Index

actors’ degree of influence 79
ad hoc transport assignments 152–3
administrative costs ratio 219
advanced biofuels 183–4
aggregation methods 35
agreed-upon subjectivity 35
agricultural feedstock 207
agro-food industry 184, 185
AHP see analytic hierarchy process (AHP)
alternative performance assessment 89–91
Amsterdam University of Applied Sciences (AUAS) 164, 167
practical-oriented research in 165
analytic hierarchy process (AHP) 33, 48–52, 79, 128, 130, 154
applications 128–9
details of 49
friendliness and understandability 10
process 52
annual performance report 215, 218
appraisal 100, 108, 112, 114
approaches 101
dimensions 110
themes 110
transport 102–3
Appraisal Summary Table (AST) 103
AST see Appraisal Summary Table (AST)
AUAS see Amsterdam University of Applied Sciences (AUAS)
avtomated pick-up locker boxes 161
BAU see business as usual (BAU)
BCR see benefit-cost ratio (BCR)
benefit-cost ratio (BCR) 31, 102, 107
betterment tax/benefit assessment 124–5
biofuel options in France 93, 183–4
car industry 203
end-users’ criteria 201–2
feedstock producers 194–6
fuel distributors 198–201
government 203
identification of 185–7
criteria and weight elicitation 188–9
stakeholder groups 185–8
NGOs 203–207
performance assessment EBDLs and data collection 190–92
multi-criteria method 190
producers 196–7
refining industry 198
results 190–94
stakeholder analysis 184–5
biofuels
advanced 183–4
competitiveness criterion 191–2
conventional 183
development in France 184
drop-in 203
first generation 184
incorporation cost 201
markets 196
mitigation accounting of 198
scores, aggregation of 190, 193
set of alternatives 187
biomass-based industry 185
business as usual (BAU) 60, 66–70, 155, 159, 162, 171
scenario 155, 157
car industry 203
outputs 204
car manufacturers, biofuel policy for 203
car manufacturers group 185–6
cash and cash equivalents 220
CBA see cost-benefit analysis (CBA)
Decision-making for sustainable transport and mobility

CEA see cost-effectiveness analysis (CEA)
cellulosic biofuels 207
charitable organizations 214
charities, ranking 211–13, 220
case study 214–21
characteristics of 215
methodology 213–14
results 221–6
circular economy 165
city logistics 149–50
concept of 150
discussion of results 157–60
evaluation of scenarios 155–6
implementation of pilot 160–61
literature 150–51
and MAMCA 152, 166–7
perceptions in scenario evaluations 161
policy measures 152–3
selection of policy measures to 152–3
selection of relevant stakeholder groups 153–4
stakeholders’ assessment criteria and weights 154–5
City Logistics research group 167
COMCA see Competence-based Multi Criteria Analysis (COMCA)
Common Agricultural Policy (CAP) subsidies 89
Competence-based Multi Criteria Analysis (COMCA) 77
applications of 77, 83–4
definition of 77–9
multi-level decision making with 81
steps in 79–80
working process 79–80
alleviating political transaction costs 80
internalising externalities 80–83
competence domains 79
comprehensive questionnaire survey 130
consensus process 15
construction logistics, MAMCA application case description 168
elicitation of alternatives 168–9
evaluation of alternatives 171–3
stakeholder groups and criteria 169–71
conventional biofuels 183–4
corporate entity 211
corporate finance 213
corporate social responsibility 131
data collection 190–91
data computation 68–72
debt level ratio 220
debt-to-income ratio for businesses 220
decision alternatives, desirable vs. feasible 82
decision making 2 deliberative process for 108 problems 49 process 86–7, 122–3, 214 tools, classification of 29
decision making methods 78, 82 cost-effectiveness analysis (CEA) 29–30 eclectic MCA 35–6 multi criteria analysis (MCA) 33–5 social cost-benefit analysis (SCBA) 30–33 decision support xii decision tree 129 based on characteristics 41–3 based on evaluation objectives 37–40 desirable vs. feasible decision alternatives 82
development indicators 108
Index

