

TOM KENDRICK, PMP

HOW TO **MANAGE** **COMPLEX** **PROGRAMS**

High-Impact Techniques for
Handling Project Workflow,
Deliverables, and Teams

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Program Management

Figure 1-1 A portfolio of projects and programs.

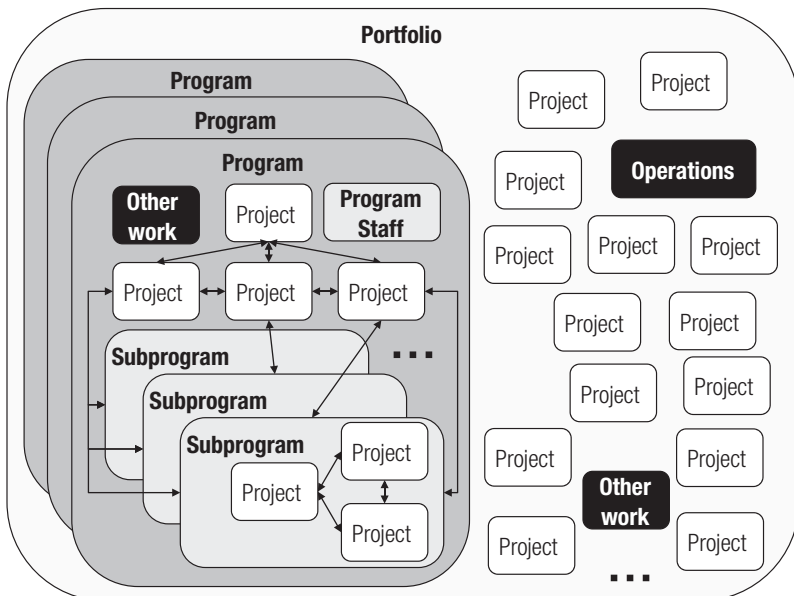


Figure 1-2 Program management domains.

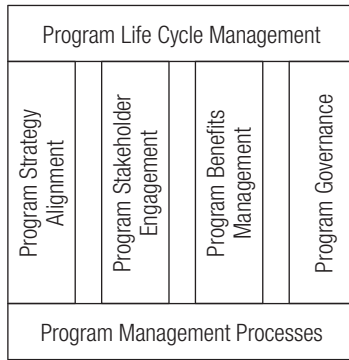


Figure 1-3 A program having a large staff and multiple project teams.

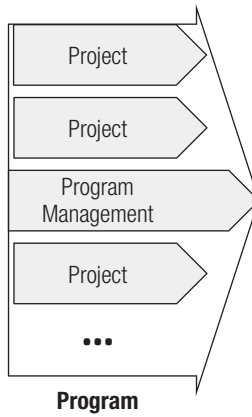


Figure 1-4 A program made up of a sequence of projects.

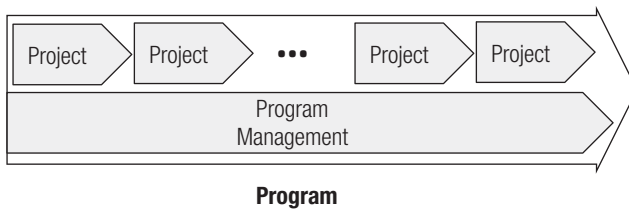
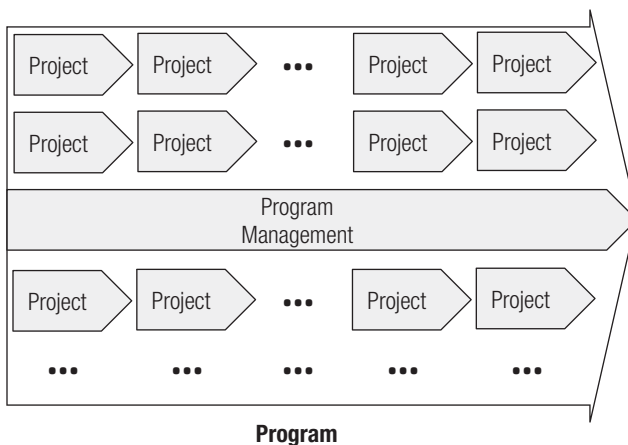


Figure 1-5 A program with multiple phases staffed by several project teams.



CHAPTER **2**

Program Initiation

Figure 2-1 A typical top-down portfolio process.

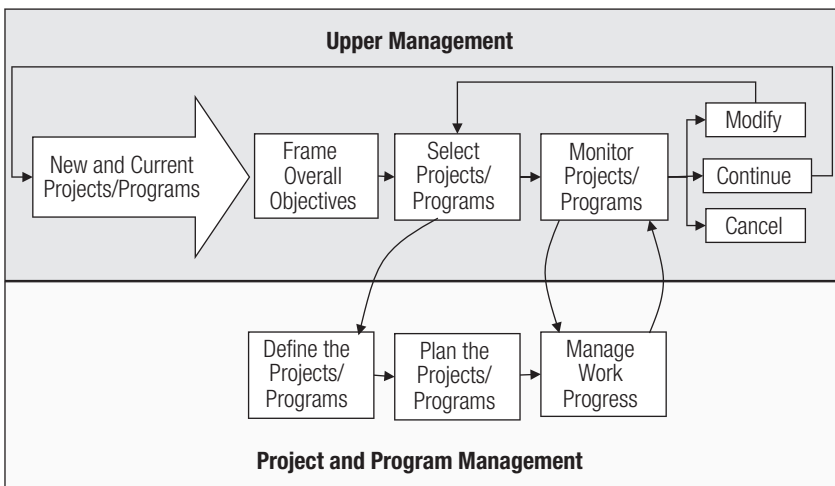


Figure 2-2 A portfolio process using project and program feedback.

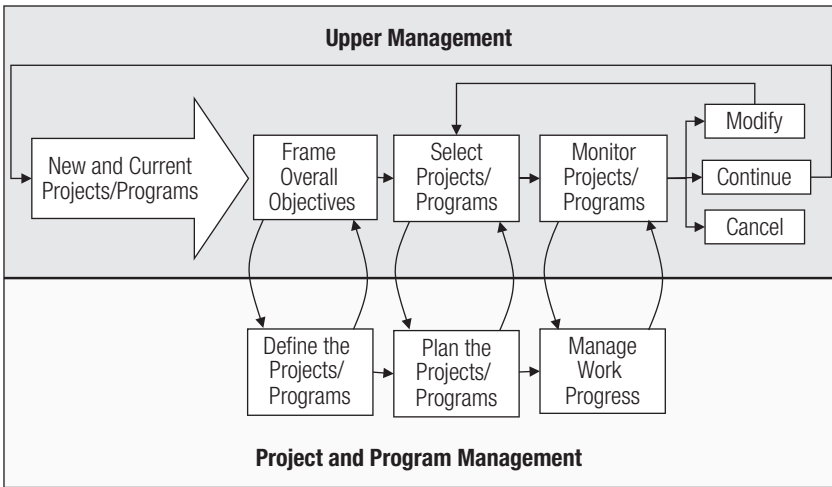


Table 2-1 Costs and benefits per quarter for a multiyear program.

