PROJECT MANAGEMENT

ACHIEVING COMPETITIVE ADVANTAGE

Jeffrey K. Pinto
Pennsylvania State University
CONTENTS

Preface 15

Chapter 1 Introduction: Why Project Management? 21
PROJECT PROFILE: Case—Disney's Expedition Everest 22
Introduction 24
1.1 What Is a Project? 24
General Project Characteristics 26
1.2 Why Are Projects Important? 28
PROJECT PROFILE: Dubai—Land of Mega-Projects 30
1.3 Project Life Cycles 31
PROJECT MANAGERS IN PRACTICE: Christy Rutkowski, Regency Construction Services 34
1.4 Determinants of Project Success 35
PROJECT MANAGEMENT RESEARCH IN BRIEF: Assessing Information Technology (IT) Project Success 37
1.5 Developing Project Management Maturity 38
1.6 Project Elements and Text Organization 41
Summary 45
Key Terms 46
Discussion Questions 46
Case Study 1.1 MegaTech, Inc. 47
Case Study 1.2 The IT Department at Hamelin Hospital 47
Internet Exercises 48
PMP Certification Sample Questions 48
Notes 49

Chapter 2 The Organizational Context: Strategy, Structure, and Culture 51
PROJECT PROFILE: Project Management Improves Lenovo's Bottom Line 52
Introduction 53
2.1 Projects and Organizational Strategy 54
2.2 Stakeholder Management 57
Identifying Project Stakeholders 57
Managing Stakeholders 60
2.3 Organizational Structure 62
2.4 Forms of Organizational Structure 63
Functional Organizations 63
Project Organizations 66
Matrix Organizations 67
Moving to Heavyweight Project Organizations 70
PROJECT MANAGEMENT RESEARCH IN BRIEF: The Impact of Organizational Structure on Project Performance 71
2.5 Project Management Offices 71
2.6 Organizational Culture 74
How Do Cultures Form? 75
Organizational Culture and Project Management 77
PROJECT PROFILE: Creating a Culture for Project Management: The Renault Racing Team 78
Chapter 3  Project Selection and Portfolio Management  90

PROJECT PROFILE:  Project Selection Procedures: A Cross-Industry Sampler  91

Introduction  92
3.1 Project Selection  92
3.2 Approaches to Project Screening and Selection  94
   Method One: Checklist Model  94
   Method Two: Simplified Scoring Models  96
   Limitations of Scoring Models  98
   Method Three: The Analytical Hierarchy Process  98
   Method Four: Profile Models  101
3.3 Financial Models  104
   Payback Period  104
   Net Present Value  106
   Discounted Payback  107
   Internal Rate of Return  107
   Options Models  109
   Choosing a Project Selection Approach  110

PROJECT PROFILE:  Project Selection and Screening at GE: The Tollgate Process  111
3.4 Project Portfolio Management  112
   Objectives and Initiatives  112
   Developing a Proactive Portfolio  113
   Keys to Successful Project Portfolio Management  115
   Problems in Implementing Portfolio Management  115

Summary  116
Key Terms  118
Solved Problems  118
Discussion Questions  119
Problems  119
Case Study 3.1 Keflavik Paper Company  122
Case Study 3.2 Project Selection at Nova Western, Inc.  123
Internet Exercises  124
Notes  124

Chapter 4  Leadership and the Project Manager  126

PROJECT PROFILE:  Case—New Product Development at PING Golf, Inc.  127

Introduction  129
4.1 Leaders vs. Managers  129
Chapter 6 Project Team Building, Conflict, and Negotiation 185

PROJECT PROFILE: Japanese Automakers Launch "Pre-Collision" Projects 186

Introduction 187

6.1 Building the Project Team 188
Identify Necessary Skill Sets 188
Identify People Who Match the Skills 188
Talk to Potential Team Members and Negotiate with Functional Heads 188
Build in Fallback Positions 190
Assemble the Team 190

6.2 Characteristics of Effective Project Teams 190
A Clear Sense of Mission 190
A Productive Interdependency 191
Cohesiveness 191
Trust 191
Enthusiasm 192
Results Orientation 192

6.3 Reasons Why Teams Fail 193
Poorly Developed or Unclear Goals 193
Poorly Defined Project Team Roles and Interdependencies 193
Lack of Project Team Motivation 193
Poor Communication 194
Poor Leadership 194
Turnover Among Project Team Members 194
Dysfunctional Behavior 194

6.4 Stages in Group Development 195
Stage One: Forming 195
Stage Two: Storming 196
Stage Three: Norming 196
Stage Four: Performing 196
Stage Five: Adjourning 196
Punctuated Equilibrium 196

6.5 Achieving Cross-Functional Cooperation 197
Superordinate Goals 198
Rules and Procedures 198
Physical Proximity 199
6.6 Virtual Project Teams 200

