

Index

A

Aardex

- design model, 76–77
- profile, 13–14
- supply-side alliances, 77–79
- workplace, study of, 265

Acceleration, 263

Accidental adversaries, 39

Adjustable contracts, 30

Adobe, 141

Advanced Management Institute, 164

Advanced modeling, 290

Agreements. *See* Trust-based agreements

AIA. *See* American Institute of Architects (AIA)

Airplane game, 203–205

Alliance Partnerships, 232–233

Alliance websites, 288

American Institute of Architects (AIA), 181, 200, 232–233

Anderson, Ray, 44–45, 158

Andrew project, 218

The Architecture of Intelligence (de Kerckhove), 188

Architects

- adversarial behavior of, 9
- bid process and, 15

budgetary role, 12

future of, 292–293

lean adoption by, 212–213

liability concerns, 11

low-bid contracting and, 29–31

McGraw-Hill survey of, 79–80

offsite construction and, 245, 292

training, 10

The Art of Finding, Pricing, and Getting Paid for Contract Change, 34

Auditing contracts, 40–41

Automobile industry, 145, 147

Azinger, Paul, 94, 107

B

Banner Bank, 141–142

Banner Bank Building, 142

Bannister, Roger, 45

Berkshire Hathaway, 216

Better choices, 123

Better value, 123

Bidding. *See also* Low-bid contracting

line item, 31–32

multiple, 17

stakeholders' role, 15–16

BIM. *See* Building Information Modeling (BIM)

- BIMStorm, 184–186, 188
 - Black, Bill, 74
 - Blogs, 288
 - Boeing, 171–172
 - Boilerplate planning, 11–14
 - Boldt, 105–107
 - BP, 218
 - Broadcast culture, 294
 - Broken Buildings, Busted Budgets (LaPatner), 99
 - Brokers
 - budgetary role, 11
 - construction waste role, 6
 - contracting role of, 35
 - Buffet, Warren, 216
 - Building information modeling (BIM)
 - advance use of, 118–119
 - advantages of, 89, 175–176
 - application of, 173
 - Boeing example, 171–172
 - capabilities of, 48
 - CATIA for, 171–172
 - change implications
 - compensation, 182
 - design drawings, 178–181
 - measurements, 181
 - stakeholders' roles, 181–182
 - strategic planning, 182
 - work phasing, 181
 - defined, 172–173
 - future of, 186–189
 - growth in, 183–184
 - impact of, 54, 176–177
 - information portion, 172
 - Internet comparison to, 174–175
 - milestone, 182–183
 - mindshift, 174–176
 - model server, 290–291
 - modeling portion, 172
 - modeling tools, 288–289
 - offsite construction, 64, 250, 252
 - recommended reading, 279–280
 - software, 184–185, 187–188
 - stages of, 177
 - sustainability, 62
 - websites, 283–284
 - Building Informational Modeling, 10
 - Built-in sustainability
 - acceptance of, 136–139
 - business benefits of, 142–143
 - compounded growth approach, 144
 - cost effectiveness in, 139–144
 - defined, 89
 - energy consumption and, 135–136
 - greenhouse gases and, 145–149
 - LEED's influence on, 136–139
 - milestones, 151
 - New York Times building, 133–134, 147–150
 - overview, 150–152
 - Business
 - cultural changes, 293–294
 - design plans, 117
 - planning process, 8–9
 - Butler Buildings, 63
- C**
- CAD. *See* Computer Aided Drawings (CAD)
 - Camino Medical Project, 69–70
 - Candor, 125
 - Capital equipment, 7
 - CATIA, 171–172
 - Center for Building Performance Diagnostics, 261
 - Change orders, 34–35, 118
 - Charette, Mark
 - agreement process, 215–217
 - transformational leadership of, 159–160
 - trust-based projects, 80–82, 84
 - Clash detecting, 289
 - Class A buildings, 86
 - Client-centered incentives, 89
 - Co-locations, 69, 125

