## Index

### A

- Accountability, 114
- Advisory board, 143
- Agile project management, 29, 406, 419

*A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Fifth Edition*

- description, 27, 419
- global standard, 27
- knowledge areas, 27
- organizational structure, 122
- projects, programs, and portfolios, 7–9, 352
- quality control and assurance, 319
- risk management, 266–267, 270
- scope definition, 154
- scope processes and procedures, 155
- specification definition, 169
- triple constraint, 153

- Alternative dispute resolution, 177–178
- Artery Business Committee, 42, 86–88
- Association for Project Management (APM), 25, 133, 420
- Audit, 252–253, 368–374
- Australian Institute of Project Management (AIPM), 25, 133, 420
- Awards, 53–54, 415–418

### B

- Baldridge performance excellence program, 141
- Bechtel/Parsons Brinckerhoff, 53, 93–94, 118, 129, 420
- Best practices, 271–272

- Big Dig. See Central Artery/Tunnel Project
- Board of directors, 123–125
- Boehm, Barry, 174
- Boston Harbor Cleanup Project, 57, 337
- B/PB. See Bechtel/Parsons Brinckerhoff
- Bridge Design Review Committee, 88

### C

- Central Artery/Tunnel Project (The Big Dig)
  - benefits of, 39–41, 49–54
  - Big Dig timeline, 43, 186–188
  - Cable-Stayed Bridge, 47–49
  - Casting Basin, 46–47
  - description, 38–49
  - environmental mitigation, 50
  - Fort Point Channel, 45–46
  - immersed tubes, 44–45
  - innovation and problem solving, 42
  - open space, 51
  - organization. See project organization structure
  - planning, 41–42
  - shellfish population, 50
  - slurry walls, 47
  - stakeholder. See stakeholder management
  - Ted Williams tunnel, 42
  - vision, 38

- Change management, 351–353
- Claims and changes, 365–367
- Collaboration, 24

457
Communication. See stakeholders
Configuration management, 355–356
Conflict management, 95, 137–138
Connaughton, Mary, 90, 128
Construction
  complexity, 14
  partnering, 361–365
  risk, 295
  safety. See safety and health
Controls program, 159–160
Corporate social responsibility, 97–98, 104, 141–142
Cost estimation research, 214–217, 226–229
Cost forecast 1994 (B/PB), 225
Cost growth history, 214–229
  changes in preliminary concept, 217–218
  inflation, 221–222
  political realities, 224–226
  potential change allowance, 222–224
  reasons for, 221
  schedule delays, 219–221
  subsurface conditions, 218–219
Cost management
  budgeting, 235–236
  control, 235
  cost centers, 236, 239, 424
  cost escalation strategy, 257–258
  cost management team, 236–240
  estimating, 22, 167, 214–215, 235
  planning, 235
Cost control tools
  bottom-up assessment of to-go project costs, 248–249
  budget, cost commitment and forecast report, 245–246
  claims and changes, 253–254
  contingency funding as a means of control, 249–250
  cost and schedule containment initiatives, 176, 256
  design evolution, 241
  earned value methodology, 247
  finance plan, 242
  management reserves, 252
  mitigation, 247–248
  potential change allowance (PCA), 250–251
  project management monthly (PMM), 242–245
  variance reports, 248
Cost data resources, 240–241
Cost and schedule containment, 176, 256
Cost recovery, 175–177, 254–256
Critical exposures. See schedule
Critical infrastructure controls, 300–303
Critical path method (CPM). See schedule
Culture, 23, 276

D
Deliverables, 18
Design
  complexity, 14
  concurrent engineering, 24
  design criteria, 14, 117, 133
  development, 167–168, 194–196
  errors and omissions, 366–367
  evolution, 241
Dispute Review Board (DRB), 17, 374–377

E
Early identification and trend analysis, 177
Earned value. See cost and schedule
Emergency preparedness, 301–303
Environmental impact report (EIS), 24, 217
Environmental mitigation, 50
Ethics
  dilemmas and challenges, 21–22
  Ethics Resource Center, 140–141
  governance, 139–140, 146
  transparent leadership, 399–400
  Eurotunnel, 59–64, 124, 139, 377
Events and causal factors analysis (ECFA). See Root Cause Analysis
F