		Cost (\$M)	Benefit (\$M)	Net (\$M)	Total (\$M)
Year 1	Q1	(\$0.5)	\$0.0	(\$0.5)	(\$0.5)
	Q2	(\$0.8)	\$0.0	(\$0.8)	(\$1.3)
	Q3	(\$1.5)	\$0.1	(\$1.4)	(\$2.7)
	Q4	(\$1.5)	\$0.4	(\$1.1)	(\$3.8)
Year 2	Q1	(\$1.5)	\$0.9	(\$0.6)	(\$4.4)
	Q2	(\$1.5)	\$1.4	(\$0.1)	(\$4.5)
	Q3	(\$1.5)	\$2.0	\$0.5	(\$4.0)
	Q4	(\$1.5)	\$2.6	\$1.1	(\$2.9)
Year 3	Q1	(\$1.5)	\$3.2	\$1.7	(\$1.2)
	Q2	(\$1.5)	\$3.8	\$2.3	\$1.1
	Q3	(\$1.0)	\$4.3	\$3.3	\$4.4
	Q4	(\$1.0)	\$4.8	\$3.8	\$8.2
Year 4	Q1	(\$1.0)	\$5.3	\$4.3	\$12.5
	Q2	(\$1.0)	\$5.8	\$4.8	\$17.3
	Q3	(\$1.0)	\$6.1	\$5.1	\$22.4
	Q4	(\$1.0)	\$6.4	\$5.4	\$27.8
Year 5	Q1	(\$0.5)	\$6.6	\$6.1	\$33.9
	Q2	(\$0.5)	\$6.8	\$6.3	\$40.2
	Q3	(\$0.5)	\$6.9	\$6.4	\$46.6
	Q4	(\$0.5)	\$7.0	\$6.5	\$53.1

Formula for the Time Value of Money

$$PV = FV/(1 + i)^n$$

where:

PV is the present value

FV is the future value

i is the interest rate per period

n is the number of periods

Table 2-2 Present values of costs and benefits for a multiyear program.

		Cost (\$M)	Benefit (\$M)	Net (\$M)	Total (\$M)
Year 1	Q1	(\$0.5)	\$0.0	(\$0.5)	(\$0.5)
	Q2	(\$0.8)	\$0.0	(\$0.8)	(\$1.3)
	Q3	(\$1.5)	\$0.1	(\$1.4)	(\$2.7)
	Q4	(\$1.5)	\$0.4	(\$1.1)	(\$3.7)
Year 2	Q1	(\$1.4)	\$0.9	(\$0.6)	(\$4.3)
	Q2	(\$1.4)	\$1.3	(\$0.1)	(\$4.4)
	Q3	(\$1.4)	\$1.9	\$0.5	(\$3.9)
	Q4	(\$1.4)	\$2.4	\$1.0	(\$2.9)
Year 3	Q1	(\$1.4)	\$3.0	\$1.6	(\$1.3)
	Q2	(\$1.4)	\$3.5	\$2.1	\$0.8
	Q3	(\$0.9)	\$3.9	\$3.0	\$3.8
	Q4	(\$0.9)	\$4.3	\$3.4	\$7.2
Year 4	Q1	(\$0.9)	\$4.7	\$3.8	\$11.0
	Q2	(\$0.9)	\$5.1	\$4.2	\$15.2
	Q3	(\$0.9)	\$5.3	\$4.4	\$19.6
	Q4	(\$0.9)	\$5.5	\$4.7	\$24.3
Year 5	Q1	(\$0.4)	\$5.6	\$5.2	\$29.5
	Q2	(\$0.4)	\$5.7	\$5.3	\$34.8
	Q3	(\$0.4)	\$5.8	\$5.4	\$40.2
	Q4	(\$0.4)	\$5.8	\$5.4	\$45.5

Figure 2-3 Simple payback graph.

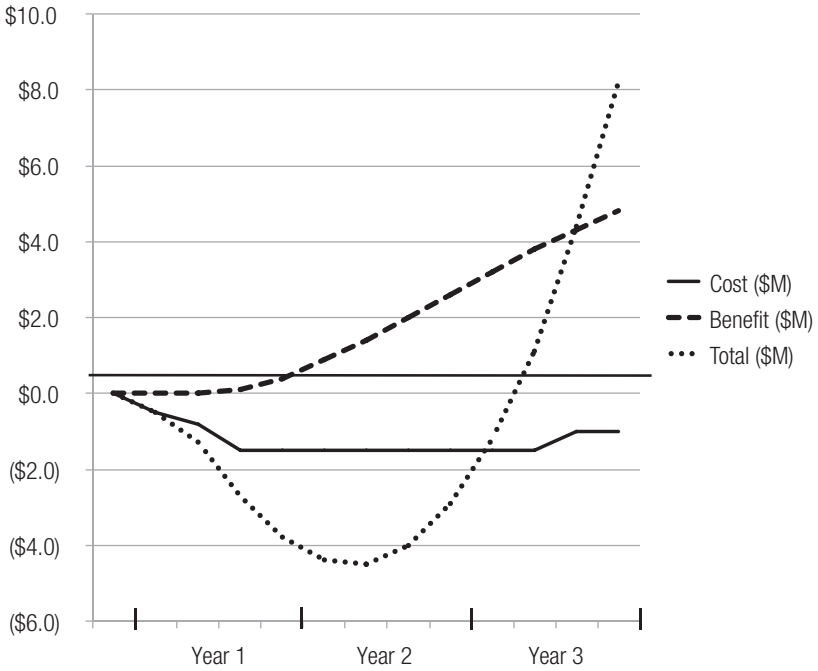
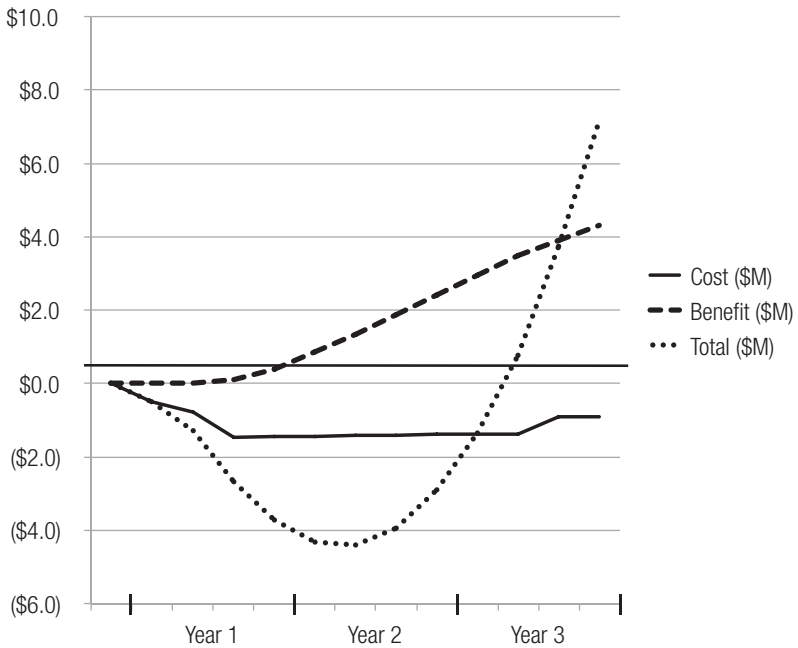


Figure 2-4 Discounted payback graph.



PERT Formula Example

$$Cost_{(expected)} = (5 * Cost_{(target)} + Cost_{(worst case)})/6$$

Figure 2-5 Decision tree for technology choice.