318 Index

- COBIE. *See* Construction Operations Building Information Exchange (COBIE)
- Cognitive ergonomics, 258, 266–267
- Cohos Evamy, 230
- Collaboration
- barriers to, 121–122
 - defined, 111
 - early
 - importance of, 89
 - iterative design in, 116–119
 - process, 111–112
 - project planning *vs.*, 116–117
 - psycho-tracking, 112–115
 - risks concerns, 115–116
 - 3D, 120–121
 - 2D, 119–121
 - websites, 289
 - 3D
 - better choices in, 123
 - better value in, 123
 - candor in, 125
 - co-location in, 125
 - common language for, 129–130
 - common tools for, 129–130
 - context in, 125
 - immersion, 126
 - innovation in, 124–125
 - just-in-time drawings for, 128
 - knowledge front loading, 127–128
 - modeling in, 128–129
 - planning front loading, 127–128
 - prototyping in, 128–129
 - respect in, 125
 - set-based designs in, 128
 - simulating in, 128–129
 - streaming in, 122–123
 - 2D collaboration *vs.*, 120–121
 - value of, 130–132
 - visualization tools in, 126
- Collaborative designs, 69
- Committee on the Environment (COTE), 164
- Complexity, 263
- Computer Aided Drawings (CAD)
- adoption of, 44–45
 - BIM and, 178–179
 - offsite construction and, 252
 - paper *vs.*, 178
- Compuware, 160
- Consensus Docs, 233
- Construction industry. *See also* Offsite construction
- bid process, 15–16
 - boilerplate planning, 11–14
 - costs estimates, 3
 - death rates, 19
 - hierarchical dilution, 15–17
 - liability, 217–219
 - manufacturing parallels, 4–5
 - model strategies, 24–25
 - poor planning, 20
 - recommended reading, 280
 - reform efforts, 21
 - silos model, 8–11
 - stakeholders, 8–11
 - standards of practice and, 34
 - sub-trade coordination, 14–15
 - team building process, 18
 - time factors, 6–7
 - waste in, 3, 6, 19
- Construction manager at risk model, 24
- Construction Operations Building Information Exchange (COBIE), 186
- Construction User's Round Table (CURT), 62–63, 101
- Contractors. *See* Sub-trades
- Contracts
- auditing, 40–41
 - changing, 34–35
 - explicit, 39
 - IFOA
 - application, example, 221
 - characterization of, 232

- creation of, 65
 - features of, 219
- MoU, 232
- power distribution in, 30–31
- selection, 231–233
- SPE, 232–233
- sub-trade responsibility under, 119
- Sutter health approach, 68
- trust-based, 218–220
- types of, 31
- Convergence, 264
- CoreClarity, 107
- CoreNet Global Summit, 30
- Costs
 - bidding, 26–27
 - built-in sustainability and, 139–144
 - contact savings, 221–222
 - materials, 20
 - productivity and, 254–257
 - target, setting, 223–225
- COTE. *See* Committee on the Environment (COTE)
- Cultural changes, 293–294
- Cultural effectiveness, 267
- Culture of trust, 61
- CURT. *See* Construction User's Roundtable (CURT)
- CYA process, 97–98
- D**
- DALI. *See* Digital Addressable Lighting Interface (DALI)
- Davy, Kyle, 164–165
- DBB. *See* Design-bid-build model (DBB)
- Design Thinking, 125
- Design-bid-build model (DBB)
 - bidding strategies, 23–24
 - construction teams in, 18
 - cumulative costs of, 19–21
 - decline in, 5
 - defined, 23
 - delivery models, 5–6
 - hierarchical structure, 15–17
 - planning process in, 20
 - process, 4
 - sub-trade coordination in, 14–15
 - time lines, 6–7
 - waste in, 6
- Designs. *See also* 3D design; 2D design
 - Aardex model, 76–77
 - BIM drawings, 178–181
 - collaborative, 69
 - development stage, 85
 - iterative
 - change orders and, 118
 - defined, 117–118
 - fabrication and, 118–119
 - in 3D planning, 120–121
 - in 2D planning, 119–121
 - productivity and, 89–90
 - set-based, 128, 212
 - target value, 211
 - Diffusion of Innovations* (Rogers), 177
 - Digital Addressable Lighting Interface (DALI), 162–163, 246
 - Digital culture, 294
 - DISC assessment, 107
 - Discovery AE, 164–165
 - DProfiler, 187–188
- Drawings
 - CAD
 - adoption of, 44–45
 - BIM and, 178–179
 - offsite construction and, 252
 - paper *vs.*, 178
 - just-in-time, 128
- E**
- East River Science Park, 71–72
- The Elegant Solution* (May), 196
- EMCOR, 187
- Emerson College, 72
- Energy, 135–137, 145–147

