PROJECT MANAGEMENT

A Systems Approach to Planning, Scheduling, and Controlling

TWELFTH EDITION

HAROLD KERZNER, Ph.D.

WILEY

Contents _____

Preface xix

1 OVERVIEW 1

1.0	Introduction I	
1.1	Understanding Project Management 2	
1.2	Defining Project Success 6	
1.3	Trade-Offs and Competing Constraints 7	
1.4	The Entry-Level Project Manager 9	
1.5	The Talent Triangle 10	
1.6	Technology-Based Projects 10	
1.7	The Project Manager–Line Manager Interface 11	
1.8	Defining the Project Manager's Role 13	
1.9	Defining the Functional Manager's Role 15	
1.10	Defining the Functional Employee's Role 17	
1.11	Defining the Executive's Role 17	
1.12	Working with Executives 17	
1.13	Committee Sponsorship/Governance 19	
1.14	The Project Manager as the Planning Agent 20	
1.15	Project Champions 21	
1.16	Project-Driven versus Non–Project-Driven Organizations 22	
1.17	Marketing in the Project-Driven Organization 24	
1.18	Classification of Projects 25	
1.19	Location of the Project Manager 26	
1.20	Differing Views of Project Management 27	
1.21	Public-Sector Project Management 28	
1.22	International Project Management 31	
1.23	Concurrent Engineering: A Project Management Approach 32	
1.24	Added Value 32	
1.25	Studying Tips for the PMI® Project Management Certification Exam	
Problems 36		

VIII CONTENTS

Case Study

Williams Machine Tool Company 37

	2	Project Management Growth: Concepts and Definitions	39
--	---	---	----

2 0	T . 1	20
2.0	Introduction	39

- 2.1 The Evolution of Project Management: 1945–2017 39
- 2.2 Resistance to Change 43
- 2.3 Systems, Programs, and Projects: A Definition 45
- 2.4 Product versus Project Management: A Definition 47
- 2.5 Maturity and Excellence: A Definition 49
- 2.6 Informal Project Management: A Definition 50
- 2.7 The Many Faces of Success 52
- 2.8 The Many Faces of Failure 54
- 2.9 Causes of Project Failure 57
- 2.10 Degrees of Success and Failure 59
- 2.11 The Stage-Gate Process 60
- 2.12 Project Life Cycles 61
- 2.13 Gate Review Meetings (Project Closure) 65
- 2.14 Engagement Project Management 66
- 2.15 Project Management Methodologies: A Definition 67
- 2.16 From Enterprise Project Management Methodologies to Frameworks 69
- 2.17 Methodologies Can Fail 70
- 2.18 Organizational Change Management and Corporate Cultures 71
- 2.19 Benefits Harvesting and Cultural Change 76
- 2.20 Agile and Adaptive Project Management Cultures 77
- 2.21 Project Management Intellectual Property 77
- 2.22 Systems Thinking 79
- 2.23 Studying Tips for the PMI® Project Management Certification Exam 82

Problems 85

Case Study

Creating a Methodology 86

3 ORGANIZATIONAL STRUCTURES 89

- 3.0 Introduction 89
- 3.1 Organizational Work Flow 90
- 3.2 Traditional (Classical) Organization 91
- 3.3 Pure Product (Projectized) Organization 93
- 3.4 Matrix Organizational Form 95
- 3.5 Modification of Matrix Structures 99
- 3.6 The Strong, Weak, or Balanced Matrix 101

3.7 3.8 3.9 3.10 3.11 3.12	Project Management Offices 101 Selecting the Organizational Form 103 Strategic Business Unit (SBU) Project Management 106 Transitional Management 107 Seven Fallacies that Delay Project Management Maturity 109 Studying Tips for the PMI® Project Management Certification Exam 111 ems 113		
ORGA	NIZING AND STAFFING THE PROJECT OFFICE AND TEAM 115		
4.0 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 4.10 4.11 4.12 4.13	Introduction 115 The Staffing Environment 116 Selecting the Project Manager: an Executive Decision 117 Skill Requirements for Project and Program Managers 121 Special Cases in Project Manager Selection 125 Today's Project Managers 126 Duties and Job Descriptions 127 The Organizational Staffing Process 128 The Project Office 131 The Functional Team 133 The Project Organizational Chart 133 Selecting the Project Management Implementation Team 136 Mistakes Made by Inexperienced Project Managers 139 Studying Tips for the PMI® Project Management Certification Exam 140		
Proble	Problems 142		
MANA	AGEMENT FUNCTIONS 145		
5.0 5.1 5.2 5.3 5.4 5.5 5.6 5.7 5.8 5.9 5.10 5.11 5.12 5.13	Introduction 145 Controlling 146 Directing 146 Project Authority 148 Interpersonal Influences 152 Barriers to Project Team Development 154 Suggestions for Handling the Newly Formed Team 157 Team Building as an Ongoing Process 158 Leadership in a Project Environment 159 Value-Based Project Leadership 160 Transformational Project Management Leadership 163 Organizational Impact 163 Employee—Manager Problems 165 General Management Pitfalls 166 Time Management Pitfalls 167		

