

Project Management Technologies

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PMG 312- L11
Revision

جدول الاختبار النهائي



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PMG312
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Project Management Technologies

د. منى العشري

Chapter 2- L1



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What is Project Management?

❑ Project Management is the process of defining, Planning ,organizing, leading and controlling the development of an Information System Project.



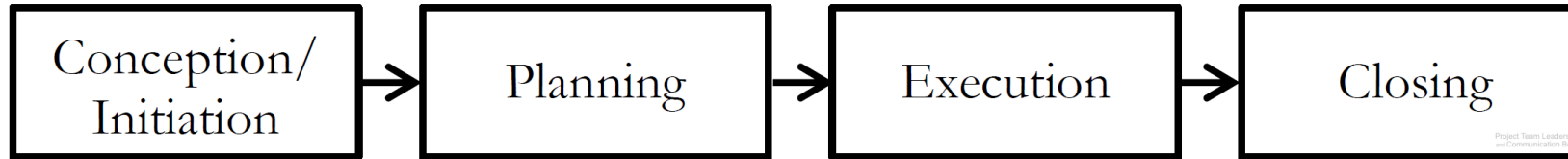
The top 10 reasons why projects are successful and the first five make up 72% of the total.

Table 2.1 Summary of Factor Rankings for Successful Projects

Rank	Factor	%
1	User involvement	17
2	Executive management support	15
3	Experienced project management	14
4	Clean business objectives	14
5	Minimized scope	12
6	Agile requirement process	7
7	Standard infrastructure	6
8	Formal methodology	5
9	Reliable estimates	5
10	Skilled staff	5
	Total	100

Source: Adapted from Standish Group from *InformationWeek Magazine*, December 15, 2003.

Project Management Phases

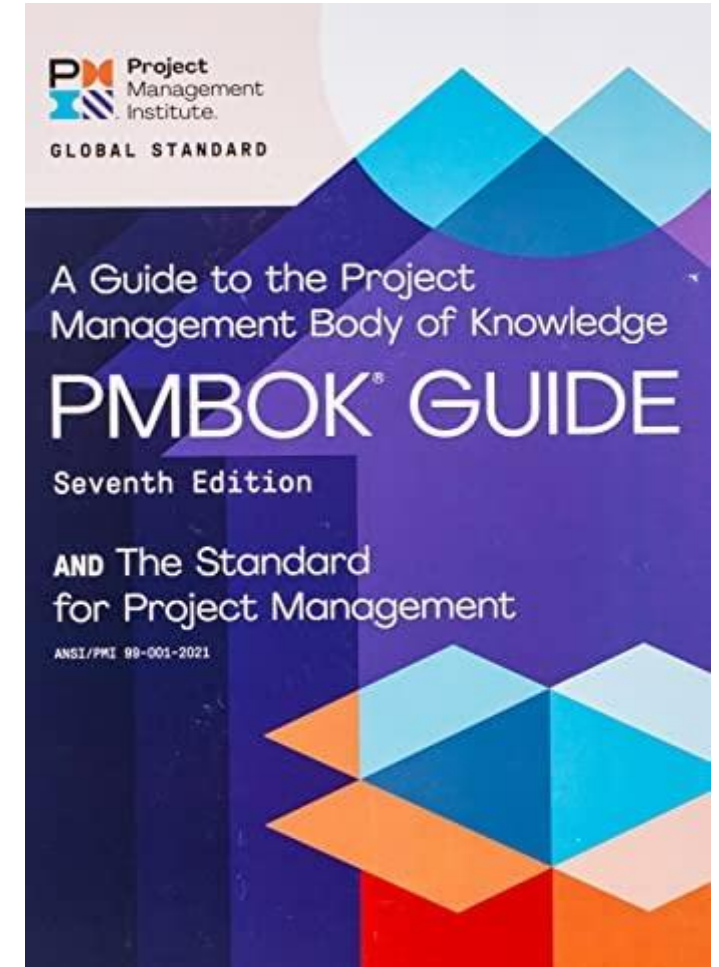


- INITIATING/Defined THE PROJECT
- PLANNING THE PROJECT
- EXECUTING THE PROJECT
- CLOSING DOWN THE PROJECT

Methodology

- ❑ There are many options to look at for guidance in this.

Some notable examples of project management definition are found in the Project Management Body of Knowledge (PMBOK) from the PMI, PRINCE2 (UK), or the more contemporary



Methodology

- ❑ A large part of improving a methodology is keeping a documented history of lessons learned from project outcomes.
- ❑ Unfortunately, most companies do not do this or they record it and just let it collect dust.
- ❑ Using lessons learned is a way of benchmarking and collecting best practices to help you improve your methodology by updating your policies, processes, and procedures along with your associated tools and techniques.

Chapter 2- L2



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Project requirements definition

- ❑ One of the major issues in starting the project is getting good requirements!
- ❑ The following are some of the popular techniques that are used for this collecting process.
 - Workshops
 - Brainstorming (Brown paper; Process chart)
 - Decision logic table
 - RACI charting

Workshops

- ❑ A popular workshop process is joint application design (JAD), which is usually more effective in small, clearly defined projects and less effective in large complex projects.

Brainstorming

- ❑ A requirement gathering is a group brainstorming exercise that needs to be facilitated by the PM.
- ❑ The group consists mostly of the clients or shareholders.



Brainstorming

❖ The following are some techniques that could be used during the brainstorming session:

- A. Brown paper
- B. Process chart

A- Brown paper

- ❑ Brown paper is a form of flow-charting used to capture a complete process for evaluation (e.g., finding ways to streamline the system)
- ❑ Including highlights of key activities, interfaces, documentation, data sources, strengths, and problems.



B- Process chart

	Operation	When something is changed or created
	Transportation	When something is moved
	Inspection	When something is verified or checked
	Delay	When something waits
	Storage	When something is kept

Figure 2.1 Process chart symbols. (Shade the appropriate symbol with a connector.)



B- Process chart (Example 1)

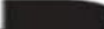
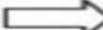
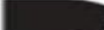
Steps of present (or proposed) system	Operation	Transportation	Inspection	Delay	Storage	Notes
1. Sales person creates bill						
2. Sales person places in out basket						
3. Taken to finance						
4. Placed in basket						
5. Accountant places in pending file						
Number of steps/action	1	1	0	2	1	

Figure 2.2 Sample situation: Minimal bill process chart.

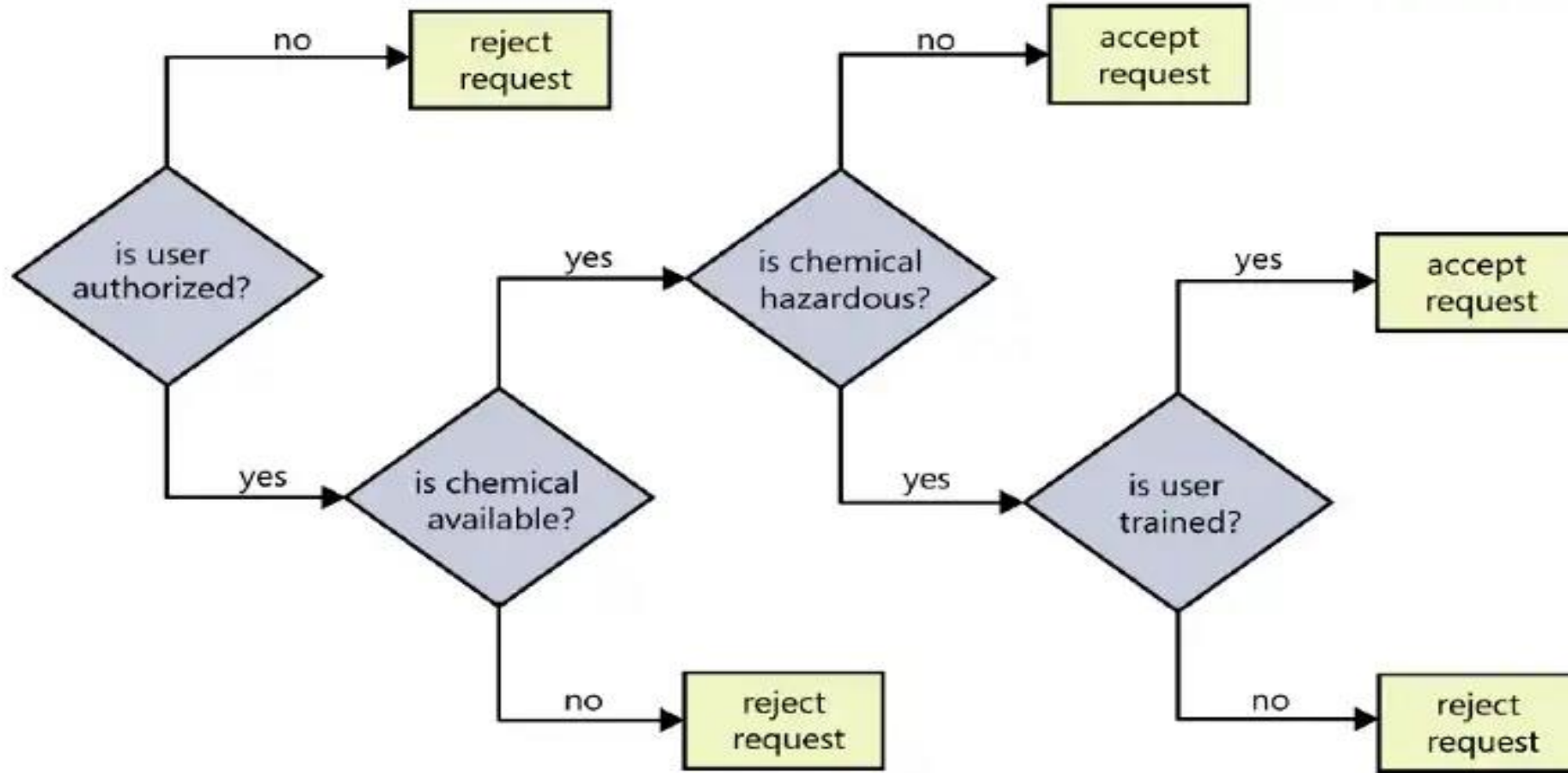
Decision logic table

- ❑ A decision logic table (DLT) is a documentation technique that can display an entire situation visually, with all alternatives shown side by side.