development mechanisms 137
distributors 201
double counting 34

EBDLs see expert-based distribution laws (EBDLs)
eclectic MCA 35–6
‘ordered complexity’ of 35–6
strengths and weaknesses of 39
economic-centric tools 100
ECR see effectiveness-cost ratio (ECR)
education 164–7, 180
educational purposes and practical-oriented research
context 164–6
limits of approach 179–80
MAMCA
city logistics and 166–7
workshop city logistics in dense neighbourhood 173–9
workshop construction logistics 168–73
education, research and practice 165–6
effectiveness-cost ratio (ECR) 29–30
EIA see environmental impact assessment (EIA)
electric vehicles (EV) 169
elicitation of alternatives 174
end-users 62
criteria 201–2
outputs 202
preferred options for 201
energy alternatives, development of 183
entities, types of 219
environmental impact assessment (EIA) 35
ethanol 198
European biofuel implementation 184
European Commission 207
European Directive requirements 183–4
European fuel markets 198
evaluation line/bar chart 136, 138–42
evaluation of alternatives 171–3
multi-actor 172
evaluation tab 67
ex ante assessment of the suitability 124
ex ante evaluation framework 123
expert-based distribution laws (EBDLs) 190–91
and data collection 190–92
designing 91–3
examples of 94
exploratory scenario approach 86, 88
EXPROM IIv 226
method 213–14, 225
externalities, internalising 80–83
extrapolatory approaches 88
feedstock 198
life cycle 207
producers 194–6
financial stability ratio 219–20
financing policies 122
first financial ratio (fF1) 219
fiscal deficit 220
food crop-based biodiesels 194–5
foreign lands, acquisition of 207
France
biofuel development in 184
biofuel industry 201
fuel consumption 198
objectives for transport sector 185
freight
concession 174, 178
transport infrastructure, alternatives of 21
transport, problems and solutions 150
vehicles 166–7
French tax system 201
fuel distributors 198–201
group 185
outputs 200
preferences 198
functional measurement (FM) method 10
fundamental desirability 29
Germany
NGOs in 211
governance/government
multi-level 82
outputs 205
greenhouse gas (GHG) emissions 183
mitigation 198, 203
group decision making 2, 5, 77–8, 82, 130
local retailers 152–4
logistics service providers (LSPs) 152–5, 157, 159, 169
attributes 169–70
operational costs for 161
revenues for 161
logistics supply chain 180
LSPs see logistics service providers (LSPs)

Hicks-Kaldor (H-K) compensation criterion 32
magical recipes 121
MAMCA see Multi Actor Multi Criteria Analysis (MAMCA)
“marketing” strategy 130
MCA see multi criteria analysis (MCA)
MCDA see Multi Criteria Decision Aid (MCDA)
MCDM see Multi Criteria Decision-making (MCDM)
measurement methods 132–3
microalgae biodiesels 86, 194–5, 203
minimality 9
modal shift criterion 66
Monte Carlo simulation 86, 88, 93–6, 190
multi actor alternative analysis 69
multi-actor and overall performance 113
multi actor charts 68
multi-actor evaluation of alternatives 178–9
multi-actor line chart 134–5, 222–3
Multi Actor Multi Criteria Analysis (MAMCA) 2, 28, 101, 123
alternative performance assessment 89–91
analysis 159
applications of 12, 21–4, 127, 162
approaches 101, 149–50
with EXPROM IIv 226
with PROMETHEE II 221–2
with PROMETHEE IIv 223–5
city logistics and 166–7, 173–9
in dense neighbourhood 173–9
classification of decision-making tools 28–9
cost-benefit analysis and 100–101
Blackpool and South Fylde line 104–7

Highway Agency road schemes 103
Hirsch-Kaldor (H-K) compensation criterion 32
human judgement uncertainty 87
ILUC see indirect land-use changes (ILUC)
implementation cost 31
indicators 132–3
indirect land-use changes (ILUC) 198
individual preferences
aggregation of 78
rankings 78
information and reputation ratings 220–21
information ratings 221
innovation 131
innovative financing tools, implementation of 125–6
innovative professional practice 181
innovation 131
innovative financing tools, implementation of 125–6
innovative professional practice 181
intelligent transportation systems (ITS) 150
inter-institutional cooperation 77, 80
inter-institutional projects 80
international politics 80
investment incentives 130
ITS see intelligent transportation systems (ITS)
joint development 125, 134
juxtaposed preference rankings 82
knowledge uncertainty 87
labour costs 219
land grabbing 207
land-use issues 203
land-use planners 126
land value capture 121
language ambiguity 87
language vagueness 87
large-scale transportation projects 121
linguistic vagueness 127
loading zones 153
local pick-up point 174
Index