320 Index

- Energy Star, 136
 Environmental Protection Agency (EPA), 136
 EPA. *See* Environmental Protection Agency (EPA)
 Equipment, 7, 35
 Ergonomics. *See* Cognitive ergonomics
 Escalation, 39
 Estimators, 16, 248–250
Everything is Miscellaneous (Weinberger), 249
- F**
- Fast-tracking, 43
 Fees, Larry, 160
 Fischer, Martin, 64, 159
 Fixed-price contracts, 31
 Food Concierge Group, 225–226
 Full disclosure, 68–69
Future Shock (Toffler), 5
- G**
- Gehry Technologies, 48, 173–174
 Gehry, Frank, 173–174, 241
 General contractor approach, 81
 General contractors
 bidding process and, 15, 17, 34–35
 role of, 7
 General Motors, 130, 195–196
 Gensler, 75–76
 Geospatial, 291
 Ghafari Associates, 109, 130–131
 Global foods
 trust-based agreement
 assignment, 219–220
 changed work principles, 219–220
 concept model discussion, 226–229
 needs/wants, 225–226
 paradigm shift, 230
 project target costs, 223–225
 team selection, 223
- GMP. *See* Guaranteed Maximum Price (GMP)
 Gonzales, Dan, 64
 Gottfried, David, 164
 Great Place to Work Institute, 95
 Green analysis, 290
 Green Globes, 137
 Greenhouse gases
 autos' percentage of, 145
 buildings' percentage of, 145–147
 reducing, 146–147
 Guaranteed Maximum Price (GMP), 117
- H**
- Harris, Susan, 164–165
 Haworth, 74–76
 Health and well-being, 266
 Heating, ventilation and air conditioning (HVAC), 119, 187
 Heifetz, Ronald, 156–157
 Hilali, Jabir, 74
 HVAC. *See* Heating, ventilation and air conditioning (HVAC)
- I**
- iBrain*, 258
 IDEO, 124–125
 IFOA. *See* Integrated form of agreement (IFOA)
 iGeneration, 258–259
 Immediacy, 264
 Immersion, 126
The Innovator's Dilemma (Christensen), 61
 Innovations
 lean, 61–62, 69
 models, 48–49
 3D design, 124–125
 Insurance, 233–234
 Intangibility, 264
The Integrity Dividend (Simons), 95

- Integrated form of agreement (IFOA)
 - application, example, 221
 - characterization of, 232
 - creation of, 65
 - features of, 219
 - future of, 293
- Integrated modular slabs
 - advantages, 240
 - resistance to, 245–246
 - tradeoffs, 243
 - use of, 244
- Integrated Performance Management System (IPM), 107, 129
- Integrated Project Delivery*, 200
- Integrated project delivery
 - function of, 89
 - future of, 293
 - introduction to, 62–63
 - recommended reading, 278
 - websites, 283
 - work phasing *vs.*, 181
- Interconnection, 263
- Internet, BID comparison to, 174–175
- Invitations, bidding, 26
- IPM. *See* Integrated Performance Management System (IPM)
- Italiano, Michael, 164
- Iterative design
 - change orders and, 118
 - defined, 117–118
 - fabrication and, 118–119
 - 3D planning, 120–121
 - 2D planning, 119–121
- J**
- Johnson Controls, 141, 265
- Just-in-time drawings, 128
- K**
- Kieviet, Dave, 104, 108–109
- Kimmel Center, 241–242
- KlingStubbins
 - collaboration in, 112–115
 - East River Science Park project, 71
 - Emerson College project, 72
- Knowledge, 127–128
- KPMG, 74, 76
- Kyoto protocol, 147
- L**
- Lag of intelligence curve, 18
- Laiserin, Jerry, 64–65
- Landlords. *See* Owners
- Language, 129–130
- Laser scanner spatial imaging, 291
- Last planner system, 207–209
- Leadership. *See* Transformational leadership
- Leadership in Energy and Environmental Design (LEED), 132
 - achieving Platinum examples, 141–142
 - by-products, 137–139
 - classification levels, 143
 - cost effectiveness and, 139–140, 143–144
 - energy guidelines, 136–137
 - New York Times Corporation and, 148, 150
 - role of, 13–14
- Lean construction
 - airplane game, 203–205
 - analogies for, 193–195
 - architects adoption of, 212–213
 - cost savings with, 237
 - effectiveness of, 196–197
 - essentials, 199–202
 - function of, 195
 - future of, 214
 - GM adaptation, 195–196
 - goal of, 201–202
 - implantation of, 71
 - initiating, 202–203
 - innovations, 61–62, 69
 - recommended reading, 279

