# EIGHTH EDITION

# PROJECT MANAGEMENT

A Managerial Approach

# International Student Version

Jack R. Meredith

Broyhill Distinguished Scholar and Chair in Operations Wake Forest University

Samuel J. Mantel, Jr.

Joseph S. Stern Professor Emeritus of Operations Management University of Cincinnati



John Wiley & Sons, Inc.

#### CHAPTER 1 Projects in Contemporary Organizations 1

1.1	The	Definition	of a	"Project"	10
-----	-----	------------	------	-----------	----

- 1.2 Why Project Management? 16
- 1.3 The Project Life Cycle 18
- 1.4 The Structure of This Text 23

#### PROJECT MANAGEMENT IN PRACTICE

A Unique Method for Traveler-Tracking at Copenhagen Airport 12 The Smart-Grid Revolution Starts in Boulder, Colorado 13 The Australian Pavilion at the World Expo 2010 15

Turning London's Waste Dump into the 2012 Olympic Stadium 21 DIRECTED READING: Lessons for an Accidental Profession 30

#### PROJECT INITIATION 39

#### CHAPTER 2 Strategic Management and Project Selection 41

- 2.1 Project Management Maturity 43
- 2.2 Project Selection Criteria and Models 44
- 2.3 Types of Project Selection Models 47
- 2.4 Risk Considerations in Project Selection 64
- 2.5 The Project Portfolio Process (PPP) 65
- 2.6 Project Bids and REPs (Requests for Proposals) 74 PROJECT MANAGEMENT IN PRACTICE

Implementing Strategy through Project Management Tools 4

Taipei 101: Refitted as World's Tallest Sustainable Building Virtual Project Team Strategy 55

Using a Project Portfolio to Achieve 100% On-Time Delivery at

Decor Cabinet Company 66 CASE: Pan-Europa Foods S.A.' 82

DIRECTED READING: From Experience:

Linking Projects to Strategy 90

CHAPTER	3 The	<b>Project</b>	Manager	101

3.1	Proiect	Management	and the	Project	Manager	103

- 3.2 Special Demands on the Project Manager 108
- 3.3 Attributes of Effective Project Managers 118
- 3.4 Problems of Cultural Differences 124

PROJECT MANAGEMENT IN PRACTICE

Churchill as a Project Manager\_ 107

A Surprise "Director of Storm Logistics" for Katrina 109

Channel Tunnel 115

Why Project Managers Need to Have Local Knowledge 123 Success at Energo by Integrating Two Diverse Cultures 126

CASE: The National Jazz Hall of Fame 134

DIRECTED READING: What It Takes to Be a Good

Project Manager 140

#### CHAPTER 4 Managing Conflict and the Art of Negotiation 145

4.1 Conflict and the Project Life Cycle 148

4.2 The Nature of Negotiation 155

4.3 Partnering, Chartering, and Scope Change 156

4.4 Some Requirements and Principles of Negotiation 161

PROJECT MANAGEMENT IN PRACTICE

Quickly Building a School through Negotiation 147

Consideration of Waste During Project

Implementation 154

Habitat for Humanity Wins a Big One 157

Project Assessment and Recovery 163

DIRECTED READING: Methods of Resolving

Interpersonal Conflict 168

## CHAPTER 5 The Project in the Organizational Structure 175

- 5.1 Projects in a Functional Organization 177
- 5.2 Projects in a Projectized Organization 180
- 5.3 Projects in a Matrixed Organization 183
- 5.4 Projects in Composite Organizational Structures 188

5.5 Selecting a Project Form 189

- 5.6 The Project Management. Office (PMO) 192
- 5.7 The Project Team 197
- 5.8 Human Factors and the Project Team 200

PROJECT MANAGEMENT IN PRACTICE

Managing Risk in a Competitive Market 180

Software Firm Yunio Avoids Complex Technologies 187

Trinatronie, Inc. 191

A Project Management Office Success for the Transportation Security Administration 193

The Empire Uses Floating Multidiseiplinary Teams 199

South African Repair Success through Teamwork 204

CASE: Dizplaze 210

DIRECTED READING: The Virtual Project: Managing Tomorrow's

Team Today 213

#### PROJECT PLANNING 219

#### CHAPTER 6 Project Activity and Risk Planning 221

- 6.1 Initial Project Coordination and the Project Charter 224
- 6.2 Starting the Project Plan: The WBS
- 6.3 Human Resources: The RACI Matrix and Agile Projects
- 6.4 Interface Coordination through Integration Management
- 6.5 Project Risk Management 249

