium 6
universitas studii 6

universitas magistrorum et scholarium 6
universitas studii 6
Index

medieval organisation 8–9
original schools 6
University of Prague 9
University of Rousse
Career Centre 56
Faculty of Business and Management 55–6
future plans 57–8
know-how commercialisation and collaboration with industry 56–7
overview 53–4
Research & Development Sector 56–7
see also Dartek; Ecohumus; Networx
University of Salamanca 9
University of Sankt Gallen 49
university spinouts 137–8, 236

Vahčíč, Alex 38
Valley of Death 103–4, 240
valorisation of know-how, see commercialisation of know-how
Van Osnabrugge, M. 215
van Overstraeten, R. 142
Van Overveldt, J. 210
venture capital 105–8, 240–41
Indonesia 49–50
Verloop, Jan 90, 213, 214, 219
vice-chancellors 15

video cassette recording standards 185
vision of a 3GU 158
von Wartenberg, Ludolf 97

Wachman, M. 216
Wageningen Food Valley 143
Wageningen University 34
Wageningen University and Research Centre (WURC) 143
Walpole, Horace 236
Watson, James D. 25
Watt, James 107
Weber, L.E. 210
William B. Gates Building 42
willingness to change 149, 241
Wilson, E.O. 212
Winter, S.G. 218
Wissema, J.G. 213, 216, 217, 219
personal university experience 16–17
women, in management positions 131
Wright, M. 216
WURC (Wageningen University and Research Centre) 143

Yale 42
Yayasan Sumber Daya Hayati (Natural Resource Foundation) 51–2

Zaki Rahman Nur 50–51