X CONTENTS

 5.15 Management Policies and Procedures 171 5.16 Human Behavior Education 171 5.17 Studying Tips for the PMI® Project Management Certification Exam 174
Problems 177
Case Studies The Trophy Project 178 McRoy Aerospace 180 The Poor Worker 182 The Prima Donna 182 The Reluctant Workers 184 Leadership Effectiveness (A) 185 Leadership Effectiveness (B) 189 Motivational Questionnaire 195
COMMUNICATIONS MANAGEMENT 203
6.0 Introduction 203 6.1 Modeling the Communications Environment 203 6.2 The Project Manager as a Communicator 208 6.3 Project Review Meetings 212 6.4 Project Management Bottlenecks 212 6.5 Active Listening 213 6.6 Communication Traps 214 6.7 Project Problem Solving 215 6.8 Brainstorming 223 6.9 Predicting the Outcome of a Decision 224 6.10 Facilitation 226 6.11 Studying Tips for the PMI® Project Management Certification Exam 223 Problems 230
Case Studies Communication Failures 231 The Team Meeting 234
CONFLICTS 237
 7.0 Introduction 237 7.1 The Conflict Environment 238 7.2 Types of Conflicts 239 7.3 Conflict Resolution 240 7.4 The Management of Conflicts 241 7.5 Conflict Resolution Modes 242

8

9

Radiance International 313

 7.6 Understanding Superior, Subordinate, and Functional Conflicts 244 7.7 Studying Tips for the PMI® Project Management Certification Exam 246
Problems 248
Case Studies Facilities Scheduling at Mayer Manufacturing 248 Telestar International 250 Handling Conflict in Project Management 251
SPECIAL TOPICS 257
 8.0 Introduction 257 8.1 Performance Measurement 257 8.2 Financial Compensation and Rewards 262 8.3 Effective Project Management in the Small Business Organization 270 8.4 Mega Projects 271 8.5 Morality, Ethics, and the Corporate Culture 273 8.6 Professional Responsibilities 275 8.7 Internal and External Partnerships 278 8.8 Training and Education 279 8.9 Integrated Product/Project Teams 281 8.10 Virtual Project Teams 283 8.11 Managing Innovation Projects 284 8.12 Agile Project Management 287 8.13 Studying Tips for the PMI® Project Management Certification Exam 289 Problems 295
Case Study
Is It Fraud? 295
THE VARIABLES FOR SUCCESS 299
 9.0 Introduction 299 9.1 Predicting Project Success 299 9.2 Project Management Effectiveness 302 9.3 Expectations 303 9.4 Lessons Learned 305 9.5 Understanding Best Practices 306 9.6 Studying Tips for the PMI® Project Management Certification Exam 312
Problems 313
Case Study

ZIII CONTENTS

10 WORKING WITH EXECUTIVES 317

- 10.0 Introduction 317
- 10.1 The Project Sponsor 317
- 10.2 Handling Disagreements with the Sponsor 327
- 10.3 The Collective Belief 327
- 10.4 The Exit Champion 328
- 10.5 The In-House Representatives 329
- 10.6 Stakeholder Relations Management 329
- 10.7 Project Portfolio Management 335
- 10.8 Politics 337
- 10.9 Studying Tips for the PMI® Project Management Certification Exam 338

Problems 339

Case Studies

The Prioritization of Projects 340

The Irresponsible Sponsors 341

Selling Executives on Project Management 342

11 PLANNING 345

- 11.0 Introduction 345
- 11.1 Business Case 346
- 11.2 Validating the Assumptions 348
- 11.3 Validating the Objectives 351
- 11.4 General Planning 352
- 11.5 Life-Cycle Phases 355
- 11.6 Life-Cycle Milestones 356
- 11.7 Kickoff Meetings 358
- 11.8 Understanding Participants' Roles 360
- 11.9 Establishing Project Objectives 360
- 11.10 The Statement of Work 361
- 11.11 Project Specifications 363
- 11.12 Data Item Milestone Schedules 364
- 11.13 Work Breakdown Structure 365
- 11.14 Wbs Decomposition Problems 370
- 11.15 Work Breakdown Structure Dictionary 372
- 11.16 Project Selection 373
- 11.17 The Role of the Executive in Planning 377
- 11.18 Management Cost and Control System 378
- 11.19 Work Planning Authorization 379
- 11.20 Why Do Plans Fail? 380
- 11.21 Stopping Projects 381
- 11.22 Handling Project Phaseouts and Transfers 381