Federal Highway Administration (FHWA), 59, 65, 67, 89, 92, 95, 100, 112, 126, 128, 158–159

Financing of megaprojects

Big Dig funding plan, 65–71
credit rating agencies, 55–56
debt financing costs, 70–71
definition of project finance, 54–55
features of megaprojects, 63–64
general obligation bonds (GOBs), 68–71

grant anticipation notes (GANS), 65, 67–68, 431
long-term infrastructures, 54–55
major sources of funding, 65–70

Massachusetts Port Authority Bond Anticipation Notes (BANs), 69–70
Massachusetts Turnpike Authority (MTA), 69–70

revenue sources, 55
sponsorship, 14, 91–93
structuring a PPP, 57–65
Surface Transportation and Uniform Relocation Assistance Act, 65

Transportation Infrastructure Fund (TIF), 69

Force accounts, 157, 162–164, 227, 236, 429
Force majeure, 170, 172, 277, 429

Future of project management, 407–409

G

GAO report highway projects, 13

Global development opportunities, 4–5

Governance

APM standards, 118, 133
architecture, 119, 132–133
board of directors, 123–125
centralization v. decentralization, 137–138
consortium, 117–118
corporate, 111–112, 119
decision-making, 130–132
definition of, 111–112, 114–115, 118
design criteria. See design enterprise, 119
factor of success, 113

Gateway process, 135
implementation of architecture, 132–133
implementation challenges, 137–142
independent advisory board, 143
institutional memory, 144–145
interface management, 143–144
joint venture, 118–119
lessons learned, 143–145
measuring performance, 133–136, 144
measurement tool, 135
megaproject paradox, 117–118
optimization of governance structure, 136
organization chart (Big Dig), 120
planning, 143
program governance, 113–114
projects as temporary institutions, 117
purpose of, 112–113
roles and responsibilities, 125–130
staged development, 135–136
stakeholders, 125
standards, 113–114
success factors, 113
trust, 138–139
whistle blower, 140–141

Governance as a dynamic regime, 21, 115–116
Governance framework: five step process, 118–136
Governance structures, 118–119

Governmental Accountability and Transparency Board (GATB), 7
Government at the Brink Report, 7

H

Heathrow Airport T5 project, 142–143
Hurricane Katrina, 301–302

I

Improvisation, 29, 394, 406, 431
Incentive models, 207–208
Innovation and problem solving, 42–43

Innovative process and program integration, 358–359

Institutional learning, 3–4
Insurance. See owner-controlled insurance program
Integration management
audit and oversight, 368–374
budget and finance plan, 381–382
change control, 365–367
configuration management—project delivery systems, 354–357
contracting, 379–381
cost and schedule, 196–200
dimensions of, 353–354
dispute resolution. See Dispute Review Board
innovative process and programs, 358
megaproject characteristic, 24
models, 359
organization, 357–358
quality governance and organization, 327–328
relationship to change, 351–352
risk management, 381
stakeholders, 364–365
structuring change, 383–384
teams, 378
utilities. See utility prevention
Integrated project delivery (IPD), 354–355
Integrated project organization (IPO), 91, 120–121, 357–358
International Project Management Association (IPMA), 25, 133, 139, 434

K
Kecamatan Project, Indonesia, 97–98

L
Labor
Agreement, 58, 93, 95
workplace accidents, 303–304
Leadership
categories of, 29–30
characteristics of, 394
cultural environments, 394–395
definition of, 392–393
dimensions of, 393
lessons from the Big Dig, 399–407
partnering environment, 402–403
stages of project management, 398–399
styles, 395–398
team-building, 405–406
transformation, 401–402, 406–407
transparency. See ethics
vision, 400–401