transport appraisal in the UK 102–4
criteria and weights, defining 9–12
decision-context under uncertainty 87–8
decision-makers in making sustainable decisions 4–7
decision-making methods see decision-making methods
decision tree see decision tree
defining problem and alternatives 7–8
definition of 86–7
educative case study 16–21
evaluations 28, 155, 160
framework 4, 101, 149
implementation and recommendations 15
indicators and measurement methods 12
methodology 7, 213
output 14–15
overall analysis 12–13
problem setting 107–10
range-based MAMCA 90–91, 95, 187–8
ranking charities using see charities, ranking
results and discussion 110–12
results and sensitivity analysis 13–15
stakeholder analysis 8–9
concept 4
workshop 151
strengths and weaknesses of 39
sustainability concept 3
workshop 154, 160–61, 167, 173, 179–80
construction logistics 168–73
Multi Actor Multi Criteria Analysis (MAMCA) software 58, 154
decision-method, choice for 48–9
extracted from 71
and guide future 48
illustrative case study 58–9
alternatives 60
criteria definition 63–4
data computation and result analysis 68–72
decision-problem and alternatives 59–60
option performance 65–8
preference matrices 59
recommendations 72
stakeholder analysis 60–63
weights 64–5
qualitative scale 67
multi criteria analysis (MCA) 33–5, 110, 150–51
advantages and disadvantages 34
approaches 100–101
framework 12–13, 110, 114
methods 13, 100
model 115
participatory 114
processes 115
strengths and weaknesses of 38–9
weighting procedure in 35
Multi Criteria Decision Aid (MCDA)
frameworks 5
methods 49, 123, 129
origins in 77
procedure 5
processes 5
steps and actors’ involvement 6
techniques 213–14
Multi Criteria Decision-making (MCDM) 87
multi-criteria methods 28–9, 190
multi-disciplinary work environment 180–81
multi-level governance 82
multi-stakeholder view 157–8
multi-stakeholder work environment 180–81
municipality 63
weight chart 66

NATA see New Approach to Appraisal (NATA)
National Court Register 212
negative benefits 31
negotiation costs 80
net present value (NPV) 31, 102
network of lockers 153
neutral party 152
New Approach to Appraisal (NATA) 103
appraisal summary table 104
Decision-making for sustainable transport and mobility

NGOs see nongovernmental organizations (NGOs)
night deliveries 168
non-corporate entity 211
nongovernmental organizations (NGOs) 4, 187, 203, 206–7, 211
non-profit organizations (NPOs) 211
non-redundancy 9
normative scenario approaches 88
NPOs see non-profit organizations (NPOs)
NPV see net present value (NPV)
oil-based reference 203
oil price 89
oil refining process 198
open-brand lockers 160
operationality 10
overall analysis 133–4
paid work 219
pairwise comparison matrix (PCM) 49–50
consistency of 52
pairwise comparison method 176
Pareto optimal ranking 190
participatory decision-making 72, 86–96
participatory process 79
PBO see Public Benefit Organization (PBO)
PCM see pairwise comparison matrix (PCM)
performance assessment
EBDLs and data collection 190–91
Multi-criteria method 190
performance evaluation criteria 221
personal income tax (PIT) 212
petroleum-based fuels 183
pilot, implementation of 160–61
PIT see personal income tax (PIT)
Poland
charities in 211
public benefit organizations in 211
small and medium-sized enterprises (SMEs) in 212
policy assessment framework 154
policy measures, implementation of 150
political transaction costs 80
PPPs see public private partnerships (PPPs)
practical-oriented knowledge 166
preference ranking 78, 83
by competence domain 79
juxtaposition of 78
preferences, synthesis of 134
preliminary objectives 108–9
private revenue concentration ratio 219
procedural uncertainty 89
Professional Associations group 132
programme services 220
project appraisal 100, 116
project management tab 49
project proposal, environmental consequences of 102–3
PROMETHEE 10, 48–9, 52–8, 134, 171, 176, 213–14
details of 49
GDSS PROMETHEE 133, 143
global positive, negative and net flows 55
global preference degrees 54–5
method 65
parameters 67
preference functions 54, 57
problem setting 56
qualitative scale of 155
ranking 55–8
unicriterion preference degrees 52–4, 58
PROMETHEE II 221–3
PROMETHEE IIv 223–5
Public Benefit Organization (PBO)
211
alternatives 215
assessment of 213
considered for support 216
efficiency and financial stability 215
expenses, categories of 219
financial ratings 217
information and reputation ratings 218
performance reports and financial statements 215, 217–18
procedure for evaluating 214–15
registered 212
status 220
public financing 219
public policy 2
Index