11.23 Detailed Schedules and Charts 383	
11.24 Master Production Scheduling 385	
11.25 Project Plan 386	
11.26 The Project Charter 391	
11.27 Project Baselines 392	
11.28 Verification and Validation 395	
11.29 Management Control 396	
11.30 Configuration Management 397	
11.31 Enterprise Project Management Methodologies 398	
11.32 Project Audits 399	
11.33 Studying Tips for the PMI® Project Management Certification Exam 40)()
Problems 404	
NETWORK SCHEDULING TECHNIQUES 409	
. •	
12.0 Introduction 409	
12.1 Network Fundamentals 41112.2 Graphical Evaluation and Review Technique (GERT) 416	
12.3 Dependencies 417	
12.4 Slack Time 417	
12.5 Network Replanning 423	
12.6 Estimating Activity Time 428	
12.7 Estimating Total Project Time 429	
12.8 Total PERT/CPM Planning 430	
12.9 Crash Times 431	
12.10 PERT/CPM Problem Areas 436	
12.11 Alternative PERT/CPM Models 436	
12.12 Precedence Networks 437	
12.13 Lag 440	
12.14 Scheduling Problems 441	
12.15 The Myths of Schedule Compression 441	
12.16 Project Management Software 442	
12.17 Studying Tips for the PMI® Project Management Certification Exam 44	15
Problems 448	
Case Study	
The Invisible Sponsor 451	
PRICING AND ESTIMATING 453	
13.0 Introduction 453	
13.1 Global Pricing Strategies 453	
13.2 Types of Estimates 455	
13.3 Pricing Process 458	

XİV CONTENTS

13.4 Organizational Input Requirements 460
13.5 Labor Distributions 462
13.6 Overhead Rates 463
13.7 Materials/Support Costs 465
**
13.8 Pricing Out the Work 466
13.9 Smoothing Out Department Man-Hours 46913.10 The Pricing Review Procedure 471
13.10 The Pricing Review Procedure 471 13.11 Systems Pricing 472
· · · · · · · · · · · · · · · · · · ·
13.12 Developing the Supporting/Backup Costs 474 13.13 The Low-Bidder Dilemma 474
13.14 Special Problems 477
13.15 Estimating Pitfalls 478
13.16 Estimating High-Risk Projects 479
13.17 Project Risks 480
13.18 The Disaster of Applying the 10 Percent Solution to Project Estimates 483
13.19 Life-Cycle Costing (LCC) 484
13.20 Logistics Support 486
13.21 Economic Project Selection Criteria: Capital Budgeting 488
13.22 Payback Period 488
13.23 The Time Value of Money and Discounted Cash Flow (DCF) 489
13.24 Net Present Value (NPV) 490
13.25 Internal Rate of Return (IRR) 490
13.26 Comparing IRR, NPV, and Payback 491
13.27 Risk Analysis 492
13.28 Capital Rationing 492
13.29 Project Financing 494
13.30 Studying Tips for the PMI® Project Management Certification Exam 496
Problems 498
Case Study
The Estimating Problem 499
COST CONTROL 501
14.0 Introduction 501
14.1 Understanding Control 503
14.2 The Operating Cycle 506
14.3 Cost Account Codes 506
14.4 Budgets 511
14.5 The Earned Value Measurement System (EVMS) 512
14.6 Variance and Earned Value 513
14.7 The Cost Baseline 529
14.8 Justifying the Costs 531