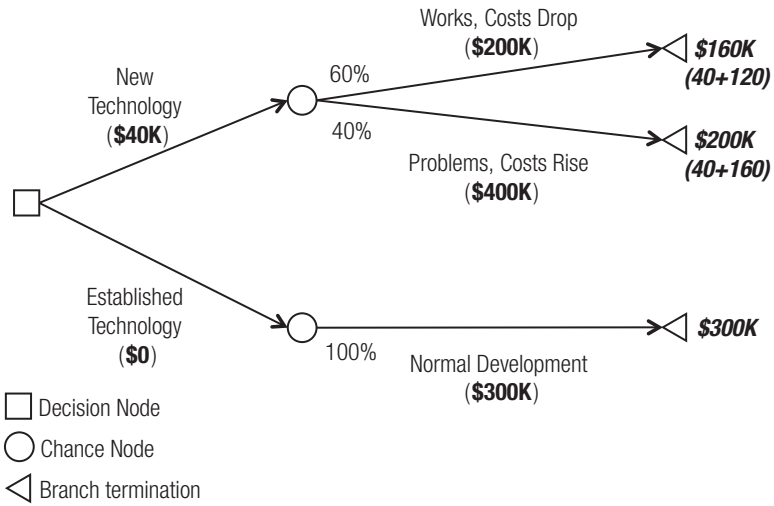
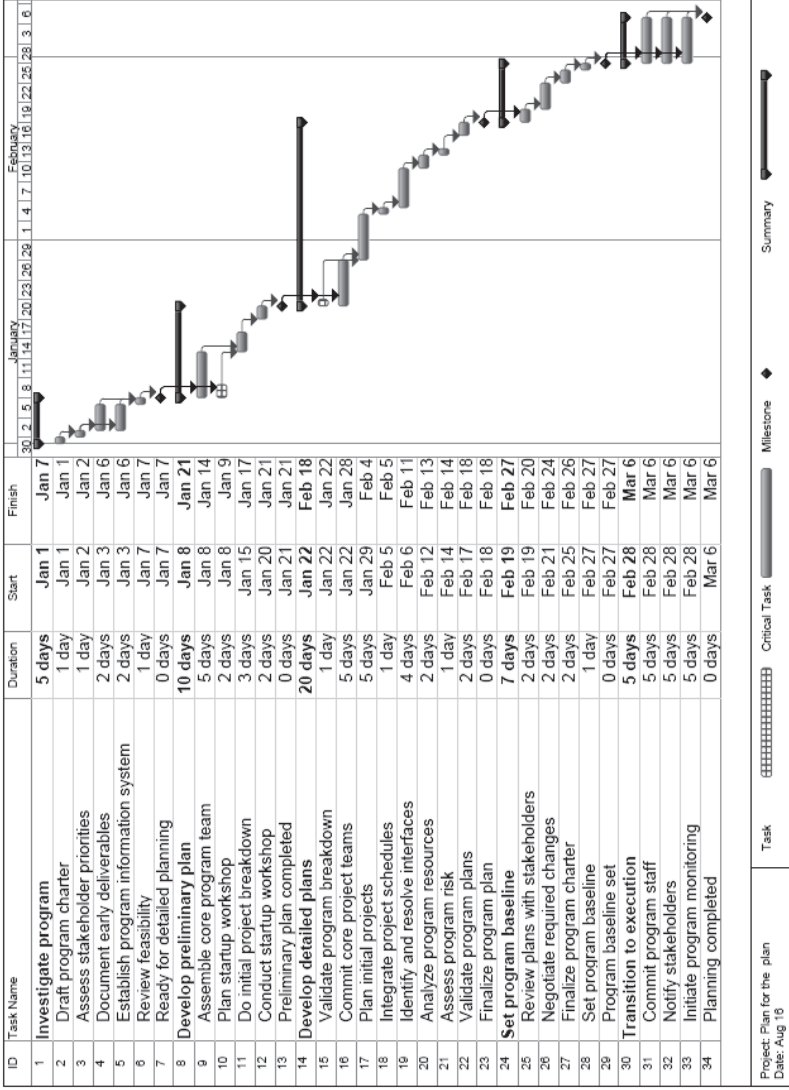


Table 2-3 Process maturity models.

Level	CMM	CMMI	OPM3
1	Initial	Initial	(None)
2	Repeatable	Managed	Standardize
3	Defined	Defined	Measure
4	Managed	Quantitatively Managed	Control
5	Optimized	Optimizing	Improve

Figure 2-6 The plan for the plan.



CHAPTER 3

Program Deliverable Management

Figure 3-1 Processes for project and product management.

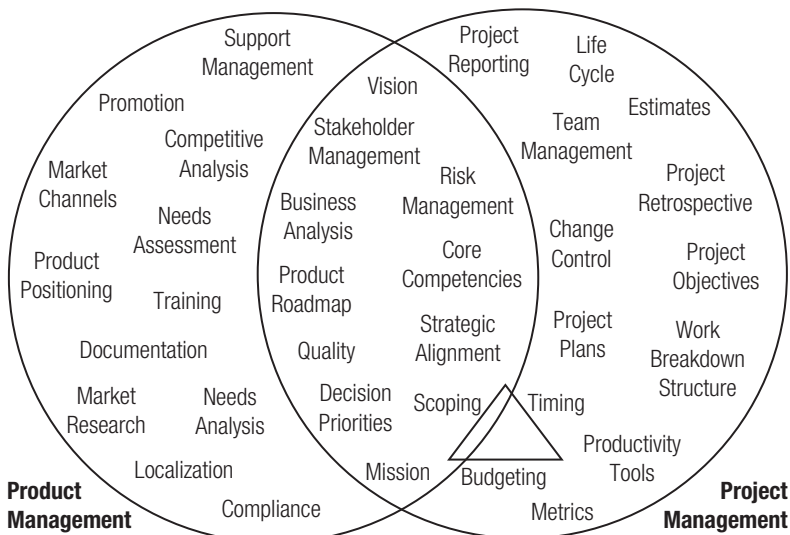


Figure 3-2 The Kano model.

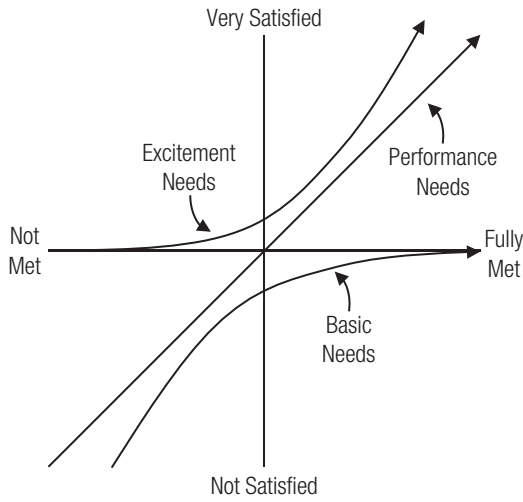


Figure 3-3 Program requirements process.