public private partnerships (PPPs) 125, 150
public resources 120
public services 154
public transport 59
quality of life 171
radar charts 70
range-based MAMCA 90–91, 95
ranking 133–4
RED see Renewable Energy Directive (RED)
refiners group 185
refiners outputs 198–9
regional economic impact study (REIS) 35
REIS see regional economic impact study (REIS)
renewable energy 183
Renewable Energy Directive (RED) 183
reputation rating 220
research programmes 164
residents 62, 154
resource costs 102
result analysis 68–72
retailers’ shared transport options 152
revealed preference 32
road infrastructure 59
Saaty scale 49–50
description of 50
SCBA see social cost-benefit analysis (SCBA)
scenario building 88
scenario evaluations, perceptions in 161
“Sensitivity Analysis” command 70
simple multi-attribute rating technique (SMART) 10
small and medium-sized enterprises (SMEs) see Poland, small and medium-sized enterprises (SMEs)
SMART see simple multi-attribute rating technique (SMART)
smart energy systems 165
smart parking 174
social cost-benefit analysis (SCBA) 30–33, 150–51
evaluates projects 30–31
partial form of 31
strength of 31–2, 38
weaknesses of 38
social equity 130
social groups 124
social-political feasibility 80
societal actors 131, 137
socio-economic evaluation methods 28, 38–9
strengths and weaknesses of 37–9
socio-economic impacts 196
South Fylde Line investment options 105–6
stakeholder analysis 8–9, 60–63, 125–6, 184–5
actor invitation 60
group parameters 60
user profile and access 60
to appraisal themes 112
and criteria 175–6
identification of 185–8
objectives adopted by 111
selection of 153–4
with weighted criteria 177–8
stakeholders 78–9, 110, 128, 132
concept 4
criteria and weight derived from the workshop 156–7
engagement in planning 122
evaluation of alternatives 160
objectives 87–8, 125–7
stated preference methods 32
subjectivity made objective 35
sustainability
concept 3
criteria for 3, 153
sustainable mobility 130–31
synergies 131
tax increment financing (TIF) 125
mechanism 134
policy 137
theoretical validity 10
Thessaloniki metro project 124
TIF see tax increment financing (TIF)
transaction costs 80
transit-oriented development (TOD) principles 125
Decision-making for sustainable transport and mobility

transport projects 28, 83–4, 100, 102–3, 107, 114, 116
benefits of 102
transport/transportation appraisal 103
practice 101
in UK 102–4
infrastructure 120, 122
investments 122–3
planners 110
policies 122, 127
problems 126
systems 121

UCC see urban consolidation centre (UCC)
UCO see used cooking oil (UCO)
uncertainty 88
of decision-context 89
decision-context under 87–8
knowledge 87
types of 86–7
uncertainty factors 92
illustration of 93
uni-criterion methods 28–9
unpaid work 219
urban consolidation centers 153, 159–61
potential of 161
urban consolidation centre (UCC) 169, 178
urban design 165
urban freight transport 149, 150, 152, 154
policy, evaluation of 150–51
urban mobility system 120
urban public transportation 121, 124
Urban Technology 165
urban transportation infrastructure 120–22
literature review 121–3
MAMCA, applications of 123–4
betterment tax/benefit assessment 124–5
definition of criteria and weight elicitiation 127–32
indicators and measurement methods 132–3
joint development 125
overall analysis and ranking 133–4
problem and identification of the alternatives 124
results 134–43
stakeholder analysis 125–6
tax increment financing (TIF) 125
VCF mechanisms for 129
used cooking oil (UCO) 89
user-friendly software 49
U.S., non-governmental sector in 211

Value Capture Finance (VCF) 120, 126
financing mechanism 130–31
implementation of 122
mechanisms 121–2, 129, 131
policies 126–7, 132, 137
research 122
tools 126
VCF see Value Capture Finance (VCF)
verbal decision analysis 79

waste-based biodiesel 198, 207
waste hierarchy 207
waterway transport 169
Web-based Transport Analysis Guidance (WebTAG) 103
web platform 152–3
WebTAG see Web-based Transport Analysis Guidance (WebTAG)
weight elicitation 188–9
definition of 127–32
weights 64–5
definition of 9–12
of respective criteria 169–70
willingness-to-accept (WTA) 33
willingness-to-pay (WTP) method 32
workshop setting 178
WTA see willingness-to-accept (WTA)
WTP method see willingness-to-pay (WTP) method