14

14.9 The Cost Overrun Dilemma 532

14.10 Recording Material Costs Using Earned Value Measurement 534 14.11 Material Variances: Price and Usage 535 14.12 Summary Variances 536 14.13 Status Reporting 537 14.14 Cost Control Problems 537 14.15 Studying Tips for the PMI® Project Management Certification Exam 53	39	
Problems 542		
Case Studies The Bathtub Period 544 Franklin Electronics 545		
METRICS 549		
 15.0 Introduction 549 15.1 Project Management Information Systems 549 15.2 Enterprise Resource Planning 550 15.3 Project Metrics 550 15.4 Key Performance Indicators (KPIS) 555 15.5 Value-Based Metrics 561 15.6 Dashboards and Scorecards 566 15.7 Business Intelligence 569 15.8 Studying Tips for the PMI® Project Management Certification Exam 57 	70	
Problems 573		
TRADE-OFF ANALYSIS IN A PROJECT ENVIRONMENT 575		
 16.0 Introduction 575 16.1 Methodology for Trade-Off Analysis 578 16.2 Contracts: Their Influence on Projects 593 16.3 Industry Trade-Off Preferences 594 16.4 Project Manager's Control of Trade-Offs 597 16.5 Studying Tips for the PMI® Project Management Certification Exam 59 	97	
Problems 598		
RISK MANAGEMENT 599		
17.0 Introduction 599 17.1 Definition of Risk 601 17.2 Tolerance for Risk 603 17.3 Definition of Risk Management 604 17.4 Certainty, Risk, and Uncertainty 604 17.5 Risk Management Process 610		

XVI CONTENTS

17.6 Plan Risk Management 611	
17.7 Risk Identification 612	
17.8 Risk Analysis 613	
17.9 Qualitative Risk Analysis 615	
17.10 Quantitative Risk Analysis 616	
17.11 Plan Risk Response 619	
17.12 Monitor and Control Risks 621	
17.13 Some Implementation Considerations 622	
17.14 The Use of Lessons Learned 623	
17.15 Dependencies between Risks 624	
17.16 The Impact of Risk Handling Measures 628	
17.17 Risk and Concurrent Engineering 631	
17.18 Studying Tips for the PMI® Project Management Certification Exam	633
Problems 637	
11001cms 057	
Case Studies	
Teloxy Engineering (A) 640	
Teloxy Engineering (B) 640	
The Risk Management Department 641	
LEARNING CURVES 643	
18.0 Introduction 643	
18.1 General Theory 643	
18.2 The Learning Curve Concept 644	
18.3 Graphic Representation 646	
18.4 Key Words Associated with Learning Curves 647	
18.5 The Cumulative Average Curve 648	
18.6 Sources of Experience 649	
18.7 Developing Slope Measures 653	
18.8 Unit Costs and Use of Midpoints 654	
18.9 Selection of Learning Curves 654	
18.10 Follow-On Orders 655	
18.11 Manufacturing Breaks 656	
18.12 Learning Curve Limitations 656	
18.13 Competitive Weapon 657	
18.14 Studying Tips for the PMI® Project Management Certification Exam	658
Problems 659	

19 CONTRACT MANAGEMENT 661

19.0 Introduction 661

- 19.1 Procurement 662
- 19.2 Plan Procurements 664

19.3 Conducting the Procurements 667 19.4 Conduct Procurements: Request Seller Responses 668 19.5 Conduct Procurements: Select Sellers 669 19.6 Types of Contracts 673 19.7 Incentive Contracts 678 19.8 Contract Type versus Risk 680 19.9 Contract Administration 680 19.10 Contract Closure 683 19.11 Using a Checklist 684 19.12 Proposal-Contractual Interaction 684 19.13 Studying Tips for the PMI® Project Management Certification Exam 68	36
Problems 691	
Case Studies To Bid or Not to Bid 692 The Management Reserve 693	
QUALITY MANAGEMENT 697	
20.0 Introduction 697 20.1 Definition of Quality 698 20.2 The Quality Movement 699 20.2 Quality Management Concepts 703 20.3 The Cost of Quality 707 20.4 The Seven Quality Control Tools 709 20.5 Acceptance Sampling 721 20.6 Implementing Six Sigma 722 20.7 Quality Leadership 723 20.8 Responsibility for Quality 724 20.9 Quality Circles 725 20.10 Total Quality Management (TQM) 725 20.11 Studying Tips for the PMI® Project Management Certification Exam 72	28
Problems 731	
MODERN DEVELOPMENTS IN PROJECT MANAGEMENT 733	
 21.0 Introduction 733 21.1 The Project Management Maturity Model (PMMM) 733 21.2 Developing Effective Procedural Documentation 737 21.3 Project Management Methodologies 741 21.4 Continuous Improvement 742 21.5 Capacity Planning 743 21.6 Competency Models 745 21.7 Managing Multiple Projects 747 	

XVIII CONTENTS

21.8 The Business of Scope Changes 74821.9 End-of-Phase Review Meetings 752

Case Study

Honicker Corporation 753 Kemko Manufacturing 755

Appendix A: Solution to Leadership Exercise 759

Appendix B: Solutions to the Project Management Conflict Exercise 765

Appendix C: Dorale Products Case Studies 771

Appendix D: Solutions to the Dorale Products Case Studies 783 Appendix E: Alignment of the PMBOK® Guide to the Text 789

Index 795