322 Index

- Lean construction (*Continued*)
 - study of, 78
 - talking points, 213–214
 - tools for, 205–212
 - universal language in, 129
 - waste elimination with, 201
 - websites, 283
- Lean Construction Institute, 199, 202–203
- LEED. *See* Leadership in Energy and Environmental Design (LEED)
- Liability
 - issues, 233–234
 - protection history, 217–219
 - silos model and, 11
- Lichtig, Will, 219
- Life cycle building management, 285
- Lighting, 162–163
- Line item bids, 31–32
- Low-bid contracting
 - architects and, 29–30
 - best value in, 32
 - bottom line, 36
 - budget in, 32
 - change orders, 34–35
 - comparisons in, 31–32
 - competitiveness in, 33
 - costs of, 26–27
 - delivery models, 32–33
 - independent brokers and, 35
 - invitations, 26
 - myths in, 31–36
 - nature of, 23
 - pre-qualification, 25
 - product suppliers, 41
 - recouping costs in, 28–30
 - rights won in, 30–31
 - risks in, 33
 - standards of practice and, 34
 - strategies, 24
 - team assembling issues, 27–28, 33
 - third parties and, 35–36
 - time issues, 27
 - value engineering in, 30
- Lucchesi Galati (LG), 49–50, 121
- Lucchesi, Ray, 121, 157
- M**
- Manufacturing, 4–5, 89
- Master Builder concept, 217–218
- MasterFormat system
 - BIM and, 250, 252
 - categorization, 248
 - worldview, 249
- Mavens, 61
- Mazria, Ed, 142
- McLane Distribution, 216
- McLeamy Curve, 127
- McLeamy, Patrick, 127
- Mechanical, electrical, plumbing engineers (MEPs)
 - costs savings for, 221
 - function of, 10
 - liability concerns, 11
 - offsite construction and, 251
 - training, 10
- Memorandum of Understanding (MoU), 232
- MEPs. *See* Mechanical, electrical, plumbing engineers (MEPs)
- Mind Maps, 126
- Minds at Work* (Lauwereyn), 258
- Mindshifts
 - BIM, 174–176
 - foundation for, 44
 - history of, 54–59
 - innovation models, 48–49
 - innovations, 61–62
 - integrated project delivery, 62–63
 - offsite construction and, 63
 - paradigm flipping and, 60
 - sustainability, 62
 - Sutter Health example, 65–66
 - trust bridge, 100–101
 - typical meeting, 53–54

- VBR and, 62, 64–65
- websites, 281
- workplace productivity
 - defining values, 261–262
 - improvement categories, 266–267
 - mapping improvement, 265–266
 - platforms, 262–263
 - tools for, 260–261
 - view of tasks, 261
- Modeling. *See also* Building
 - information modeling (BIM)
 - advanced, 290
 - BIM, 172
 - sub-trades, 290
 - in 3D collaboration, 128–129
- Modular interior walls, 74
- MoU. *See* Memorandum of Understanding (MoU)
- Multi-prime model, 24
- Mutable contracts. *See* Adjustable contracts