Requirement Number					
Condition	1	2	3	4	5
User is authorized	F	T	T	T	T
Chemical is available	—	F	T	T	T
Chemical is hazardous	—	—	F	T	T
Requester is trained	—	—	—	F	T
Action					
Accept request			X		X
Reject request	X	X		X	



Decision Tree (Example)



<https://medium.com/analysts-corner/its-only-logical-decision-tables-and-decision-trees-12a8b52243ea>

RACI charting

❑ Establishing participation for each activity, for all roles, by assigning codes as described below:

- **R (responsible)**—The individual working on the activity (the doer)
- **A (accountable)**—The individual with yes/no authority; approval or veto power (Note: If two or more A's exist, this could be a sign of problems.)
- **C (consult)**—The individual must be consulted prior to action; two-way communication occurs
- **I (inform)**—The individual receives one-way communication and will use the information or take subsequent action



Understanding the project business case

- ❖ Unfortunately, most projects have no linkage to corporate strategy (i.e., a set of short- and long-range goals), which remains revolutionary thinking in many corporations today.
- ❖ So, in ranking a new project request, you should ask: does this project have any linkage to your corporate strategy? If it does, there is a high probability that you want to execute this project.
- ❖ Also, if the new project request has nothing to do with your corporate strategy, there is a much lower probability that you would execute the project.

Chapter 2- L3



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Project ranking matrix

- ❑ What occurs when an organization has a number of requested new projects but you have **limited time, resources, and/or money** to develop the new systems?
- ❑ The best thing to do is to rank the different requested projects against each other in the area of importance or adding extra value to the overall organization and only work on the high-ranking projects.



Table 2.6 Project Ranking Matrix

	Project A	Project B	Project C	Project D	Row sum	Ranking
Project A	—	1	1	0	2	2
Project B	0	—	0	0	0	4
Project C	0	1	—	0	1	3
Project D	1	1	1	—	3	1



The weighted project ranking matrix

Table 2.7 Weighted Project Ranking Matrixes

Criteria	Weight% Total = 100%	Project request		Funded projects (Weighted scores)	
		Criteria rating 1 = Low 5 = High	Weighted Weight% × Rating	Project A	Project Z
1 Supports company's strategy, mission, and goals	25	3	0.75	1.25	1.00
2 Potential to increase revenue	20	2	0.40	0.80	0.60
3 Likelihood of success	20	4	0.80	0.80	0.80
4 Readiness, in terms of skill sets, geographic and linguistic differences among 10 members, and availability of HW and SW	15	3	0.45	0.75	0.45
5 Level of urgency, for example, competitive advantage or legal requirements	10	2	0.20	0.50	0.30
6 Potential to decrease costs	10	3	0.30	0.30	0.20
Weighted total score			2.90	4.40	3.35

Project quality management plan.

❑ Measuring quality may seem like something you can't do until after the project is complete.

❑ However, project quality management should be planned from the beginning and monitored throughout with **these three quality management processes**:

1. Quality planning
2. Quality assurance
3. Quality control



Quality planning.

❑ Answering these questions and others will help you identify and define quality requirements, allowing you to discuss the approach and plans needed to achieve those goals.

❑ This includes:

1. Assessing the risks to success
2. Setting high standards
3. Documenting everything



Quality assurance.

- ❑ Quality assurance provides evidence to stakeholders that all quality-related activities are being done as defined and promised.
- ❑ Quality assurance is done to the products and services delivered by a project, as well as the processes and procedures used to manage the project.

Quality control in project management.

- ❑ Quality control involves operational techniques meant to ensure quality standards. This includes identifying, analyzing, and correcting problems.
- ❑ While quality assurance occurs before a problem is identified, quality control is reactionary.
- ❑ Quality control occurs after a problem has been identified and suggests methods of improvement.

Quality management- Mini reviews

❑ There are three types of reviews:—

1. Health
2. Compliance
3. Deliverable.



Project Health Card

★ Overall project status is **GREEN**.

Schedule		The project schedule is on track.
Resourcing		Resourcing is adequate.
Budget		Project is within budget.
Risks		All project risks are in control.
Issues		Project issues need attention.
Benefits		Project benefits are off track and need to be fixed.

<https://shop.techno-pm.com/products/monthly-status-update-template>

Sponsor and supplier agreements

1. A **fixed price contract** has a system solution, defined requirements, fixed schedule, and a high-risk factor because of the possibility of cost/schedule overruns.
2. A **best estimate contract** has specific amount of hours, defined skills, and minimum risk.
3. An **hourly services contract** or “**body shop**” has an undefined amount of hours, rate based on skill type, and no risk.



<http://www.free-management-ebooks.com/faqpm/budget-08.htm>



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Sponsor and supplier agreements

- ❑ The structure and content of agreements can vary markedly from project to project.
- ❑ In particular, agreements with external sponsors and sub-contractors are usually very different from those with internal organizations.



Sponsor and supplier agreements

- ❑ When the parties are from the same enterprise, the agreement is less formal but should exist to eliminate future misunderstandings.
- ❑ Outsourcing a project can be a long and winding road, studded with sweet points and painful pitfalls.



Sponsor and supplier agreements

❑ At any point, organizations can make irreparable errors, including inadequate due diligence up front, cost cutting at the expense of quality, and insufficient focus on knowledge transfer and training.

❑ في أي وقت ، يمكن للمنظمات ارتكاب أخطاء لا يمكن إصلاحها ، بما في ذلك عدم كفاية العناية الواجبة مقدماً ، وخفض التكاليف على حساب الجودة ، والتركيز غير الكافي على نقل المعرفة والتدريب.

❑ The Table shows 10 key questions to ask to improve an organization's chances for outsourcing success.



Challenges

- The PM position can be very challenging because every project has its unique personality.
- **For example**, if companies Path X and Path Y were developing an identical system using the same tools and had similar organizations, there would be differences in how they developed, implemented, and used the new system.
-
- Also, it is possible that company Path X completed the project on time and within budget, whereas company Path Y went over schedule and eventually canceled the project.
- In summary, good project management can make a difference



Chapter 3- L4



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Root cause of power and politics

What types of resources are limited?

- For many organizations, it comes down to:

1. labor resources
2. Monetary resources
3. Facility (space) resources, and equipment resources.



Organizational structures

- ❑ Having an organizational structure in place allows companies to remain efficient and focused.
- ❑ **Six** different types of organizational structures that include **centralized, functional, projectized, matrix, virtual, and composite.**
- ❑ Each structure has distinct characteristics.
- ❑ There are benefits and challenges in existence for each of these structures as well.

1- Centralized organization structure

- The Centralized organizational structure is formally designed and the orders come from one manager, which is described as **Mechanistic/ Standardized structure**

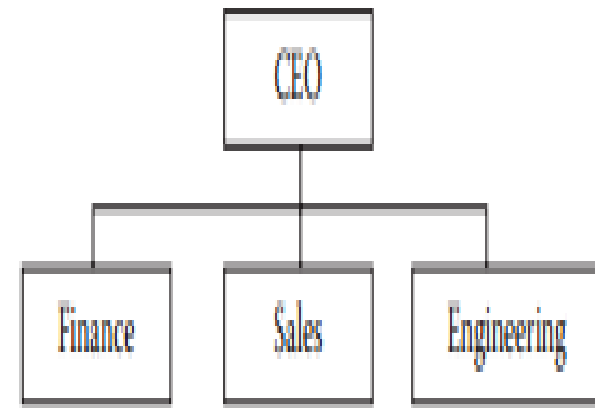


Figure 3.1 Centralized organization structure.

2. Functional organization structure

- Is set up according to major business functions such as aircraft, facilities, logistics, environment, or public affairs.
- Therefore, the different divisions are formed based on the main functions of the company, and employees have one clear supervisor
- Do not have to compete with one another to get the support of their specialty groups because only one group is familiar with aircraft and that eliminates competition within the same organization

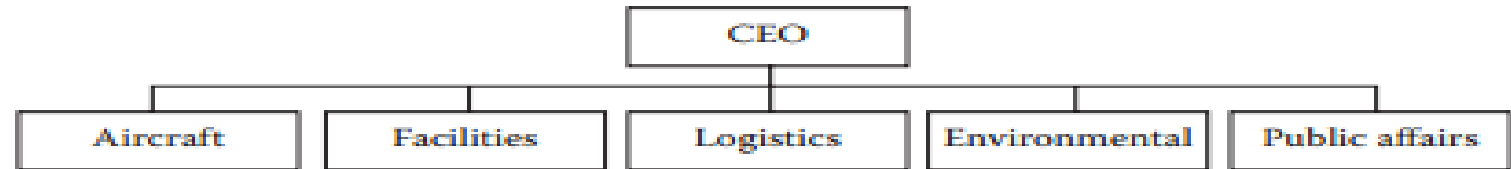


Figure 3.2 Functional organization structure.