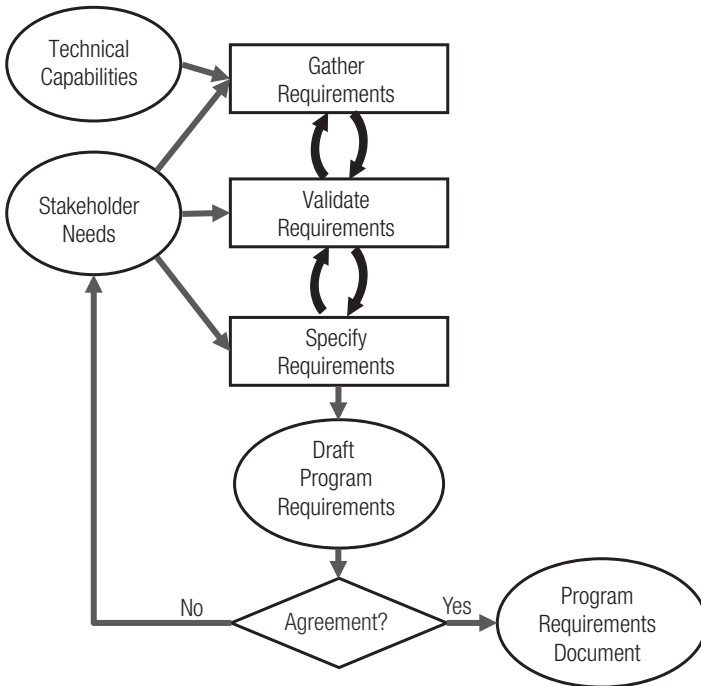


Table 3-1 Documenting “Now” and “Not yet” requirements.

Now	Not Yet
<ul style="list-style-type: none"> • Urgent needs included in current work • Functional requirements for current work • Physical and other parameters for current program deliverables • All “musts” • All “wants” where there is sufficient stakeholder consensus 	<ul style="list-style-type: none"> • All requested requirements that are excluded from current work • “Wants” that lack stakeholder consensus • Requested requirements that are omitted despite expectations of some stakeholders • Reasonable and important stated program needs excluded from current work

Table 3-2 Program deliverable categories and examples.

		Timing	
		Integrated Delivery	Incremental Delivery
Deliverables	Tangible	Phase oriented (new products and platforms, bridges, buildings, tunnels, spacecraft, artwork, transit systems, airports, sports complexes. . .)	Product-line or segment oriented (consumer products, tract housing, customized items, highway systems, automobile models. . .)
	Intangible	Architecture oriented (financial and high-reliability systems, motion pictures, complex applications, integrated processes. . .)	Agile oriented (software applications, television series, standalone processes, education curricula, websites, online services. . .)

Figure 3-4 Construction program roadmap with milestones.

Month:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Program Team	Program Startup		Plan	Design	Prepare	Build	Inspect	Fix	Program Close																
Project Team 1					PR			DR			SR					BR		CR				SO			
Project Team 2					PR			DR			SR					BR		CR				SO			
Project Team 3					PR			DR			SR					BR		CR				SO			
Project Team 4					PR			DR			SR					BR		CR				SO			
Project Team 5					PR			DR			SR					BR		CR				SO			
Project Team 6					PR			DR			SR					BR		CR				SO			
Project Team 7					PR			DR			SR					BR		CR				SO			
Project Team 8					PR			DR			SR					BR		CR				SO			

Figure 3-6 Large-scale agile framework program roadmap.

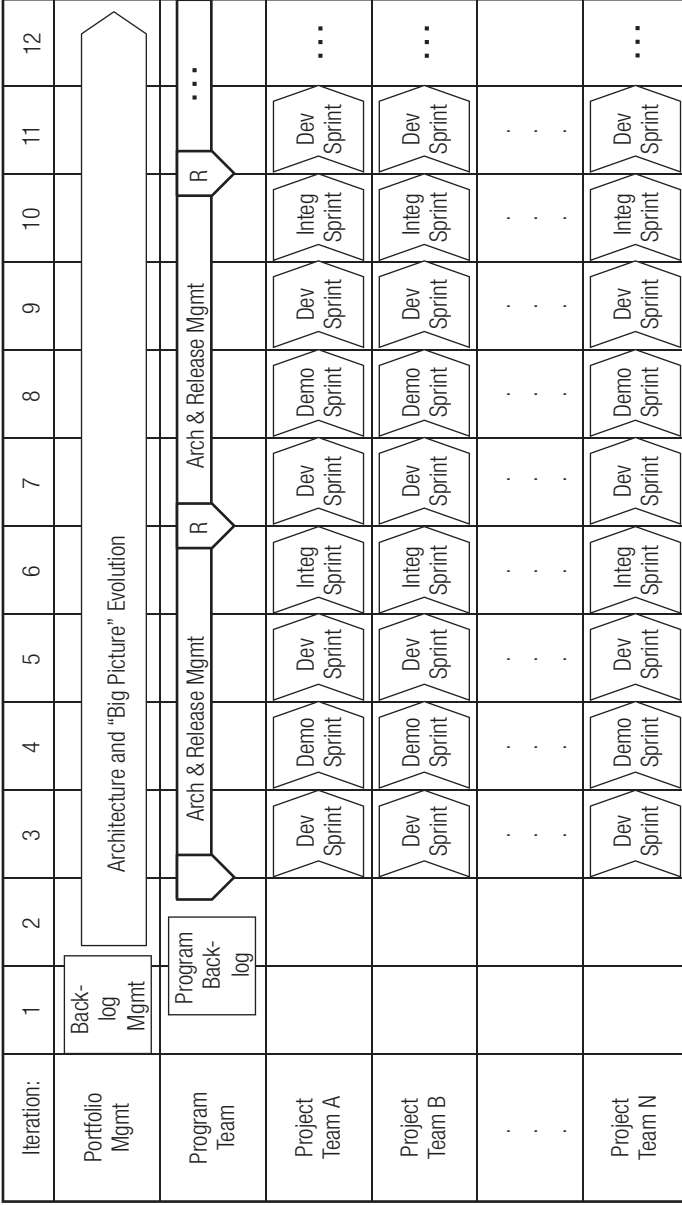


Figure 3-8 “V-model” (verification and validation) for software development.

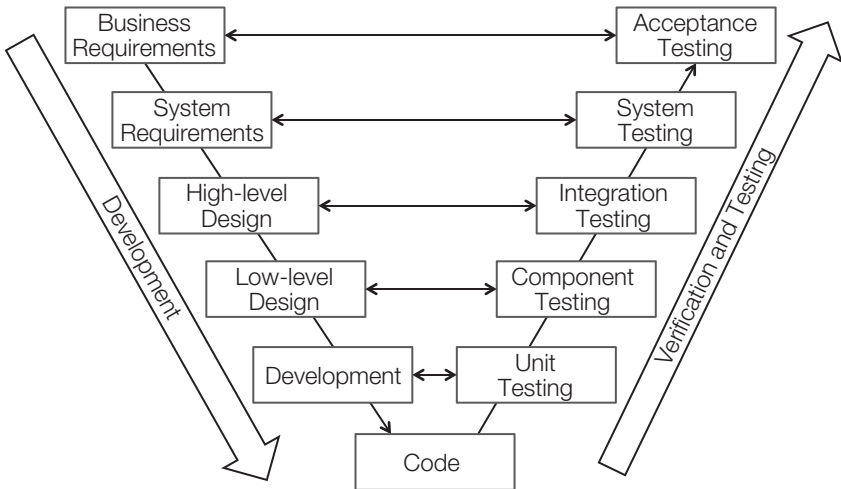


Figure 3-9 Three-dimensional computer representation for a construction plan.