PROJECT PROFILE: Tele-Immersion Technology Eases the Use of Virtual Teams 201

6.7 Conflict Management 202

What Is Conflict? 202
Sources of Conflict 203
Methods for Resolving Conflict 205

6.8 Negotiation 206

Questions to Ask Prior to the Negotiation 206
Principled Negotiation 207
Invent Options for Mutual Gain 209
Insist on Using Objective Criteria 210

Summary 211
Key Terms 211
Discussion Questions 212
Case Study 6.1 Columbus Instruments 212
Case Study 6.2 The Bean Counter and the Cowboy 213
Case Study 6.3 Johnson & Rogers Software Engineering, Inc. 214
Exercise in Negotiation 215
Internet Exercises 216
PMP Certification Sample Questions 217
Notes 217

Chapter 7 Risk Management 219

PROJECT PROFILE: Case—Project Moses: Keeping Venice Above Water 220

Introduction 221

PROJECT MANAGERS IN PRACTICE: Mohammed Al-Sadiq, Saudi Aramco Oil Company 223

7.1 Risk Management: A Four-Stage Process 224

Risk Identification 224
Analysis of Probability and Consequences 227
Risk Mitigation Strategies 229
Use of Contingency Reserves 231
Other Mitigation Strategies 232
Control and Documentation 232

PROJECT PROFILE: Ferris Wheels: Bigger and Higher 234

7.2 Project Risk Management: An Integrated Approach 235

Summary 238
Key Terms 238
Solved Problem 239
Discussion Questions 239
Problems 239
Case Study 7.1 DeHavilland's Falling Comet 240
Case Study 7.2 The Tacoma Narrows Suspension Bridge 241
Internet Exercises 243
PMP Certification Sample Questions 243
Integrated Project—Project Risk Assessment 244
Notes 246
Chapter 8 Cost Estimation and Budgeting 247
PROJECT PROFILE: Case—Boston’s Central Artery/Tunnel Project: Updated and Complete 248

8.1 Cost Management 250
Direct vs. Indirect Costs 251
Recurring vs. Nonrecurring Costs 253
Fixed vs. Variable Costs 253
Normal vs. Expedited Costs 253

8.2 Cost Estimation 254
Learning Curves in Cost Estimation 256
Problems with Cost Estimation 260
PROJECT MANAGEMENT RESEARCH IN BRIEF: Software Cost Estimation 261
PROJECT PROFILE: Heathrow Airport’s Terminal Five Development 262

8.3 Creating a Project Budget 263
Top-Down Budgeting 263
Bottom-Up Budgeting 264
Activity-Based Costing 264

8.4 Developing Budget Contingencies 266
Summary 268
Key Terms 269
Solved Problems 270
Discussion Questions 270
Problems 271
Case Study 8.1 The Dulhasti Power Plant 272
Case Study 8.2 London’s Millennium Dome 273
Internet Exercises 274
PMP Certification Sample Questions 274
Integrated Project—Developing the Cost Estimates and Budget 276
Notes 278

Chapter 9 Project Scheduling: Networks, Duration Estimation, and Critical Path 279
PROJECT PROFILE: The Spallation Neutron Source Project 280
Introduction 282
9.1 Project Scheduling 282
9.2 Key Scheduling Terminology 284
9.3 Developing a Network 285
Labeling Nodes 286
Serial Activities 287
Concurrent Activities 287
Merge Activities 287
Burst Activities 288
9.4 Duration Estimation 291
9.5 Constructing the Critical Path 294
Calculating the Network 295
The Forward Pass 296
The Backward Pass 297
Laddering Activities 299
Chapter 10  Project Scheduling: Lagging, Crashing, and Activity Networks 309

PROJECT PROFILE:  A Crushing Issue: How to Destroy Brand-New Cars 310

Introduction 311

10.1 Lags in Precedence Relationships 311
   Finish to Start 312
   Finish to Finish 312
   Start to Start 313
   Start to Finish 313

10.2 Gantt Charts 313
   Adding Resources to Gantt Charts 315
   Incorporating Lags in Gantt Charts 316

PROJECT MANAGERS IN PRACTICE:  Major Julia Sweet, U.S. Army 317

10.3 Crashing Projects 318
   Options for Accelerating Activities 318
   Crashing the Project: Budget Effects 322

10.4 Activity-on-Arrow Networks 324
   How Are They Different? 324
   Dummy Activities 326
   Forward and Backward Passes with AOA Networks 327
   AOA vs. AON 329