M
Management Consultant. See Bechtel/Parsons Brinckerhoff
Massachusetts Governors, 19
Massachusetts Highway Department (MHD), 127
Massachusetts Turnpike Authority (MTA), 127
Megaproject
definition of, 9–10
reasons to study, 2–7
Megaproject characteristics
 collaborated contracting, integration and partnering, 24
continuity of management, 18–19
cost underestimation, 22
critical front end, 15–16
cultural dimension, 23
delivery methods and procurement, 18–19, 158–159
design and construction complexity, 14
duration, 12
environmental impact, 24
ethical challenges, 21–22
framework, 25–27
governance structures, 21–22
large-scale policy making, 17–18
life cycle, 15
organizational structure, 20, 121–122
public profile and scrutiny, 16–17
regulation of, 20
risk management, 22–23
scale and dimension of, 13
socioeconomic impacts, 23
sponsorship and financing, 14
stakeholders, 20–21
systems complexity, 23–24
technological complexity, 19–20
types and purposes, 13
Megaproject literature, 9–10
Megaprojects around the World, 11–12
Megaprojects in the United States, 10–11
Metropolitan Highway System, 127
MHD. See Massachusetts Highway Department
Minority and women business development, 52
Mississippi River Bridge (I-35) Project, 11, 57, 316, 339
MORT system, 306
Mozal project, 60–64
MTA. See Massachusetts Turnpike Authority

N
National Aeronautics and Space Administration (NASA)
JWST Project, 133–134
phased review process, 135
requirements errors, 174

O
Occupational Safety and Health Administration (OSHA), 299–300, 304
OECD
definition of governance, 111
principles of good governance, 110, 114
OSHA. See Occupational Safety and Health Administration
Oversight Coordination Commission (OCC), 368–374
Owner-controller insurance program, 257, 290–294

P
Parsons Brinckerhoff, 118, 418
Partnering, 24, 102, 177–178, 358–364
Pioneer Institute, 59

PMI. See Project Management Institute
Portfolio management, 9, 113, 118, 127, 139, 211, 440
Procurement
administration, 158–159
best value procurement, 159
Program
definition of, 8–9
Program Management
definition of, 7–9
governance standards, 113–114
methodologies, 9, 23–24
Program Management Office (PMO), 8–9, 83, 121–122, 441
Program Management Standard (The Standard for Program Management), 9, 80–81, 113, 350
Program manager, 129–130
Project. See also program, program management, program management office, program manager, Program Management Standard, portfolio management, project delivery methods, A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Fifth Edition, Project Management Institute (PMI), project management in practice, project management methodologies, project management theory, project organizational structure
definition of, 8
Project delivery methods, 356–357
Project Management Institute (PMI)
best practices, 271
change management, 352–353
code of ethics and professional conduct, 22, 139
framework for project management, 25–27
governance standards, 110, 113–114, 118
integration, 364
lessons learned, 271
Mozal project of the year, 61
Project Management Institute (PMI) (Continued)
Organizational Project Management Maturity Model (OPM3), 438
portfolio management standard, 9
post disaster reconstruction, 272
process group, 442
program management standard, 8
standards, 133
project management professional (PMP), 442
Project management methodologies, theory and practice
agile, 29–30, 32
behavior approach, 29
continuity of, 18–19
framework elements, 26
improvisation, 32
policy, 26
practice, 26
process, 26
strategies, 27–28
structure, 26
structure (financial, organizational and governance), 26
theory, 28–30
Project management in practice, 25–28
Project management professional (PMP), 442
Project management theory, 28–30
Project organizational structure
functional, 122
matrix, 122
projectized, 121
structure, 20, 26
Project stakeholder roles
board of directors, 123
manager’s role, 129–130
program manager, 129
project director, 129
sponsor, 126
teams, 21, 41, 89, 126, 130, 326–327, 378, 393, 396, 401, 405
Public-Private Partnerships (PPPs)
benefits of, 56–57
definition of, 54–56
Eurotunnel, 59–61
features of, 63–64
international, 57
Mozal project, 60–62
public finance, 58–59
structures, 57–62
United States, 57
Q
Quality
allocation of responsibilities, 330
case study, 336–341
continuous improvement (Kaizen), 318, 324–325
deficiency report, 334
definition of, 317–319
elements of, 319–320
Ishikawa/fishbone diagram, 322–323
material controls, 335
planning, 319–321, 329–330
program considerations, 325–326
surveillance program, 332–334
Total-Quality Management (TQM), 318, 324–326
Quality control, 322, 331–334
Quality control chart, 323–324
Quality control tools, 322–323
Quality governance and organization, 327–328
R
Regulation of megaprojects, 20
Reporting requirements, 100–101
Risk. See also risk management, root cause analysis, safety and health
definition of, 286, 445
Risk management,
allocation, 270–271, 294–296
assessment, 268–269, 285–289
behavior–based safety, 307
business continuity management, 272–276
category, 277
critical infrastructure, 300–301
definition of, 445
exposures, 285
framework, 264–267
hazards, 285
identification, 267–268, 280–285
known, unknown and realized risk, 286–287
lessons learned, 271
loss control and claims management, 297
loss scenario analysis, 281–285
mission, 276–279
model, 267–272
monitoring and controlling, 294–296
near miss reporting, 283, 307
opportunities and best practices, 271–272, 283
organization, 278–280
perception, 268–269
principles, 278
qualitative risk analysis, 287–288
quantitative risk analysis, 288–289
response, 269, 289–290
role of, 264–266
strategy, 280
UK (OGC) 4 T’s approach, 270–271