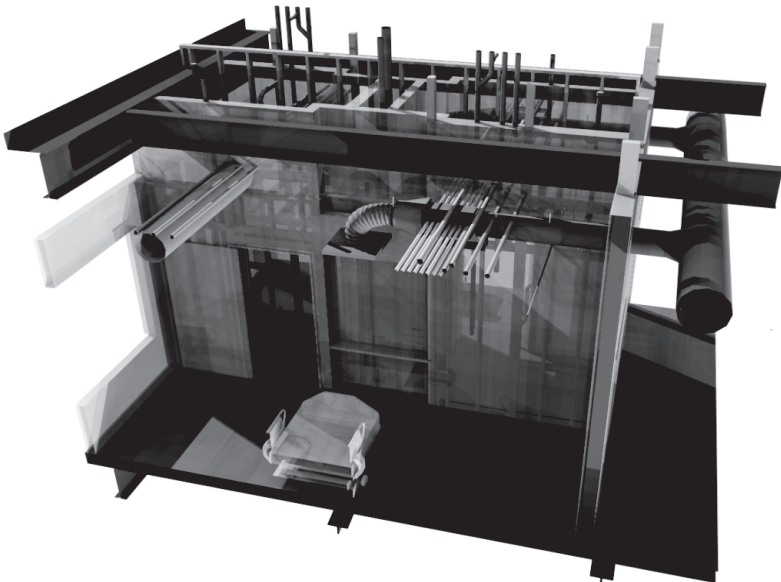


Figure 3-10 Example of a system block diagram.

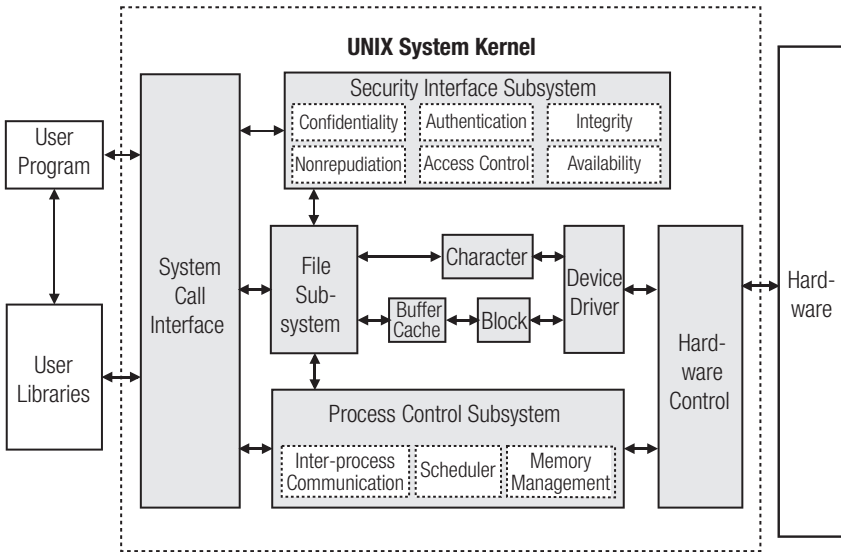


Figure 3-11 Example of a system (general ledger) flowchart.

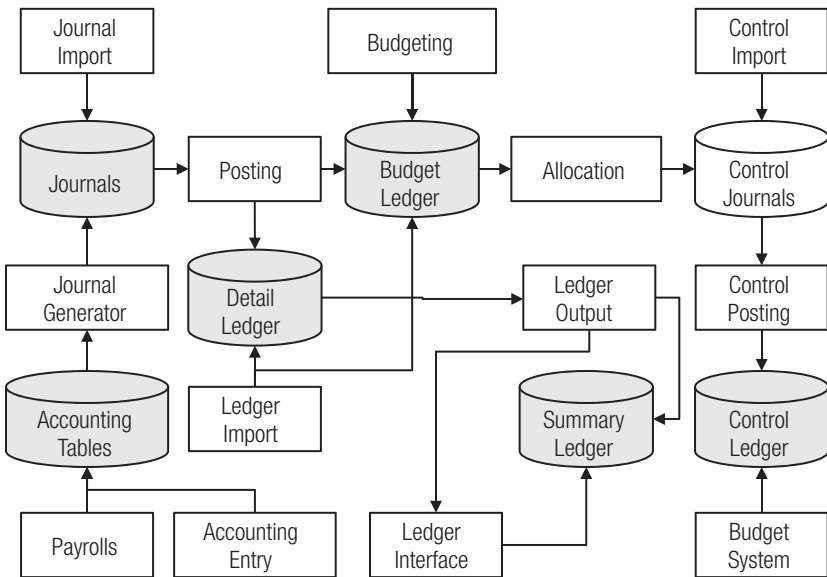


Figure 3-12 A relationship matrix mapping requirements to projects.

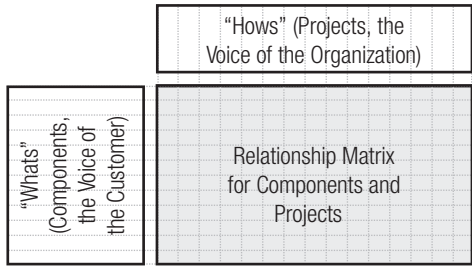
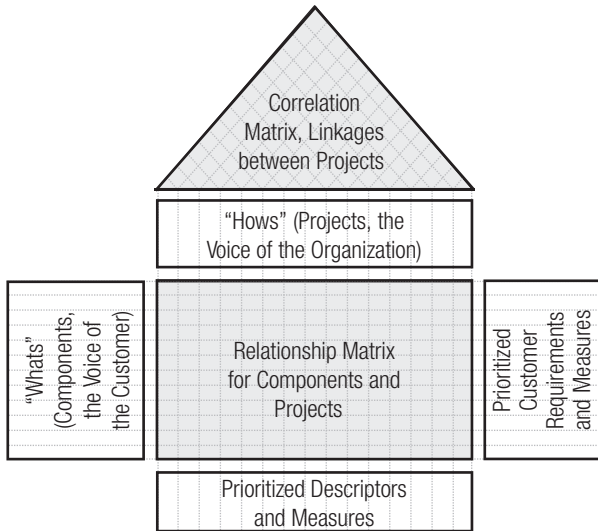


Figure 3-13 The quality function deployment “house of quality.”



CHAPTER **4**

Program Planning and Organizing

Figure 4-1 A program having a large staff and multiple project teams.

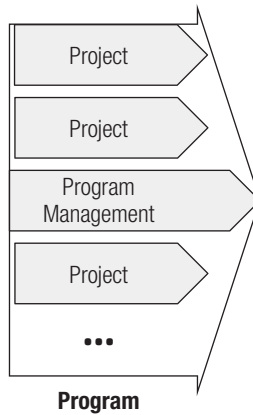


Figure 4-2 A program made up of a sequence of projects.

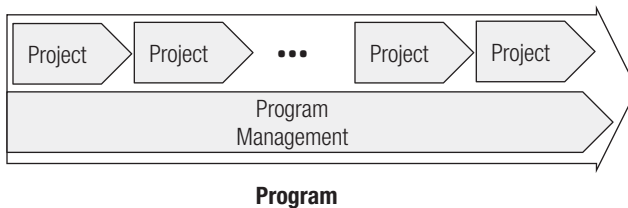


Figure 4-3 A program with multiple phases staffed by several project teams.