3. Projectized organization structure

- The projectized organization structure is a project organization that has PMs with full authority where employees actually report to the PM
- There is also staff to support the PM.

This book has an entire chapter devoted to the enterprise PMO in Chapter 24, which goes into the details of this structure. However,

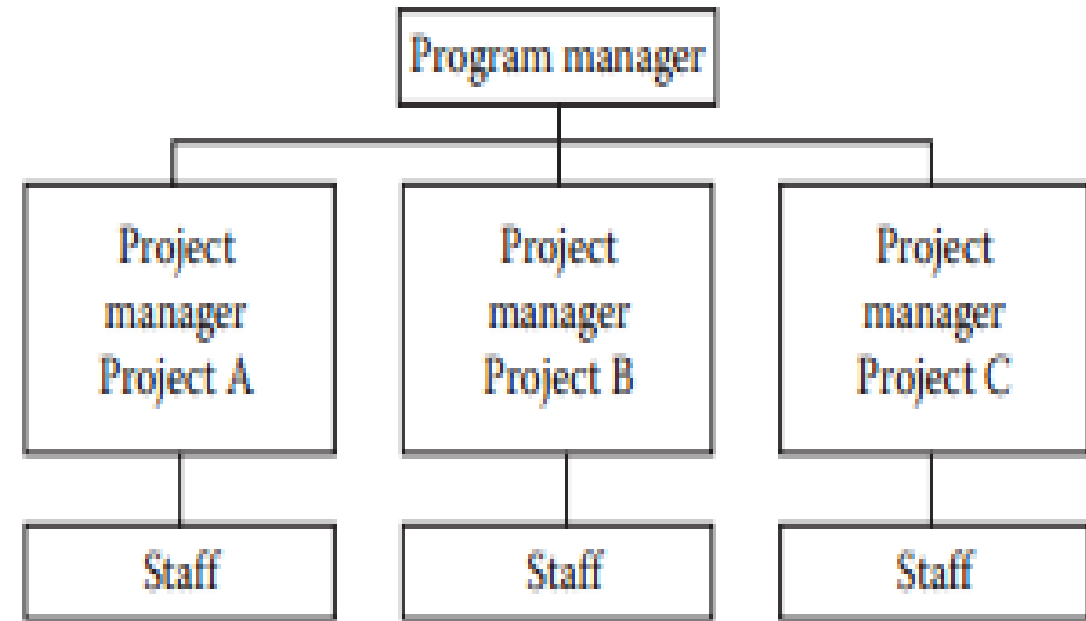


Figure 3.3 Projectized organization structure.

4. Matrix organization structure

- This structures involve projects that pull employees from various functional units trying to capitalize on the benefits of both centralized and functional structures.
- The matrix organization structure can be considered as a weak, balanced, or strong matrix.
- The matrix is a combination of functional, centralized, and/or projectized organizations as displayed in

Figure 3.4.

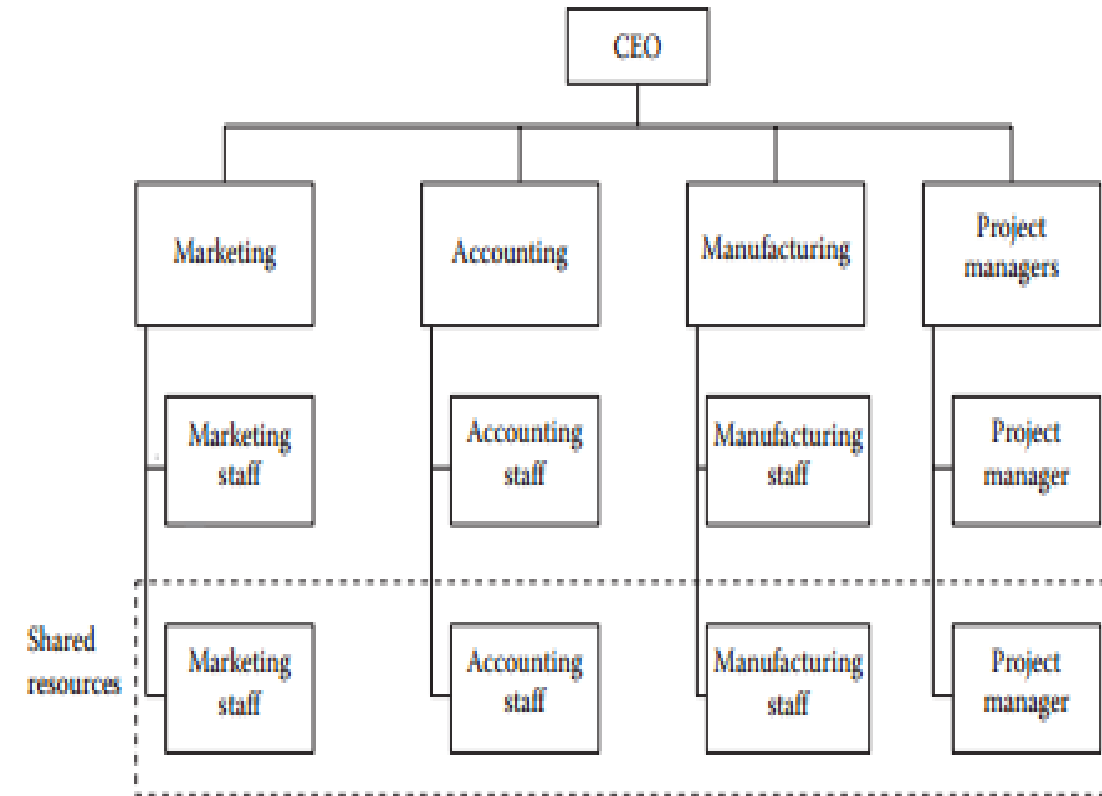


Figure 3.4 Matrix organization. (Adapted from Project Management Institute (PMI). 2008. Strong matrix organization, in: *PMBOK® Guide*, Chapter 2, 4th ed. Newton Square, PA: Project Management Institute.)

4. Matrix organization structure

- The stronger the matrix, the more it resembles a projectized organization where PMs have administrative staff with a significant amount of authority.
- The weaker the matrix, the more it resembles a functional organization where the PM has little authority and no administrative staff.
- The balanced matrix provides the PM with a greater degree of authority than the weak matrix but still not full authority as found in a strong matrix.

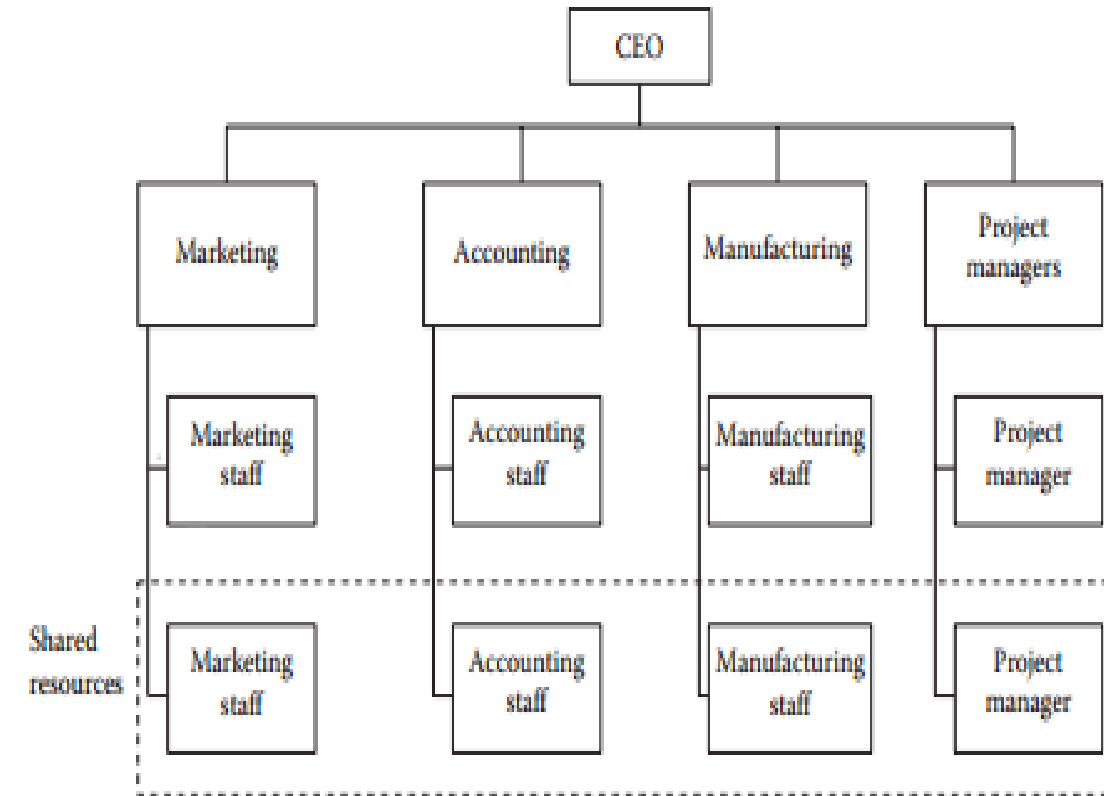


Figure 3.4 Matrix organization. (Adapted from Project Management Institute (PMI). 2008. Strong matrix organization, in: *PMBOK® Guide*, Chapter 2, 4th ed. Newton Square, PA: Project Management Institute.)