#### PROJECT MANAGEMENT IN PRACTICE

Beagle 2 Mars Probe a Planning Failure 222

Child Support Software a Victim of Scope Creep 225

Timetable Scheduling and Operational Plan Generation for London Underground 227

Faeebook Risks Interruption to Move a Terabyte 230

Disaster Project Planning in Iceland

Trying to Install a Wind Farm in the Middle of the North Sea

Ail Acquisition Failure Questions Recommended Practice 248

Risk Analysis vs. Budget/Schedule Requirements in Australia 250

Ignoring Risk Contrasted with Recognizing Risk in

Two Industries

CASE: Caprico 268

DIRECTED READING: Planning for Crises in Project Management 275

#### **CHAPTER** 7 Budgeting: Estimating Costs and Risks 283

- 7.1 Estimating Project Budgets 284
- 7.2 Improving the Process of Cost Estimating 297
- 7'.3 Risk Estimation 307

#### •PROJECT MANAGEMENT IN PRACTICE

Pathfinder Mission to Mars—on a Shoestring

Orcsund Bridge: Seeing Projects Through Different Lenses Managing Costs at Massachusetts' Neighborhood Health Plan 291

Completing the Limerick Nuclear Facility Under Budget

The Emanon Aircraft Corporation

CASE: Gujarat Auto

DIRECTED READING: Three Perceptions of Project Cost 324

#### **CHAPTER 8 Scheduling** 331

- 8.1 Background 331
- 8.2 Network Techniques: PERT (ADM) and CPM (PDM) 334
- 8.3 Risk Analysis Using Simulation with Crystal Ball®
- 8.4 Usim? These Tools 370

PROJECT	<b>MANAGEME</b>	NT IN	PRA	CTICE

Production Scheduling 332

Election Returns within Three Hours 342

Hosting the Annual Project Management Institute Symposium 361

Rapid Project Deployment at Kineo 370

CASE: Topline Arena 380

#### CHAPTER 9 Resource Allocation 383

- 9.1 Critical Path Method—Crashing a Project
- 9.2 The Resource Allocation Problem 394
- 9.3 Resource Loading 396
- 9.4 Resource Leveling 399
- 9.5 Constrained Resource Scheduling 404
- 9.6 Multiproject Scheduling and Resource Allocation 410
- 9.7 Goldratt's Critical Chain 414

#### PROJECT MANAGEMENT IN PRACTICE

Expediting Los Angeles Freeway Repairs after the Earthquake

Architectural Associates, Inc.

Thirty Days to Rescue 393

Benefit/Cost Analysis Saves Chicago's Deep Tunnel Project 395

Benefits of Resource Constraining at Pennsylvania Electric 409

CASE: D. U. Singer Hospital Products Corp. 426

#### PROJECT EXECUTION 431

## **CHAPTER 10 Monitoring and Information Systems 433**

- 10.1 The Planning-Monitoring-Controlling Cycle 434
- 10.2 Information Needs and Reporting 441
- 10.3 Earned Value Analysis 446
- 10.4 Computerized PMIS (Project Management Information Systems) 457 PROJECT MANAGEMENT IN PRACTICE

Tracking Scope Creep: A Project Manager Responds 434

Drug Counseling Program 441

Earned Value at CERN 455

CASE: Kroon Chemische Fabriek 466

## CHAPTER 11 Project Control 471

- 11.1 The Fundamental Purposes of Control 475
- 11.2 Three Types of Control Processes 476
- 11.3 The Design of Control Systems 485
- 11.4 Control of Change and Scope Creep 493
- 11.5 Control: A Primary Function of Management 497 PROJECT MANAGEMENT IN PRACTICE Regaining Control of Nuclear Fusion 473 Delhi Metro 477

Schedule and Cost Control for Australia's New Parliament House 487
Major Scope Creep in a Consultancy Project 494
Better Control ofeDevelopment Projects at Johnson Controls 496
CASE: Peerless Laser Processors 506
DIRECTED READING: Controlling Projects According to Plan 510

## CHAPTER 12 Project Auditing 517

- 12.1 Purposes of Evaluation—Goals of the System 518
- 12.2 The Project Audit 521
- 12.3 The Project Audit Life Cycle 526
- 12.4 Some Essentials of an Audit/Evaluation 529
- 12.5 Measurement 532

#### PROJECT MANAGEMENT IN PRACTICE

Lessons from Auditing 110 Client/Server and Open Systems Projects 521 Management of the Typhoon Project 527

CASE: Theater High Altitude Area Defense (THAAD): Five Failures and Counting (B) 537

DIRECTED READING: An Assessment of Postproject Reviews 540

### CHAPTER 13 Project Termination 547

- 13.1 The Varieties of Project Termination 548
- 13.2 When to Terminate a Project 553
- 13.3 The Termination Process 558
- 13.4 The Final Report—A Project History 564
- 13.5 Afterword 566

#### PROJECT MANAGEMENT IN PRACTICE

Project Termination Practices in Indian Industry 550

Pulling the Plug: Projects in a Risky World 552

Terminating the Superconducting Super Collider Project 557

When You Have to Kill a Project 564

Photo and Copyright Credits 571

Name Index 573

Subject Index 579

Please visit http://www.wiley.coni/go/global/meredith for Appendices. A: Probability and Statistics and Appendix B: Answers to the Even-Numbered Problems.