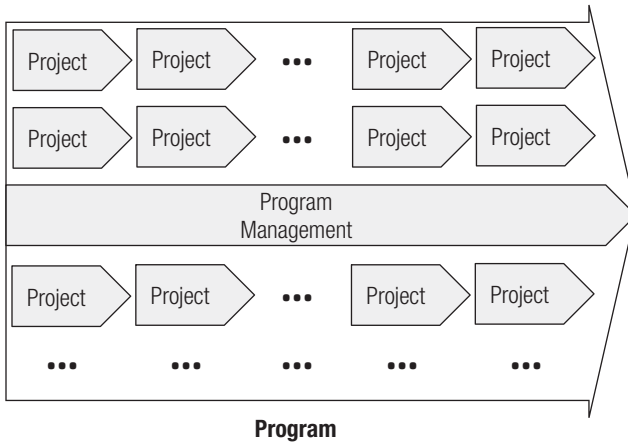


Figure 4-4 A program made up of five parallel projects.

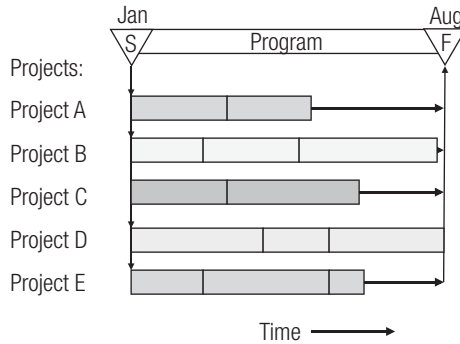


Figure 4-5 An interface connecting two projects.

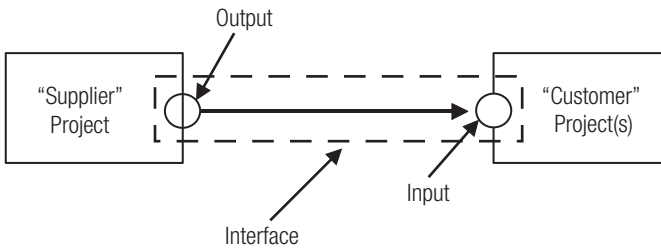


Figure 4-6 A program with five parallel projects showing interfaces.

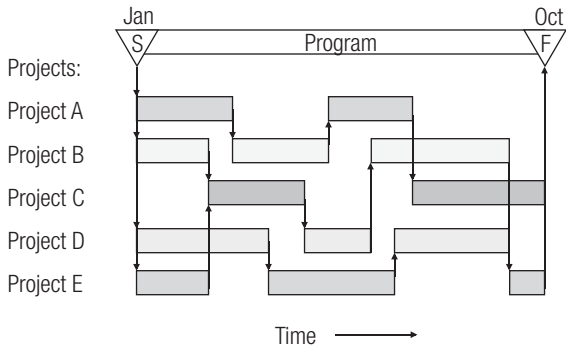


Figure 4-7 Interface definition form.

Interface Definition Form				
Program: _____				
Interface Name: _____				
Interface Code ID: _____				
	Project Name	Agreed by	Organization	Date
Supplier				
Customer(s)				
Interface Definition and Completion Criteria:				
Completion Date:				
Prepared by: _____		Revision _____	Date _____	

Figure 4-8 A three-step program planning process.

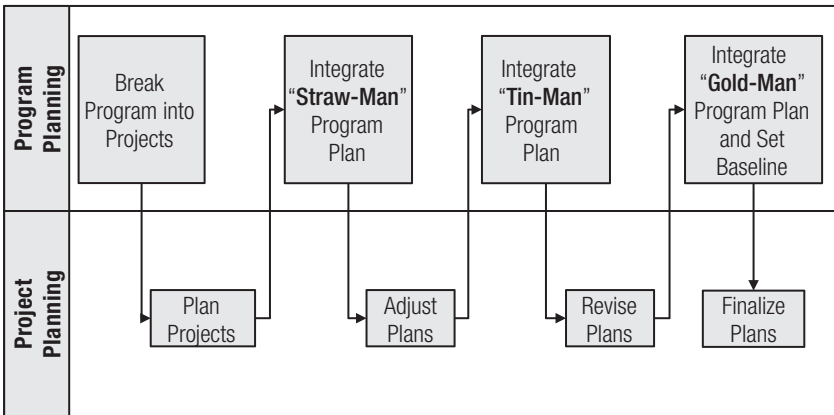


Table 4-1 Interface tracking table.

Master Program Interface Table					
Interface Code	Interface Name	Owner	Supplier Project	Customer Project(s)	Status

Figure 4-9 A portion of a program-level multiple release wave plan.