5. Virtual organization structure

- The virtual organization can take on any of the structures previously described in this chapter.
- Virtual teams consist of groups of people with a shared goal who work together without necessarily any physical interaction (PMI 2008).



6. Composite organization structure

- The composite organization may be referred to as the hybrid organization that has units resembling centralized, functional, projectized, and virtual and/or matrix organization structures.
- This organizational structure was developed to meet or customize the structure to the particular needs of a company.

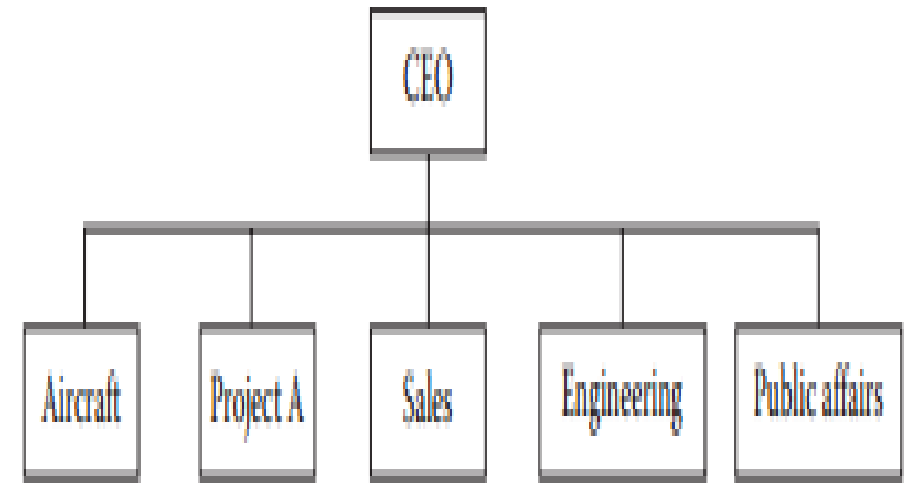


Figure 3.5 Composite organization structure.

Chapter 4- L5



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- ❑ A scope statement created by the team can assist in making the team cohesive in developing a shared blueprint for how the team operates (Peled 2000).
- ❑ Developing this with input from stakeholders also facilitates buy-in from that segment about the project's need for existence and ultimate purpose.
- ❑ A sample template for the scope statement is displayed in Table 6.1.

Table 6.1 Project Scope Statement Template

Project and product objectives
Product or service requirements and characteristics
Product acceptance criteria
Project boundaries
Project requirements and deliverables
Project constraints
Project assumptions
Project organization (team)/team assessment
Defined risks
Milestones
Initial WBS
Cost estimate
Project configuration management requirements
Approval requirements

Source: Project Management Institute (PMI). 2008. *PMBOK® Guide*, 4th ed., Newtown Square, PA: Project Management Institute.

- ❑ Objectives are defined as something that is to be accomplished by the project which can be in the form of a tangible product or possibly less tangible project items such as status reports, quality control documents, and other items related to running the project.
- ❑ A project objective would be items such as delivering the defined outputs on-time, on-budget, and within scope.
- ❑ A product objective would be to make sure the software is user-friendly, technical specifications met, and so on.

- ☐ The project scope statement outlines the criteria for which the project will be approved and therefore is a definitional guide to measuring success.
- ☐ One example of acceptance criteria would be the requirement of submission of all project close-out documentation and all program code to the customer.
- ☐ Another common example is schedule or cost criteria.

- ❑ In an information technology projects, examples of these could be goals related to performance and quality.
- ❑ For instance, system response times or transaction rates would be performance criteria, where the number of known defects that were not corrected by the completion of the project would be quality criteria (McBride et al. 2007).
- ❑ All acceptance criteria should be written in very concise statements so that no two individuals would interpret the requirement differently.

- ☐ Assumptions are statements that the PM believes to be true such as access to some defined level of organizational resources such as all team members are provided adequate computer workstations, office supplies, equipment, and so on.
- ☐ This section is again just a way to communicate to all parties' different constraints related to the project.
- ☐ This section will also contain a statement regarding the impact to the project if the assumptions are incorrect such as a project falling behind schedule if promised resources are not provided.
- ☐ A perfect plan that is not supported with resources is worthless.
- ☐ Throughout the life cycle, it is a good idea to review assumptions and verify that they are still valid.

- ❑ Project boundaries need to be set so that the PM does not find himself/herself being placed in a position where the amount of funds provided is firm, yet the scope of the project work keeps growing.
- ❑ Boundaries need to be identified in the scope statement so that there will be no confusion as to what exactly will or will not be accomplished during the course of the project.
- ❑ It is important to point out what is in scope and what is out of scope.

- ❑ This will be important later as conflicts emerge on what is within scope of the project, and it protects the project team in these situations.
- ❑ Physical documentation is very important for this purpose, as well as obtaining signatures from key stakeholders so that there is understanding of the scope.
- ❑ This process is an important one to help deal with scope definition and scope creep issues that may occur later in the life cycle.
- ❑ Creeping requirements can be avoided through having a project boundaries section (Cervone 2006).

- ☐ Milestones are any significant events, deliverables or achievements within a project or schedule (PMI 2008).
- ☐ A significant event could signify that Phase I has been completed and Phase II is beginning.
- ☐ Another example is that all system testing is completed or that a system implementation is complete at a specific location.
- ☐ Completion at each location may be defined as a project milestone event.

- ❑ Approval requirements is for the protection of the PM and the project sponsor for signatures to be obtained so that everyone agrees to the requirements contained within the project scope statement.
- ❑ Just like the analogy used in the last chapter regarding the charter, the same press release analogy applies for this chapter too as the scope statement should be sent to the project team and anyone that is affected by the project.

Chapter 7- L6



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- ❑ A WBS essentially divides overall project scope requirements into a tree structure of work units that are created by decomposing the project scope statement into smaller and smaller segments until all work and required deliverables are defined.

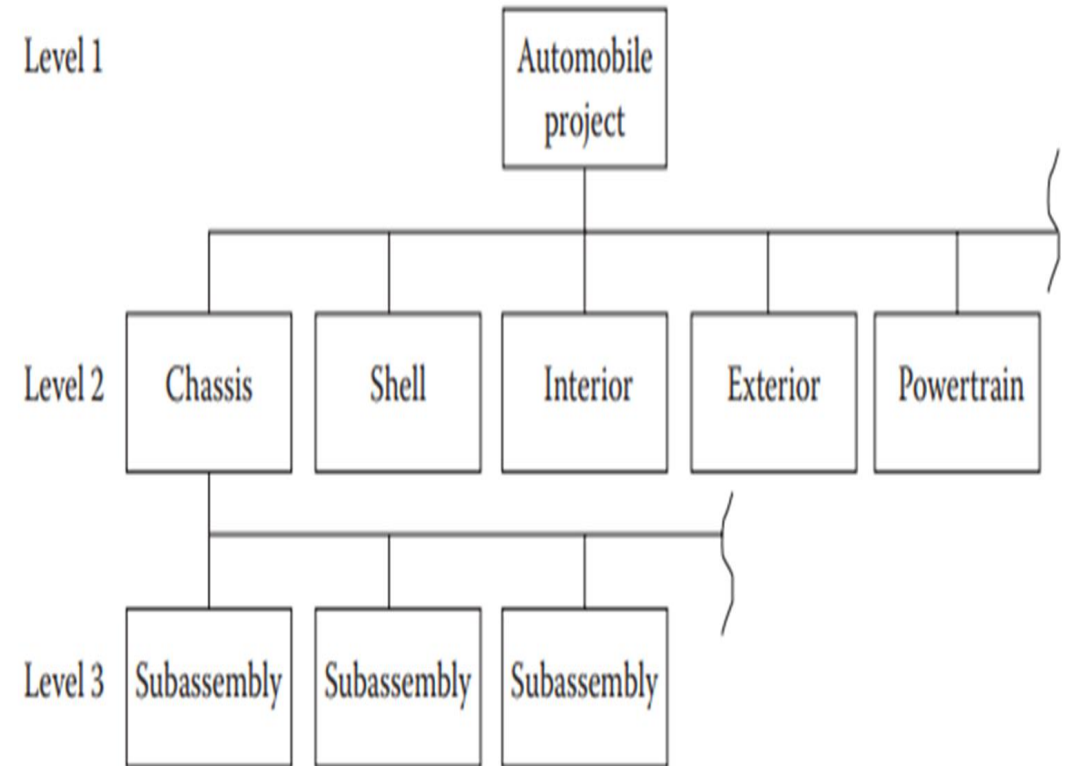


Figure 7.1 Auto project WBS.

- ❑ The top one or two decomposition levels of a WBS identify a high level view of the project's logical requirement, with little regard for the technical work required to achieve those goals (i.e., note the main auto components).
- ❑ As the lower levels are defined, these logical groupings are further decomposed into work units required to produce that segment of the overall project.