S

Safety and Health
  incentives, 103–104
  innovations, 53, 95–96, 99
  OSHA. See Occupational Safety and Health Administration
  overview, 296–300
  partnerships, 102–103
  SHARE program, 296–300
  statistics, 100
Salvucci, Fred, 15, 41, 43, 48, 79
Schedule
  Big Dig timeline. See Central Artery/Tunnel Project
  earned value, 201–202
  fast-tracking, 193–194
  incentive models. See incentives/disincentives
  liquidated damages, 208
  maintenance of, 219–220
  milestone management, 188–190
  perception of stakeholders, 193
  philosophy, 186
  planning, 192–193
  project delay and schedule recovery, 202–206
  project delivery, 191–192
  time control processes, 200–201
  tracking progress, 201–202
  Schedule and cost integration
    critical path method (CPM), 197–199
    critical risk exposure, 199–200
  Schedule control plan, 196–197
  Schedule driven project, 185–186
  Scope
    change and verification, 173
    claims avoidance plan, 177
    controls plan, 160–162
    controls program, 157–158, 159–160
    creep, 169
    definition of, 154–155
    design development. See Design
design to budget, 175
elements, 156–157
  evolution and creep, 166–167, 169
  hierarchical levels of control and reporting, 165–166
  levels of control, 162
  requirement errors, 174–175
technical scope statement, 162–163
triple constraint, 153
  (WBS). See work breakdown structure
  Scope control tools, 174–179
  Scope specification management, 169–172
  Security and emergency preparedness, 301–302
  Socioeconomic impacts, 23
  Sponsors/Owners, 127–129
  Stakeholder
    analysis of, 84–85
    characteristics of, 20–21
classification of, 85
  concerns of, 94–96
  conflicts of interest, 90–94
corporate responsibility initiatives, 97
definition of, 80–81, 447–448
  ethical considerations, 106
  influence/interest matrix, 84
  key stakeholders, 88–89
  lessons from the Big Dig, 101–104
  management of, 87–89
Stakeholder (Continued)

participation, 97–98
partnerships, 102
principles, 81
relationships, 85–86
rewards, 103–104

Stakeholder communication, 98–101
financial information on the Big Dig, 100–101
model, 99–100
Stakeholder concerns and mitigation tools, 94–97
Stakeholder framework, 82–85
Stakeholder roles, 87
developer, 92
funder, 92
governing board, 93
management consultant, 93–94
project director, 92
project owners and sponsors, 91–93
promoter, 92
regulator and enforcer, 93
Stakeholder structures, 86–87
Sustainable development, 5–6
Sykes, Allen, 10
Systems complexity, 23–24

T

Teams. See project stakeholder roles
Technology
advancement, 53–54, 415–418
complexity, 19, 39–49
national and international recognition, 53–54
transfer program, 52

TQM. See quality
Traffic congestion, 39–42, 51–52
Transparency and Oversight, 6–7
Triple constraint, 153
Trust and honesty, 102

U

U.S. Department of Energy, 305
USDOT. See U.S. Department of Transportation
U.S. Department of Transportation, 4, 7, 10–11, 55–57, 74, 178, 266, 408
U.S. Environmental Protection Agency Clean Construction Program, 337–338
Utility protection, 378–381

V

Value Engineering (VE), 178–179, 256–257, 335–336

W

Whistleblower, 140–141
Work breakdown structure (WBS), 162–165
Work Program, 93–94, 452
World Bank, 5, 6, 11–12, 452