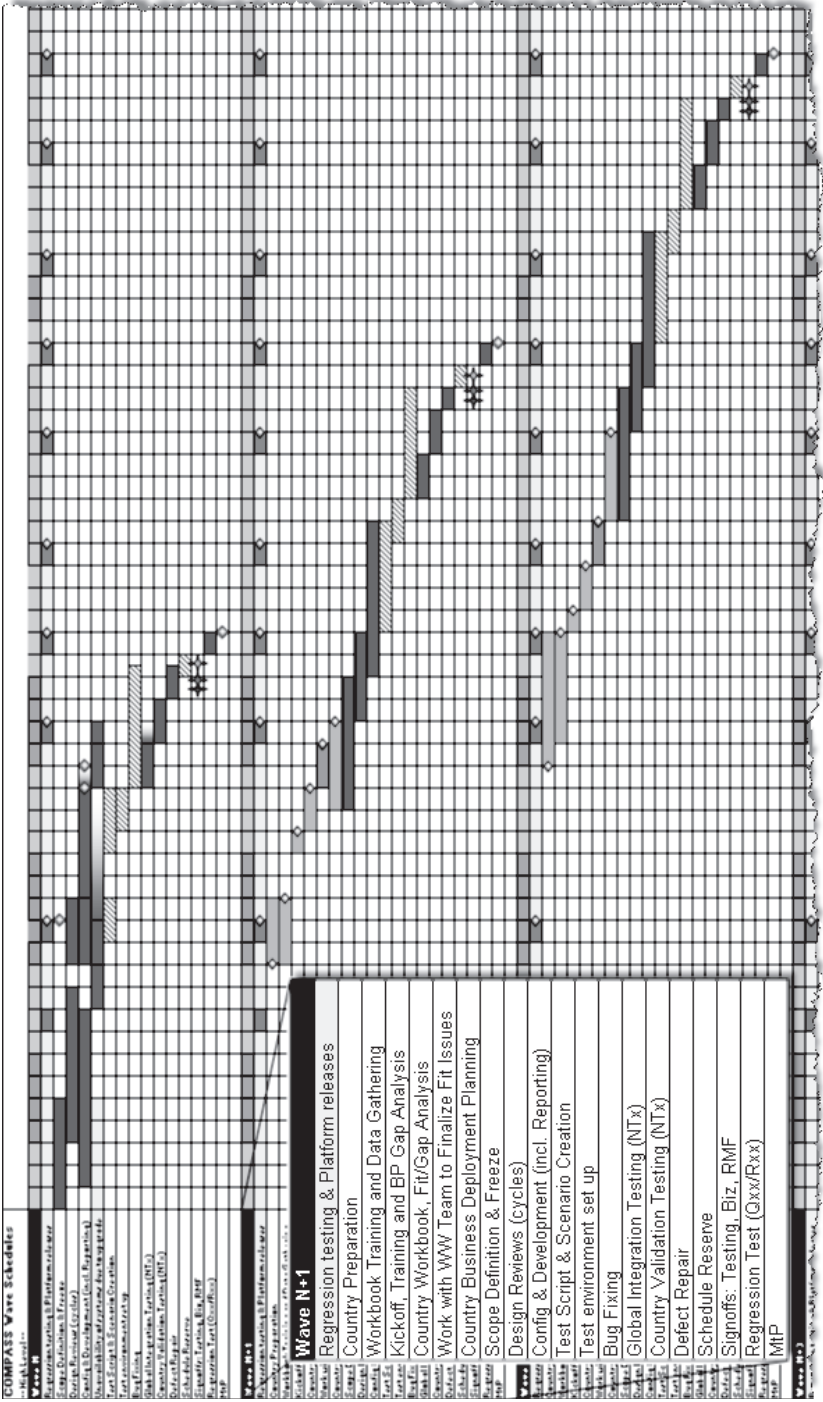
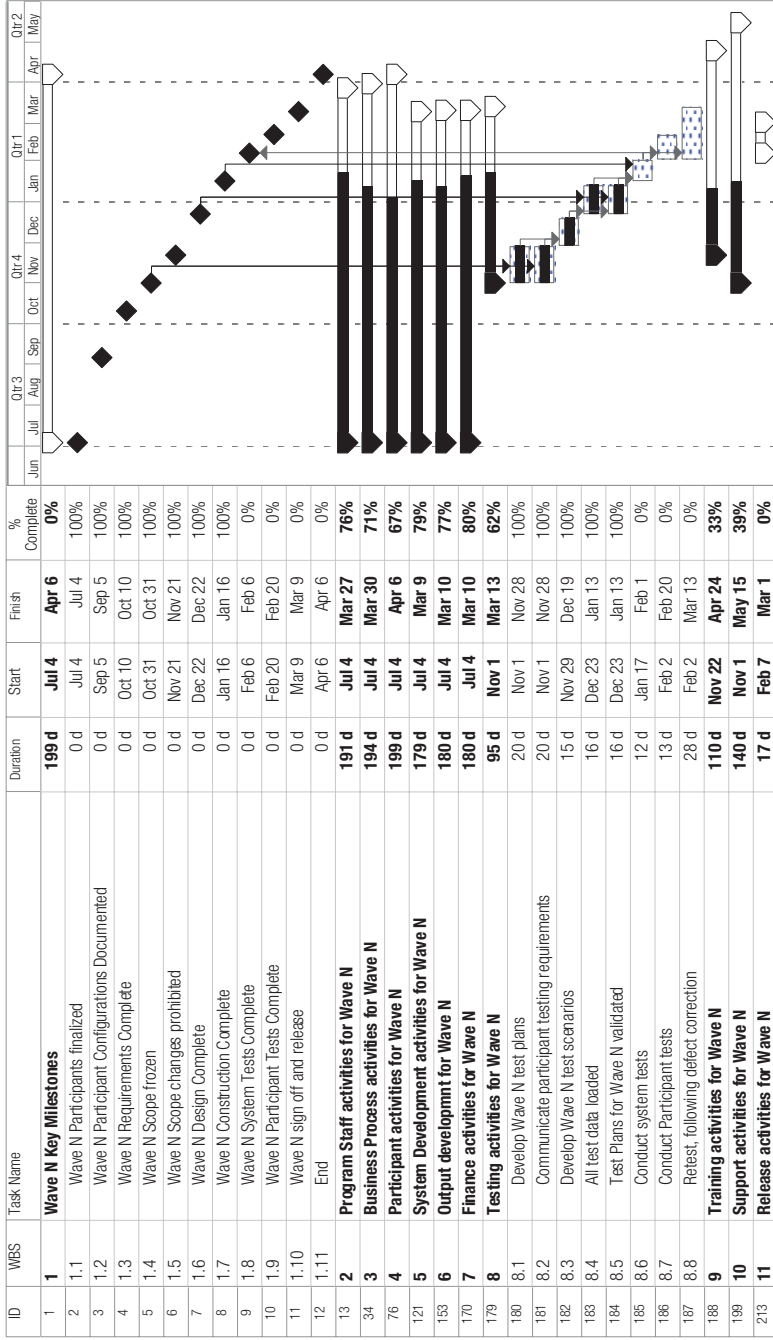


Figure 4-10 A portion of a single wave release plan.



CHAPTER 5

Program Leadership

Figure 5-1 High-level organization chart for the COMPASS program participants.

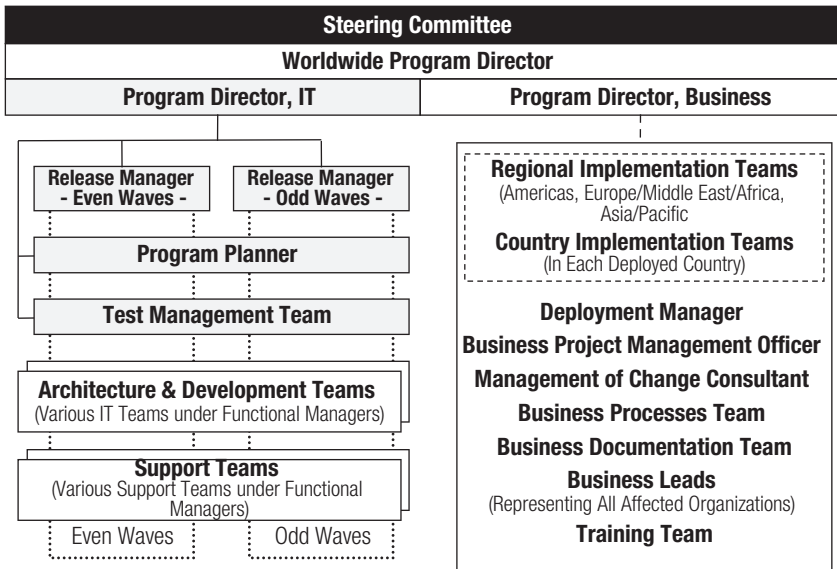


Table 5.1 Communication methods.

	Same Place	Different Place
Same time	<ul style="list-style-type: none">• Conversations• Status meetings• Presentations and broadcasts• Networking• Team-building activities• Celebrations	<ul style="list-style-type: none">• Telephone calls• Teleconferences• Videoconferences• Web-based meetings• Instant, text, and social messaging• Network collaboration tools
Different time	<ul style="list-style-type: none">• Voicemail• Email• Social media• Meeting minutes• Program reports• Memos• Newsletters• Audio recordings• Video recordings	<ul style="list-style-type: none">• Program Management Information System• Web sites• Cloud services• Yellow sticky notes• Documents and databases• Interoffice mail• Postal and express mail• FAX

Program Execution and Control

Table 6-1 Program metric definition: Interface closure index.

Description and purpose	Calculation of progress in fulfilling cross-project dependencies for program reporting.
Calculation	(Number of interfaces completed) / (Total number of interfaces) / (Percent of program phase timeline consumed)
Reported by	Project leaders
Frequency	Weekly
Data	Completed interfaces, current date
Baseline target range	0.95 to 1.1 (higher is better)
Tools used	Program interface table and scheduling tool
Potential barriers	Front-loading the program phase with extra interfaces; prematurely reporting completion of cross-project dependencies

Figure 6-1 Program scope and change management process.