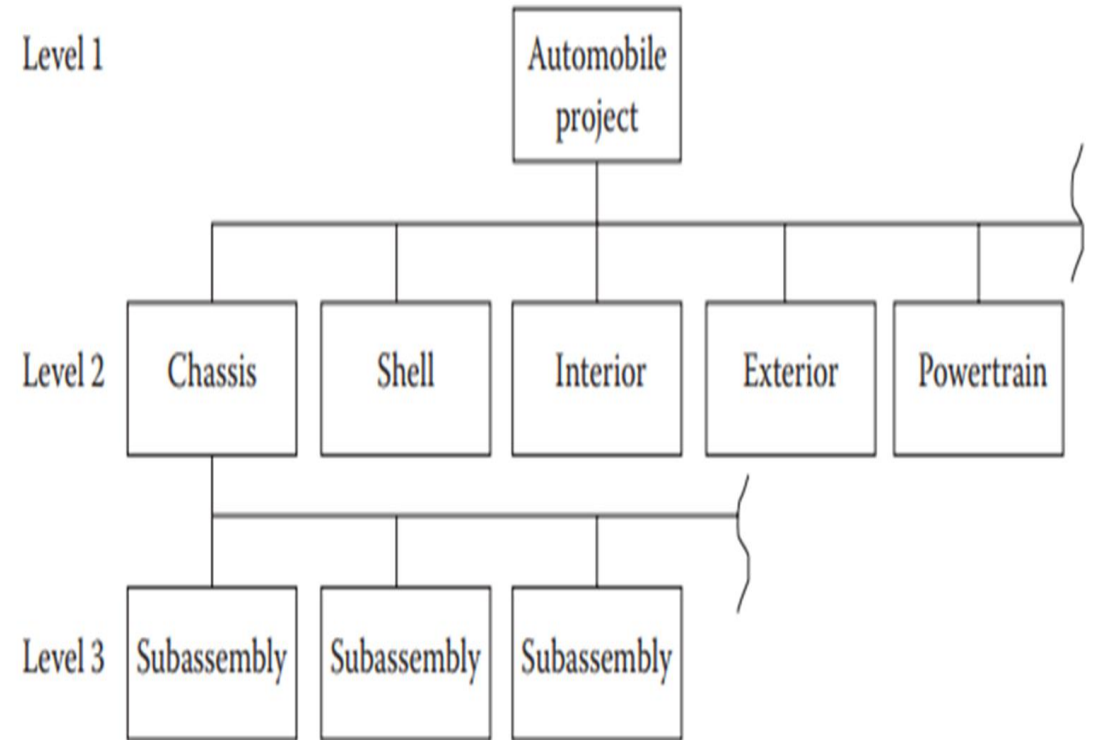


Figure 7.1 Auto project WBS.

❑ The following titles will be used here to identify the role of each box type:

- Top box—project goal
- First-level boxes—major subsets of the project goal
- Summary boxes—collections of lower-level boxes (e.g., subsystems and phases)
- Planning boxes—larger boxes not yet decomposed but needed to define the full project scope
- Work packages—lowest-level boxes that represent the fundamental work units of the project assigned to specific organizations teams

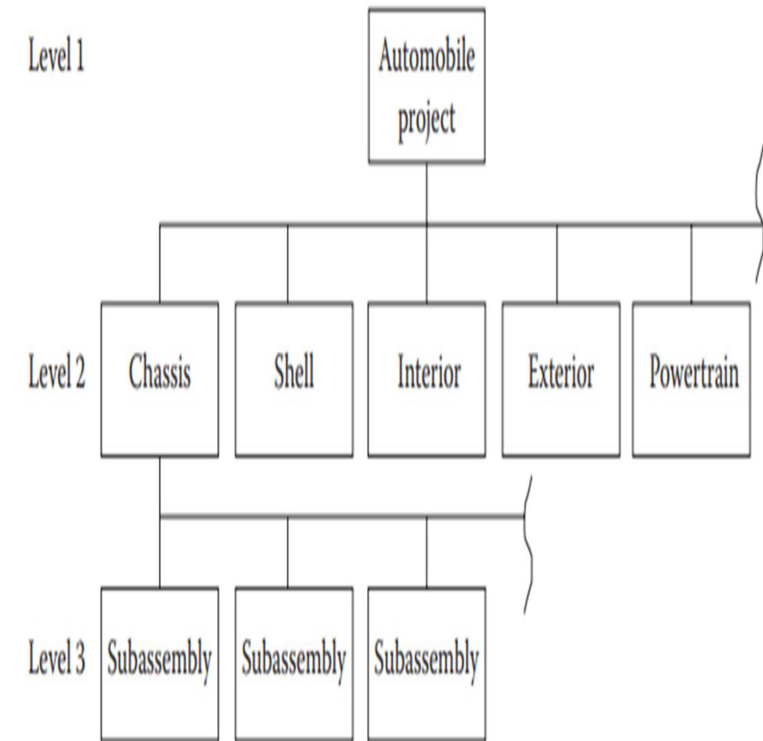


Figure 7.1 Auto project WBS.

- ❑ There are various schemes that can be used to label the WBS boxes; however, in most of these, a decimal point-type numbering approach is used to reflect the hierarchical layers (review Figure 7.4 for this view).
- ❑ Mature project management organizations such as the Departments of Energy and Defense have standardized the schemes for box numbering as well as the product-level definitions for the higher levels. The key role of box numbering is to identify aggregations of work units.
- ❑ As an example, if the top box in the WBS structure was labeled “1,” then the boxes in the immediate layer below would be 1.1, 1.2, 1.3, and so on. Conversely, if the top layer is labeled “0,” then the layer below would be defined as 1, 2, 3, 4, and so on.

Chapter 8- L7



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- ❑ Although this question seems trite, think about what the term estimate suggests. we will focus on this term only from the perspective of a project time or cost estimate.
- ❑ Even within this limited view, the specific perspective of the term varies based on one's perspective.



- ❑ As each of the individual resource and other cost items are estimated in their respective work units, a total direct project estimate is derived.
- ❑ The goal for this activity is to generate accurate estimates for each work unit's labor, material, and expense dollar costs.
- ❑ However, we also need to recognize that other less direct organizational level variables will be added to these direct cost values.
- ❑ For example, various types of overhead charges would be added to the project, and buffer, values related to estimated time overruns are often added to the base time and cost values.
- ❑ Finally, if the project is being produced for an external buyer, an additional profit value would be added. So, envision the total project estimate as MLOP—material, labor, overhead, and profit.

❑ The specific estimating techniques reviewed here include:

- 1) Expert judgment
- 2) Analogous مماثل
- 3) Heuristic إرشادي
- 4) Delphi
- 5) Parametric
- 6) Phased
- 7) Effort distribution (top-down)
- 8) Bottom-up

❑ None of these techniques is optimal to use for every case, and in most situations, multiple approaches will be used to confirm a specific derived value.

❑ Each method has a role and capability depending on specific needs and project phases. The proper choice deals with the knowledge available, the stage of the project, and the accuracy required.