- N
- NBI. *See* New Buildings Institute (NBI)
- Negative looping, 117
- Negative patterns
 - accidental adversaries, 39
 - breaking, 44–50
 - failed fixes, 41–42
 - origins, 43
 - tragedy of the commons, 42–43
 - vicious cycles, 39–41
- Nelson, Ric, 73–75
- Network of commitments, 193–194, 198
- Network websites, 288
- New Buildings Institute (NBI), 137
- New Century Financial, 266
- New United Motor Manufacturing, Inc. (NUMMI), 195
- New York Times Corporation, 230
 - construction projects drivers, 161–164
 - design needs, 134
 - energy efficiency concerns, 147–149
 - production facilities, 133–134
 - profile, 133
- Nicklaus, Jack, 93
- No More Teams* (Schrage), 120, 122
- Novartis
 - collaboration in, 113–115
 - iterative design and, 118–119
 - project time, 117
- NUMMI. *See* New United Motor Manufacturing, Inc. (NUMMI)

- O
- Offsite construction, 63
 - aesthetics, 241–244
 - architect and, 251
 - benefits, 244
 - CAD use in, 252
 - characterization of, 63
 - costs, 246
 - estimators, 248–250
 - function of, 89
 - future of, 251–252
 - government use of, 244
 - MasterFormat, 248–250
 - owners' issues, 250–251
 - popularity of, 244
 - recommended reading, 279–280
 - rise of, 239–240
 - slab tech example, 240
- Office space, 253–254
- Onuma Planning System, 184–186
- Openness, 69
- Oswald, Jim, 56–59
- Outcome-based planning, 69
- Owners
 - bid process and, 15
 - budgetary role, 11–12
 - as change catalysts, 87–90
 - function of, 9
 - key construction principles, 88–90

324 Index

P

Paradigms

- changing, 45–46
- defined, 38
- flipping, 60
- negative patterns
 - accidental adversaries, 39
 - breaking, 44–50
 - failed fixes, 41–42
 - origins, 43
 - tragedy of the commons, 42–43
 - vicious cycles, 39–41
- shifting, 47, 230–231
- trust building, 102–103

Perimeter loads, 243

Persuaders, 61

Pixley, David, 65, 67–69, 104

Planning

- boilerplate, 11–14
- front loading, 127–128
- Onuma system, 184–186
- outcome-based, 69
- poor, 20
- process, 8–9
- project, 116–117
- strategic, 182
- 3D, 120–121
- tools, 289
- 2D, 119–121

The Power of Myth (Campbell), 49

Pre-qualification, 25

Prefabrication and Modular

- construction. *See also* Offsite construction

- iterative design and, 118–119
- websites, 284

Print culture, 294

Process improvement, 266

Product suppliers, 41

Productivity. *See* Workplace productivity

Professional organizations, 286.

See also specific group

Profitable Partnering for Lean

- Construction* (Cain), 28, 87, 237

The Project Alliancing Practitioner's Guide, 232–233

Project delivery integration

- AIA guidelines, 200
- Lean construction approach, 193–197
- team dynamics, 198–199
- tracking questions, 197–198

Project management

- personnel, 36
- redefined, 116–117
- traditional, 192–193

Prototyping, 128–129

Proust and the Squid, 258

Publication websites, 286

R

Ready Fit Integrated Floors, 240

Recommended reading

- BIM, 279–280
- industry review, 279–280
- integrated delivery, 278
- leadership, 277–278
- lean construction, 279
- offsite construction, 279–280
- sustainability, 278
- workplace performance, 279

Reed, Dean

- team building by, 108–109
- transformational leadership of, 158–159
- trust-based project by, 69–70
- virtual builders roundtable and, 64