10.5 Controversies in the Use of Networks 329

Conclusions 331

Summary 332
Key Terms 332
Solved Problems 332
Discussion Questions 333
Problems 334
Case Study 10.1 Project Scheduling at Blanque Cheque Construction (A) 335
Case Study 10.2 Project Scheduling at Blanque Cheque Construction (B) 335
MS Project Exercises 336
PMP Certification Sample Questions 337
Integrated Project—Developing the Project Schedule 338
Notes 341
Chapter 11  Critical Chain Project Scheduling  342

PROJECT PROFILE:  Canada’s Oil Sands Recovery Projects  343

Introduction  345
11.1 The Theory of Constraints and Critical Chain Project Scheduling  345
Theory of Constraints  345
Common Cause and Special Cause Variation  347
11.2 CCPM and the Causes of Project Delay  348
Method One: Overestimation of Individual Activity Durations  349
Method Two: Project Manager Safety Margin  349
Method Three: Anticipating Expected Cuts from Top Management  349
11.3 How Project Teams Waste the Extra Safety They Acquire  350
Method One: The Student Syndrome  350
Method Two: Failure to Pass Along Positive Variation  351
Method Three: Negative Consequences of Multitasking  351
Method Four: Delay Caused by Activity Path Merging  352
11.4 The Critical Chain Solution to Project Scheduling  353
Developing the Critical Chain Activity Network  355
Critical Chain Solutions vs. Critical Path Solutions  357
PROJECT PROFILE:  BAE Systems and Critical Chain Project Management  358
11.5 Critical Chain Solutions to Resource Conflicts  359
11.6 Critical Chain Project Portfolio Management  360
■ PROJECT MANAGEMENT RESEARCH IN BRIEF:  Advantages of Critical
Chain Scheduling  362
11.7 Critiques of CCPM  363
Summary  364
Key Terms  365
Solved Problem  365
Discussion Questions  366
Problems  366
Case Study 11.1 Judy’s Hunt for Authenticity  369
Case Study 11.2 Ramstein Products, Inc.  369
Internet Exercises  370
Notes  370

Chapter 12  Resource Management  372

PROJECT PROFILE:  The Road to “Green”: Converting a Power Plant  373

Introduction  375
12.1 The Basics of Resource Constraints  375
Time and Resource Scarcity  376
Example: Working with Project Constraints  376
12.2 Resource Loading  377
12.3 Resource Leveling  379
Example: An In-Depth Look at Resource Leveling  380
Step One: Develop Resource-Loading Table  382
Step Two: Determine Activity Late-Finish Dates  383
Step Three: Identify Resource Overallocation  384
Step Four: Level the Resource-Loading Table  384
Chapter 13 Project Evaluation and Control 399

PROJECT PROFILE: Solar Power on the Rise 400

Introduction 401
13.1 Control Cycles—A General Model 402
13.2 Monitoring Project Performance 402
    The Project S-Curve: A Basic Tool 403
    S-Curve Drawbacks 404
    Milestone Analysis 405
    Problems with Milestones 406
    The Tracking Gantt Chart 406
    Benefits and Drawbacks of Tracking Gantt Charts 407
13.3 Earned Value Management 407
    Terminology for Earned Value 408
    Creating Project Baselines 409
    Why Use Earned Value? 409
    Steps in Earned Value Management 411
    Assessing a Project's Earned Value 412
13.4 Using Earned Value to Manage a Portfolio of Projects 414
    PROJECT PROFILE: Earned Value at Northrop Grumman 415
13.5 Issues in the Effective Use of Earned Value Management 417
13.6 Human Factors in Project Evaluation and Control 418
    Critical Success Factor Definitions 420
    Summary 422
    Key Terms 422
    Solved Problem 423
    Discussion Questions 424
    Problems 424
    Case Study 13.1 The IT Department at Kimble College 425
    Case Study 13.2 The Superconducting Supercollider 426
    Internet Exercises 427
Chapter 14 Project Closeout and Termination

PROJECT PROFILE: Navy Scraps Development of its Showpiece Warship

Introduction

14.1 Types of Project Termination

PROJECT MANAGERS IN PRACTICE: Mike Brown, Rolls-Royce Plc

14.2 Natural Termination—The Closeout Process

Finishing the Work
Handing Over the Project
Gaining Acceptance for the Project
Harvesting the Benefits
Reviewing How It All Went
Putting It All to Bed
Disbanding the Team
What Prevents Effective Project Closeouts?

14.3 Early Termination for Projects

Making the Early Termination Decision
PROJECT PROFILE: Spain Cancels Major Water Project

PROJECT MANAGEMENT RESEARCH IN BRIEF: Project Termination in the IT Industry

Shutting Down the Project
Allowing for Claims and Disputes

14.4 Preparing the Final Project Report

Conclusion

Summary
Key Terms
Discussion Questions
Case Study 14.1 Project Libra: To Terminate or Not to Terminate
Case Study 14.2 The Project That Wouldn't Die
Internet Exercises
PMP Certification Sample Questions
Notes