Chapter 08

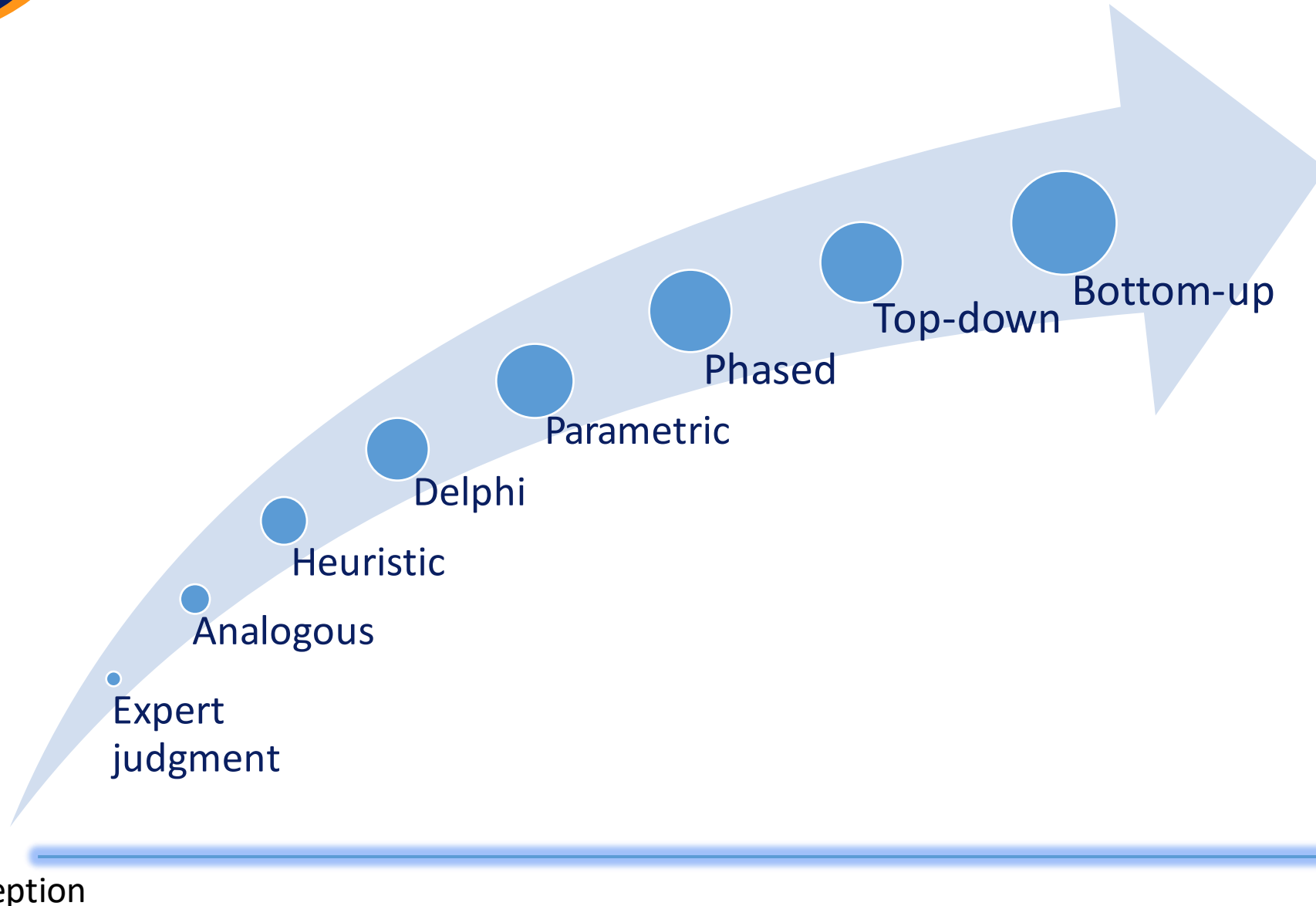
Estimating techniques

High Accuracy
& Details

Low Accuracy
& Details

Perception

Fact



- ❑ Expert judgment is a very popular technique for making both high- and low-level work unit estimations.
- ❑ In most cases, this method will generate a high-level estimate and the accuracy is always questionable.
- ❑ For improved accuracy, multiple estimating techniques should be utilized for validation comparison.
- ❑ If significant estimate differences are encountered, a better-defined scope is needed until the required accuracy level is obtained.
- ❑ There are three main advantages to using expert judgment as an estimating technique:
 - 1) It requires little data collection and simply uses experience from past projects (Snell 1997a).
 - 2) It has sufficient flexibility to be adapted to the conditions of the current project.
 - 3) It provides the user's desire for a quick answer because the expert will have a ready knowledge set from which to derive the estimate.

- ❑ Analogous estimating has similar traits to expert estimating in that the technique is based on prior experiences with and data from similar types of projects.
- ❑ Analogous estimating is best used in the early phases of a project before significant details are available. This method provides quick and easy estimates for projects or tasks that are basically stable from past models; however, Baca (2007, 136) suggests that the results are often not very accurate.
- ❑ To generate appropriate accuracy, care must be taken to properly compare the previous effort used with the current one. Also, to derive the correct forecasting measures, the estimation environment should match the expertise of the estimator (PMI 2001).

- ❑ A heuristic estimate is called a **“rule-of-thumb”** estimate.
- ❑ These “rules of thumb” are based on empirical parameters derived from past experiences. So, in that sense heuristic estimating is also based on analogous data and expert judgment, except in this case, the estimate is translated into a mathematical-type expression.
- ❑ Expert judgment estimating has to be performed by the expert, whereas heuristics can be transferred to others who are capable of manipulating the defined relationships (Mind Tools 2008).
- ❑ The major benefit of using simple heuristics is that estimating the process can be performed by many others and does not require a high expertise level. In many situations, the heuristic estimate is not expected to be highly accurate and thus should only be used in situations where the inherent risks are considered minimal (Mind Tools 2008).

- ❑ The Delphi technique is another variety of expert judgment estimating.
- ❑ It is most effective when making high-level estimates in the early stages of projects where there are many unknowns and a single expert would bring too much bias to the solution.
- ❑ **The Delphi technique involves the following sample steps to reach a convergent estimate:**
 - 1) Each expert provides input without collaboration with others.
 - 2) Results are tabulated and returned to the group for evaluation. In some cases, there is a discussion regarding logic for estimates.
 - 3) The process repeats with both time estimates and logic for the estimate.
 - 4) This process recurs until the group results converge toward a single-valued answer.

- ❑ According to the PMBOK® Guide, parametric estimating is a technique that uses statistical relationships between historical data and resulting work levels (PMI 2008, 150).
- ❑ Parameters based on size, functions, footage, or other scope-related values can be statistically modeled to produce time and cost estimates for the related work.
- ❑ Given the mathematical sophistication of a parametric estimating model, these are often computer-based statistical relationships.
- ❑ The process of creating a formal parametric model involves collecting data from many past similar efforts and from this producing a statistical regression-type model that quantifies the impact of each relevant variable.

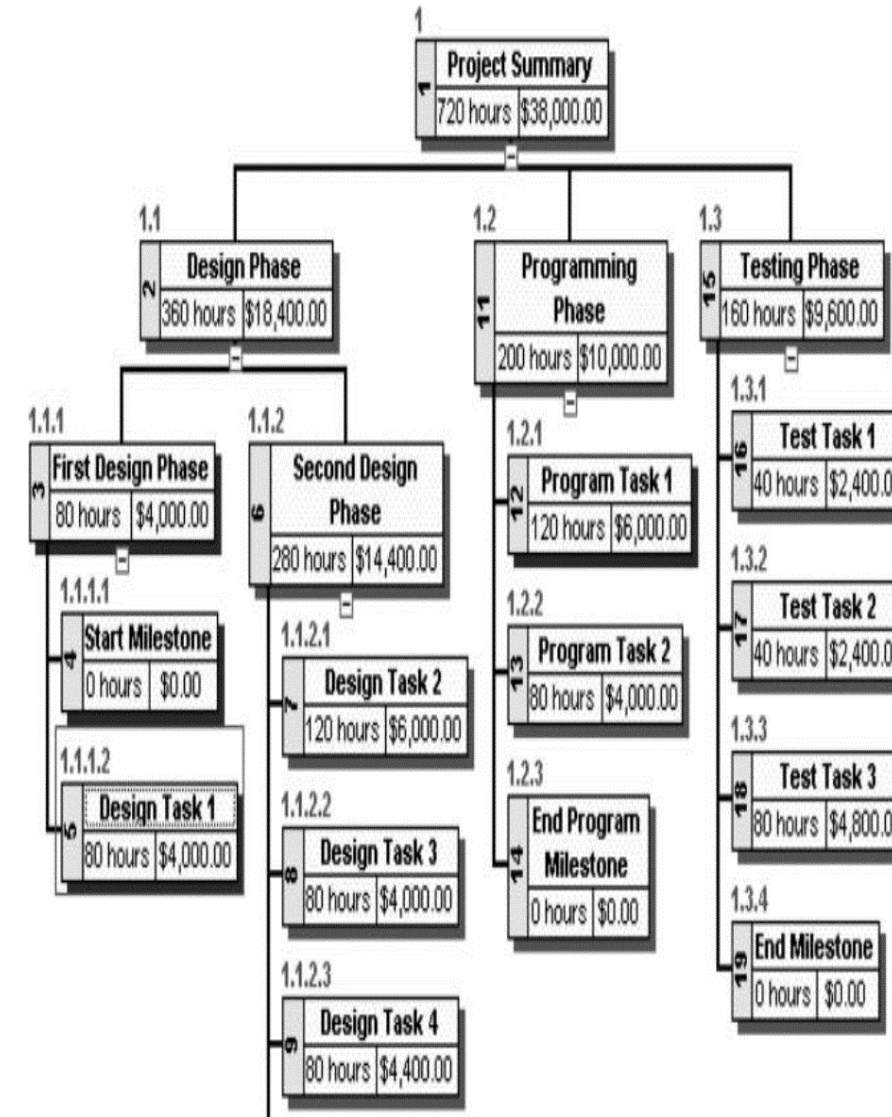
- ❑ Parametric techniques are most useful in the early stages of a project when only aggregate data are available.
- ❑ These estimates are normally considered the order of magnitude in accuracy because they may lack detailed requirement precision (Kwak and Watson 2005).
- ❑ The parametric technique can also be applied to any situation in which sufficient historical data are available and the project model is stable.
- ❑ From historical data, cost-estimating relationships (CERs) can be derived statistically to correlate with resulting work estimates.

- ❑ Phased estimating involves an incremental approach to the process.
- ❑ This plan and move forward approach is also called the rolling wave technique.
- ❑ In this case, a promising project will be given the approval to move into a particular phase with a defined rough order of magnitude schedule and budget.
- ❑ Emerging from that phase, the project is reassessed and the estimating process is repeated for the next defined phase.
- ❑ As each phase progresses, the project has to earn its way to the next one and the estimating variability range decreases as more project definition occurs.

Chapter 08

Bottom-up estimating

- ❑ This technique is considered by experts to be the most accurate of all the techniques described here.
- ❑ The estimating mechanics for this process are directly linked to the WBS work packages.
- ❑ Based on this view, the total project consists of a collection of relatively small work units that can be estimated reasonably well by the performing organizations.
- ❑ In most cases, the estimating method used would be expert judgment given that the individuals who will actually be doing these moderate-sized work units would provide the values.