Rendering tools, 289

Request for Proposal (RFP), 24, 26

Research organizations, 285–286

Respect, 125

Rethinking Construction, 78–79

Rocky Mountain Institute, 265

Ryder Cup Team, 93–94

S

- Sarbanes-Oxley Act, 216
 - Senior Executive Institute, 10
 - Set-based designs, 128, 212
 - Sick building syndrome, 266
 - Silos model, 8–11
 - Simpson, Scott, 117, 175
 - Simulation, 128–129
 - Single Purpose Entity (SPE), 232–233
 - Skepticism, 71
 - SmartObjects, 252
 - Society of Construction Law, 218–219
 - Society of Organizational Learning, 10
 - Solidus
 - agreement process, 215–217
 - construction documents
 - preparation, 85
 - design development stage, 85
 - early projects, 81
 - execution phase, 85
 - in-depth project study, 84–85
 - profile of, 80–81
 - transformational leadership at, 159–160
 - The Speed of Trusts* (Covey), 20
 - Spearin, 217–218
 - The Speed of Trust* (Merrill, Covey), 95
 - SPEs. *See* Single Purpose Entity (SPE)
 - Spradlin, Melody, 158–159
 - Springer, Tim, 255
 - Stakeholders. *See also specific members*
 - adversarial behavior among, 39
 - bid process and, 15
 - boilerplate planning by, 11–14
 - collaboration among, 11
 - early collaboration by, 89
 - offsite construction and, 245–246
 - role changes, 181–182
 - trust-based agreements and, 219–220
 - Standards organizations, 285–286
 - Stora Enso, 103–104
 - Streamlining, 122–123
 - Strengthsfinder*, 107
 - Sub-trades
 - buying clout, 35
 - coordination, 14–15
 - equipment provided by, 35
 - modeling websites, 290
 - overcharging by, 28–29
 - 2D planning by, 119–120
 - work percentage by, 33
 - Sustainability
 - built-in
 - acceptance of, 136–139
 - business benefits of, 142–143
 - compounded growth approach, 144
 - cost effectiveness in, 139–144
 - defined, 89
 - energy consumption and, 135–136
 - greenhouse gases and, 145–149
 - LEED's influence on, 136–139
 - milestones, 151
 - New York Times* example, 133–134
 - overview, 150–152
 - presentations, 62
 - websites, 281–283
 - Sutter Health
 - capital expansion approach of, 68–69
 - IFOA contract of, 65
 - press coverage, 65–66
 - profile, 68
 - project division system, 200
 - transformational leadership at, 159
 - Swarm Intelligence* (Bonabeau), 195
 - Swinerton, 187
- T**
- Target costing, 117
 - Target Value Costing, 210
 - Target value design, 198, 211

326 Index

- Team formation
 - assessment tools, 107
 - compatibility in, 107–108
 - failures, 110–111
 - future of, 293
 - mindshift bridge, 100–101
 - process, 108–109
 - trust dividend in
 - accessing, 99–100
 - study of, 94–95
 - tax on, 96
 - understanding, 96–99
 - trust-based
 - advantages, 110
 - case for, 103–104
 - compatibility in, 107–108
 - key components, 106–107
 - paradigms, 102–103
 - process, 108–109
 - psycho-tracking, 112–115
 - relational interactions, 198–199
 - selection-based on, 104–106
- Third parties, 35–36
- 3D design
 - AIA phrases, 181
 - CAD in, 178–179
 - change orders and, 180–181
 - changes in, 179–180
 - collaboration in
 - better choices in, 123
 - better value in, 123
 - candor in, 125
 - co-location in, 125
 - common language for, 129–130
 - common tools for, 129–130
 - context in, 125
 - immersion, 126
 - innovation in, 124–125
 - just-in-time drawings for, 128
 - knowledge front loading, 127–128
 - modeling in, 128–129
 - planning front loading, 127–128
 - prototyping in, 128–129
 - respect in, 125
 - set-based designs in, 128
 - simulating in, 128–129
 - streaming in, 122–123
 - 2D collaboration *vs.*, 120–121
 - value of, 130–132
 - visualization tools in, 126
 - websites, 289
- Thurm, David
 - about, 133, 160
 - BIM experience, 175
 - costs concerns, 230
 - leadership of, 160–164
 - responsibilities, 157
- Time lines
 - compensation, 182
 - low-bid contracting and, 27
 - rushing, 41–42
 - waste in, 6–7
- The Tipping Point* (Gladwell), 61
- Toffler, Alvin, 5
- Tools
 - BMI, 288–289
 - collaboration, 289
 - lean construction, 205–212
 - planning, 289
 - team formation, 107
 - 3D collaboration, 126, 129–130
 - visualization, 258–259, 289–290
 - workplace productivity, 260–261
- Toyota, 196
- Toyota Prius, 147
- Tragedy of the commons, 42–43
- Transformational leadership, 89
 - critical role in, 166
 - how-tos of
 - Compuware example, 160
 - DPR example, 158–159
 - New York Times example, 160–164
 - overview, 157–158
 - Solidus example, 159–160
 - Sutter Health example, 159