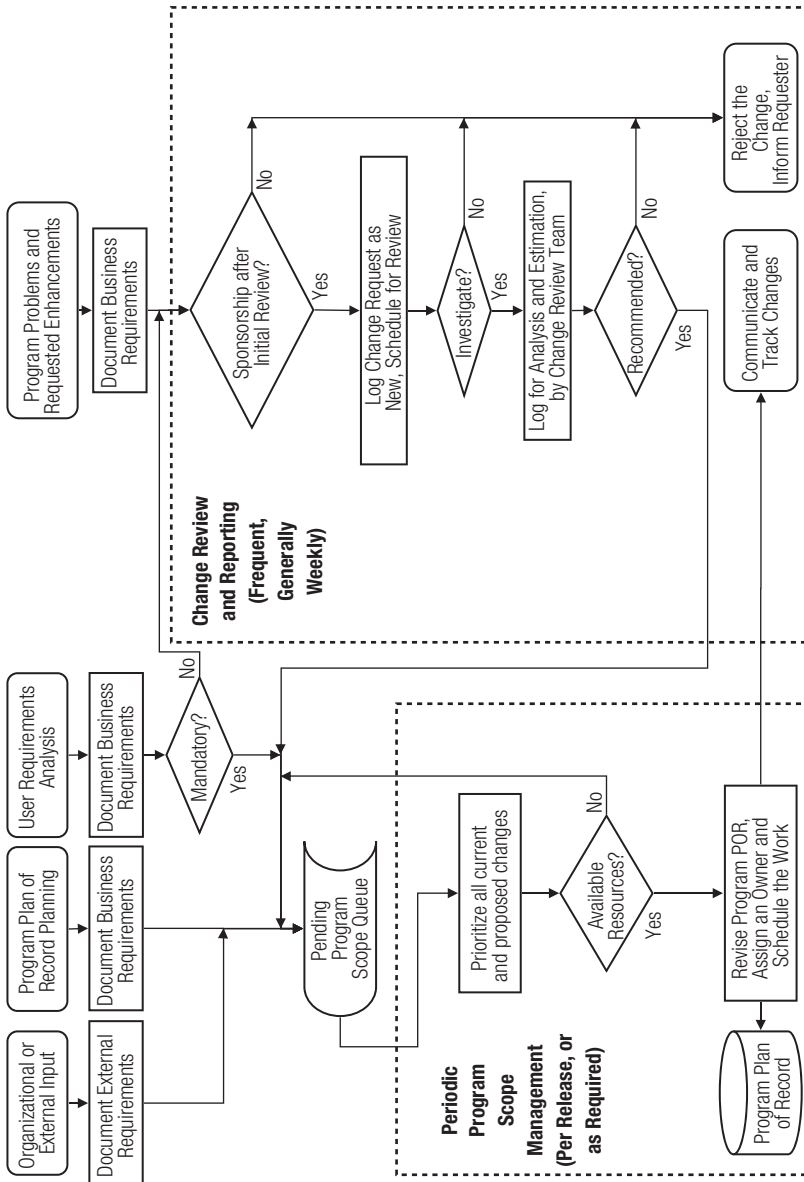


Figure 6-2 Program scope data for the compass program.

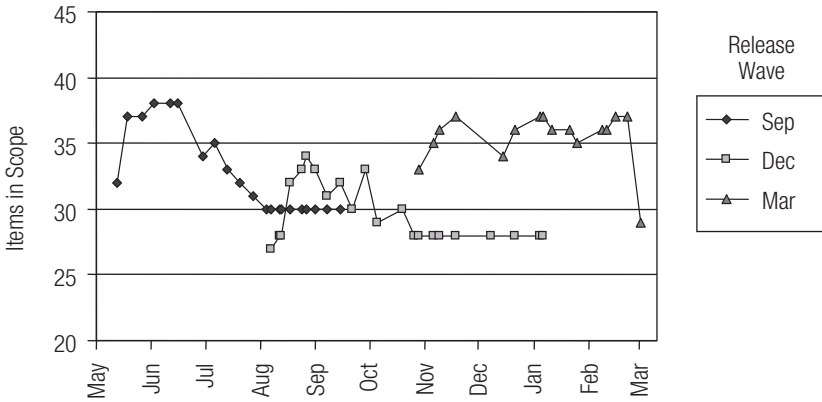


Figure 6-3 The Kurt Lewin organizational change model.

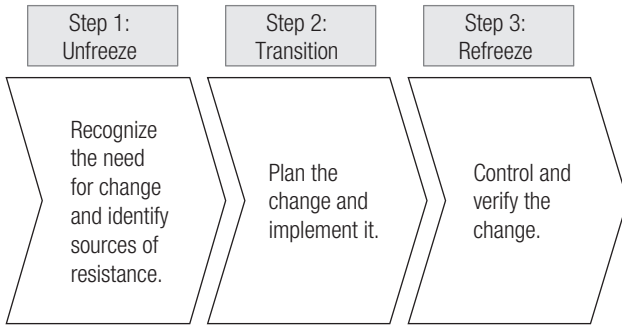


Figure 6.4 Elements enabling organizational change.

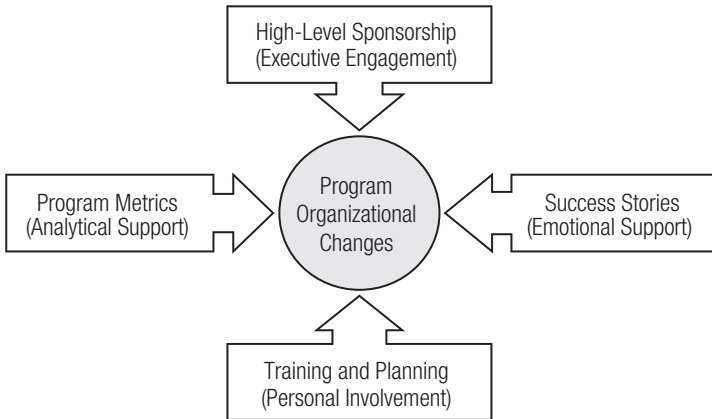
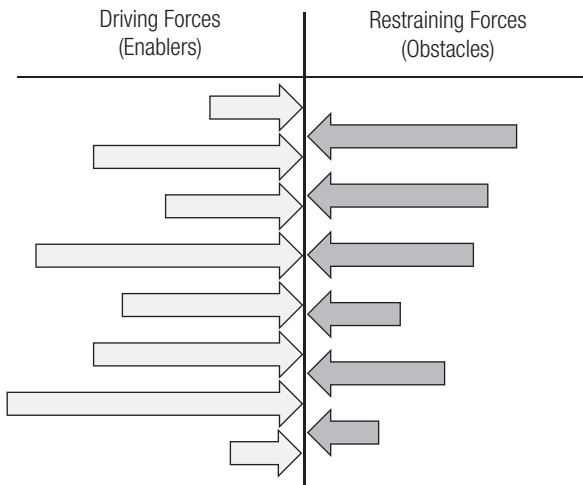


Figure 6.5 Force-field analysis for assessing change factors.



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