Chapter 9- L8



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Section four

Tools and techniques for developing the project plan

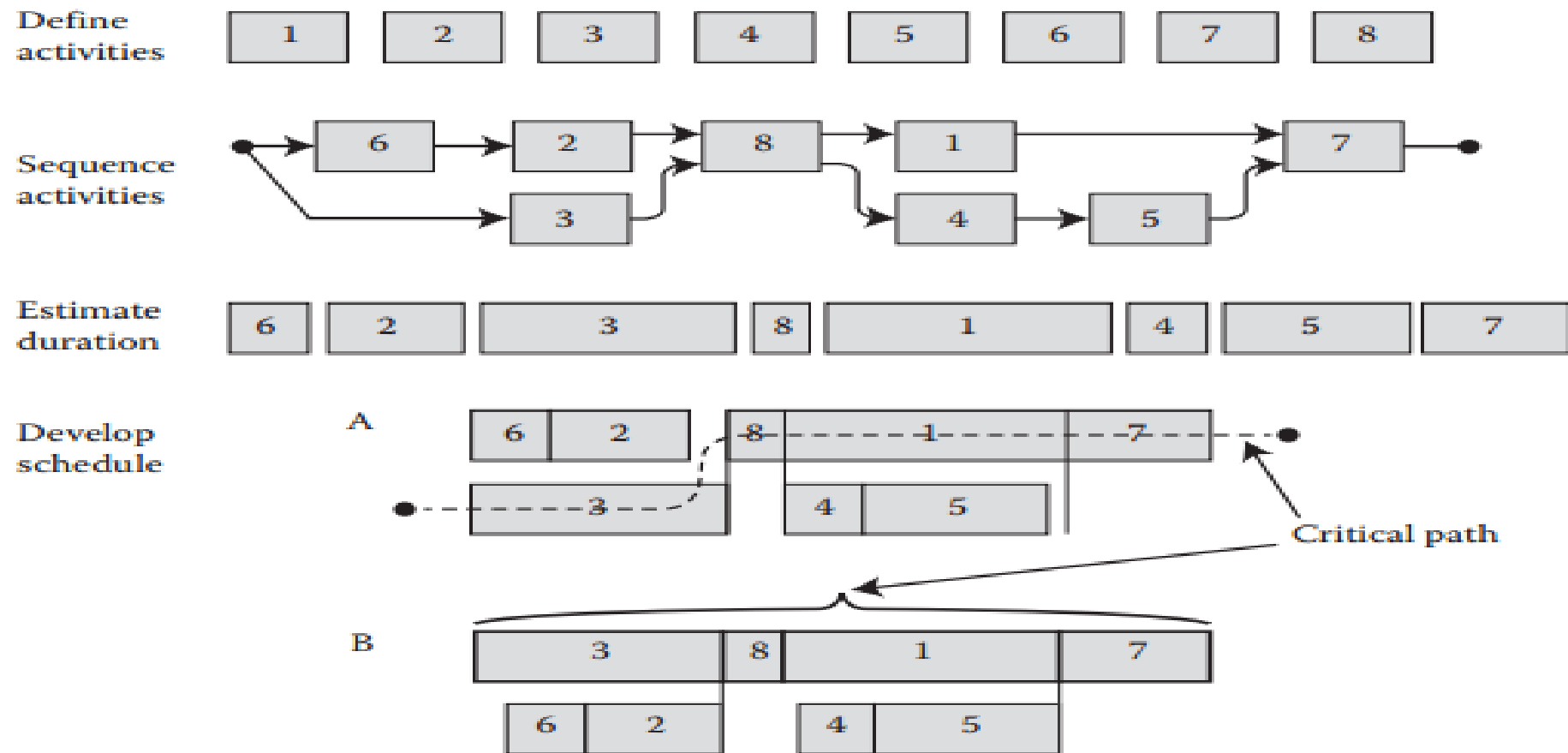


Figure IV.3 Project schedule process sequence.

- ❑ The view shown in Figure 9.1 is called a Predecessor Diagram Model (PDM).
- ❑ Figure 9.1 illustrates a sample PDM network.
- ❑ This format is useful for examining a sequence plan and evaluating it both technically and managerially.
- ❑ However, as the project grows in size, the graphical method becomes harder to maintain and other computer-based methods then become preferable.

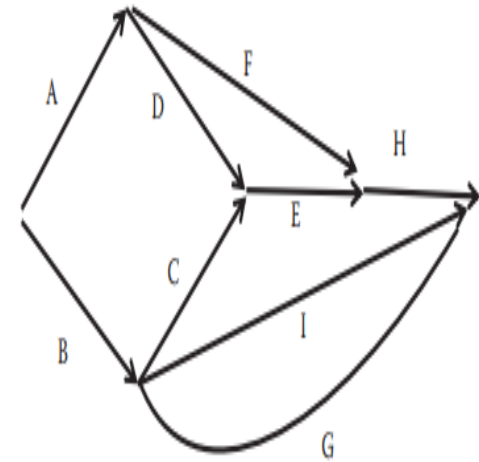


Figure 9.1 PDM network schedule model.

❑ In order to test your understanding of these concepts, the list below contains a few sample interpretations of the activity relationships in Table 9.1.

- 1) Activity A has no predecessor constraint, therefore it start immediately.
- 2) Activity C can start after B is finished.
- 3) A more complex coding example occurs with activity H. In this case, activities E and F have to be finished before H can start.

Table 9.1 Predecessor Coding

Activity	Predecessor
A	— —
B	— —
C	B
D	A
E	D,C
F	A
G	B
H	E,F
I	B

- ❑ The linking process described thus far is called FS, meaning finish–start (FS).
- ❑ Start/Start (SS)—this indicates that the two linked activities would start at the same time. So, a code of SS6 would define that the activity would start at the same time as the activity on line 6.
- ❑ Finish/Finish (FF)—this code indicates that the named activity would need to finish at the same time as its reference activity. So, a code of FF6 would define that the activity should finish at the same time as the activity on line 6.
- ❑ Start/Finish (SF)—this is a little used relationship for most projects. Its interpretation is that the successor task cannot be completed until the predecessor begins. This format basically fits the Just-in-Time manufacturing approach designed to “pull” the predecessor activity rather than a “push” relationship like the other options reflect.

- **Lag**—The term lag means that the coded task obeys one of the basic relationships, but then must wait for some further specified time.
- One easy way to remember this logic is to recall again the concrete pouring example.
- In this case, the required technical sequence for these two events is to pour the concrete slab (task A) and then paint the surface of the slab (task B). There is an obvious required technical sequence between these two tasks; however, in this case the concrete must also be allowed to dry first and this drying time represents a required lag. If we assume the concrete must dry for 5 days, then the predecessor code for task B would be $A + 5$.

- **Lead**—a lead relationship is just the opposite of a lag in that the linked task can start before the predecessor is finished. So, the code A-5 would say that B could start 5 days prior to completion of A.

- ❑ One of the most important plan status elements is to define which tasks are constraining the overall schedule.
- ❑ Understanding both critical path and slack concepts is vital for effective time management and requires that the PM keep these parameter values in mind as the project unfolds.
- ❑ In project management, “float” defines the amount of time a task can be delayed without causing a delay in:
 - ❑ Any subsequent, dependent tasks - called “free float”
 - ❑ Any delay in the overall project - called “total float”
 - ❑ Any activity or task on the critical path has zero float. That is, you can’t delay it at all without causing a delay in the project or dependent tasks.
 - ❑ However, there are plenty of other activities in the project that can be delayed. The quantification of this delay is called the “float”.

- ❑ After supplying the basic activity, duration, and predecessor parameters for defining the network plan, there are seven management-oriented parameters that can be calculated from these data.
- ❑ These are:
 - 1) ES or T(E)—early start; earliest time the activity can commence.
 - 2) LS or T(L)—late start; latest time the activity can start and not affect project schedule.
 - 3) EF—earliest time that an activity can finish.
 - 4) LF—latest time the activity can finish and not affect project schedule.
 - 5) Total slack (float)—the difference between the earliest date that the activity can start and the latest date the activity can start before delaying the completion date (LS–ES).
 - 6) Free float—the amount of time an activity can be delayed before any successor activity will be delayed (EF–ES).
- ❑ A schematic view of this type of relationship is shown in Figure 9.5.

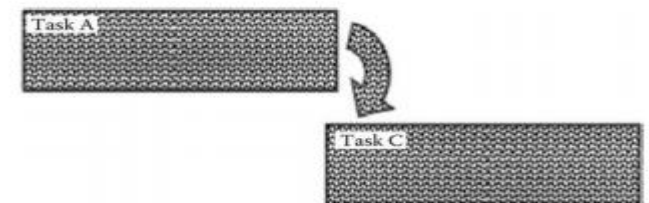


Figure 9.5 FS relationship.

Chapter 11 & 22- L9



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- ❑ Risk management is formally defined as the systematic process of planning for, identifying, analyzing, responding to, and monitoring project risks involving processes, tools, and techniques to help the Project Manager maximize the probability of a predictable outcome.

- ❑ To be effective, the risk management process must be proactive throughout the project life cycle.
- ❑ Therefore, not only does a Project Manager anticipate and plan for the event, but the Project Manager must also monitor activities during the execution phase to minimize risk impact when the event does occur.
- ❑ Risks are potential events with a probability of less than 100% occurring and the impact of the risk is measured in terms of how the risk event will impact the project objectives if it occurs.

- ❑ It is important to note that a risk occurring can pose an opportunity or a threat.
- ❑ Most risks are viewed as negative but sometimes the event can be linked to a positive factor such as new technology being introduced.
- ❑ If successfully delivered, this can create a competitive advantage for the organization.
- ❑ Delivering a project successfully within cost, time, and quality does not typically occur without effective risk management and this is the reason the project planning process must incorporate risk considerations.