- initiating, 165–168
 - network creation, 164–165
 - recommended readings, 277–278
 - Transparency, 69
 - Trust dividend
 - accessing, 99–100
 - measuring, 94–95
 - percentages, 96–99
 - tax on, 96
 - Trust-based agreements
 - contract selection, 231–233
 - function of, 89
 - Global foods example
 - assignment, 219–220
 - changed work principles, 219–220
 - concept model discussion, 226–229
 - needs/wants, 225–226
 - paradigm shift, 230
 - project target costs, 223–225
 - team selection, 223
 - insurance, 233–234
 - liability in, 233–234
 - paradigm shifts, 230–231
 - stakeholders' role in, 219–220
 - streamlined
 - governance roles, 235–236
 - market strategy, 236–238
 - overview, 234–235
 - value creation in, 238
 - Trust-based projects
 - AARDEX, 76–79
 - auto industry, 72–73
 - Camino Medical, 69–70
 - East River Science Park, 71–72
 - Emerson College, 72
 - formation, 88–89
 - high-performance buildings, 86
 - Naugatuck Valley Savings & Loan, 82–84
 - owners' role in, 87–90
 - regional headquarters, 73–76
 - skeptics of, 71
 - smaller firms and, 79–81
 - Solidus, 80–81, 84–85
 - Sutter Health, 68–69
 - Trust-based teams
 - advantages, 110
 - case for, 103–104
 - collaboration and
 - context in, 112
 - psycho-tracking, 112–115
 - risk concerns, 115–116
 - compatibility and, 107–108
 - key components, 106–107
 - life of, 108–109
 - paradigms, 102–103
 - selection, 104–106
 - Turner Construction, 74–76
 - 2D design
 - measurement, 181
 - planning, 119–121
 - 3D vs., 120–121
- U**
- United States Green Building Council, 164
 - Unpredictability, 264
 - User Effective Buildings*, 265
 - USGBC, 265
- V**
- Value stream mapping, 205–207, 221
 - Values
 - better, 123
 - compensation, 182
 - creating, 201, 238
 - engineering, 30
 - productivity, 261–262
 - redesigning, 165
 - Vance, Michael, 126
 - VBR. *See* Virtual Builders Roundtable (VBR)
 - Virtual Builders Roundtable (VBR), 62
 - Virtual design and construction, 69, 71
 - Visual management, 210–211

328 Index

- Visualization
 - environments rich in, 258–259
 - rendering tools, 289–290
 - 3D tools, 126
- W
- Wacker, Jeff, 177
- Wal-Mart, 216
- Waste
 - elimination, 201
 - energy, 135–136
 - productivity and, 258
- Website resources
 - advanced modeling, 290
 - alliances, 288
 - analysis tools, 289
 - BIM model server, 290–291
 - BIM modeling, 283–284
 - BMI modeling, 289
 - geospatial, 291
 - green analysis, 290
 - integrated project delivery, 283
 - laser scanner spatial imaging, 291
 - lean construction, 283
 - life cycle building management, 285
 - mindshifts, 281
 - networks, 288
 - prefabrication/modular
 - construction, 284–285
 - professional organizations, 286
 - publications, 286
 - rendering tools, 289–290
 - research organizations, 285–286
 - standards organizations, 285–286
 - sub-trade modeling, 290
 - 3D modeling, 289
 - visualization tools, 289–290
 - workplace productivity, 284
- Wiki sites, 288
- Wolford, Arol, 186–187
- Woods, Tiger, 94
- Work dynamics, 267
- Workplace productivity
 - assessment tools for, 259–260
 - building design and, 89–90
 - case study, 267–268
 - cognitive ergonomics, 258, 266–267
 - cost distribution, 257–258
 - cost factors, 254–256
 - cultural effectiveness, 267
 - dynamics, 267
 - effective space and, 267
 - health and well-being, 266
 - human resources, 267
 - index, 255
 - mindshifts
 - defining values, 261–262
 - improvement categories, 266–267
 - mapping improvement, 265–266
 - platforms, 262–263
 - tools for, 260–261
 - view of tasks, 261
 - views of work, 263–265
 - office space and, 253–254
 - process improvement, 266
 - recommended reading, 279
 - social factors, 256–257
 - sustainability in, 267
 - visual tools for, 258–259
 - waste and, 258
 - websites, 284