- ❑ Realize that a risk event relates to something that has not happened yet.
- ❑ The vocabulary term trigger is used to define an early warning sign that a risk event has occurred or is about to occur.
- ❑ Delivering a project successfully within cost, time, and quality does not typically occur without effective risk management and this is the reason the project planning process must incorporate risk considerations.

- ❑ Risks are divided into two broad categories, known risks, and unknown risks, as described below:
 - **Known** risks are risks that are logically expected to occur and for which some general probabilities and impacts can be estimated. These risks can be handled through risk management techniques and can be minimized by following those techniques.
 - **Unknown** risks are not predictable events and are not generally anticipated in terms of the formal risk evaluation process.

- ❑ Risk identification involves the definition of potential risks affiliated with a project.
- ❑ These risks can be known risks for a potential project such as those identified by looking at company historical records to see which risk factors have occurred before on a related project.
- ❑ However, a brainstorming session is an often-used support process to further identify other risks that may have never occurred before but still pose a threat to the project.
- ❑ Suggests categorizing risks using headings such as environment, technical, resources, integration, management, marketing, and strategy.
- ❑ The environment category is further broken down into government policy, exchange rates, weather, culture, and so on.
- ❑ Technical grouping could be new technologies or methods.

- ❑ Resource risks include people resources, monetary resources, and equipment or material resources.
- ❑ Examples of the integration category are risks affiliated with merging new with old systems.
- ❑ Management category items include corporate policies, project management techniques, and organizational structure.
- ❑ Marketing risks include customers and competitors.
- ❑ Competitors can also be further broken down into direct, indirect, and substitute.

- ❑ Direct examples are companies with similar products or services that sell to similar customers.
- ❑ Indirect examples are competitors with related businesses or capabilities.
- ❑ Substitute competitors are competitors who sell products or services that can replace (be substituted as) your company's products or services.
- ❑ Adds in the category of "commercial risks," which includes financing, warranty, and vendor performance.
- ❑ These categories are listed in Figure 11.2, which displays a sample risk breakdown structure.

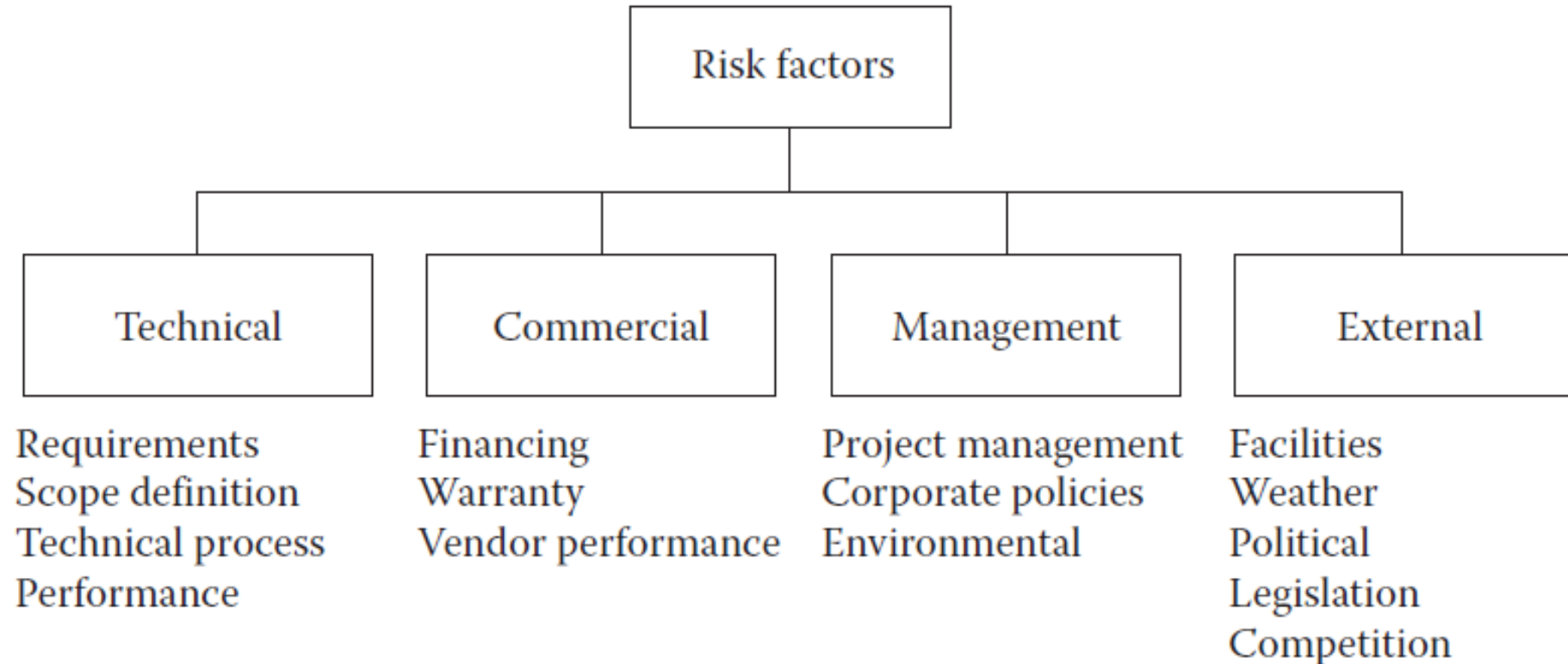


Figure 11.2 Risk breakdown structure. (From Richardson, G.L. 2010. *Project Management Theory and Practice*. New York: CRC Press, Taylor & Francis Group.)

- ❑ A **fishbone diagram** (also known as an Ishakawa or cause-and-effect diagram) is a schematic map that is used to provide a logical method to list factors that may affect a problem or a preferred corrective outcome.
- ❑ Figure 11.3 displays a sample layout of this diagram and Figure 11.4 displays an example of a filled-out diagram relating to the car case study.
- ❑ This method allows a team to graphically identify and detail the possible causes of a problem.
- ❑ The box to the far right of the diagram is the “effect” or problem and everything to the left of the box is a possible cause of that effect.

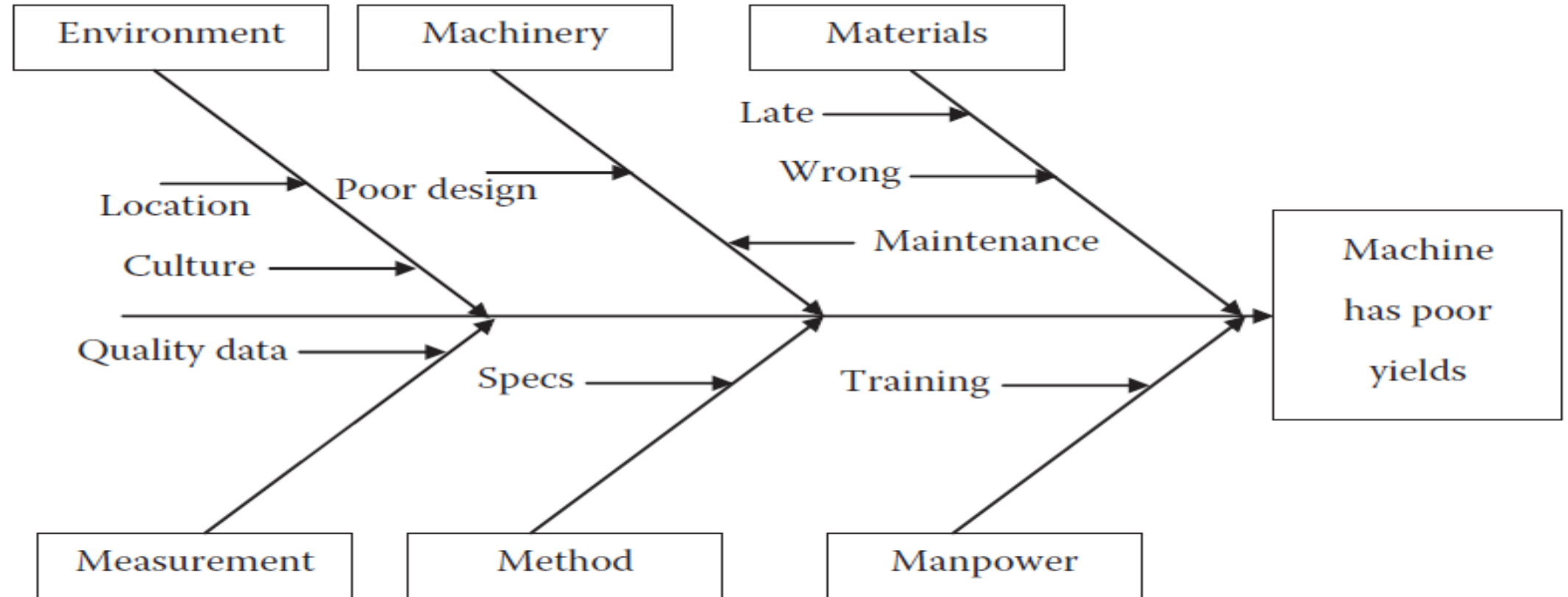


Figure 11.4 Fishbone diagram to examine poor process output.

- ☐ The primary documentation output of the risk identification phase is the risk register.

Section Six Ch. 22

Qualitative risk analysis

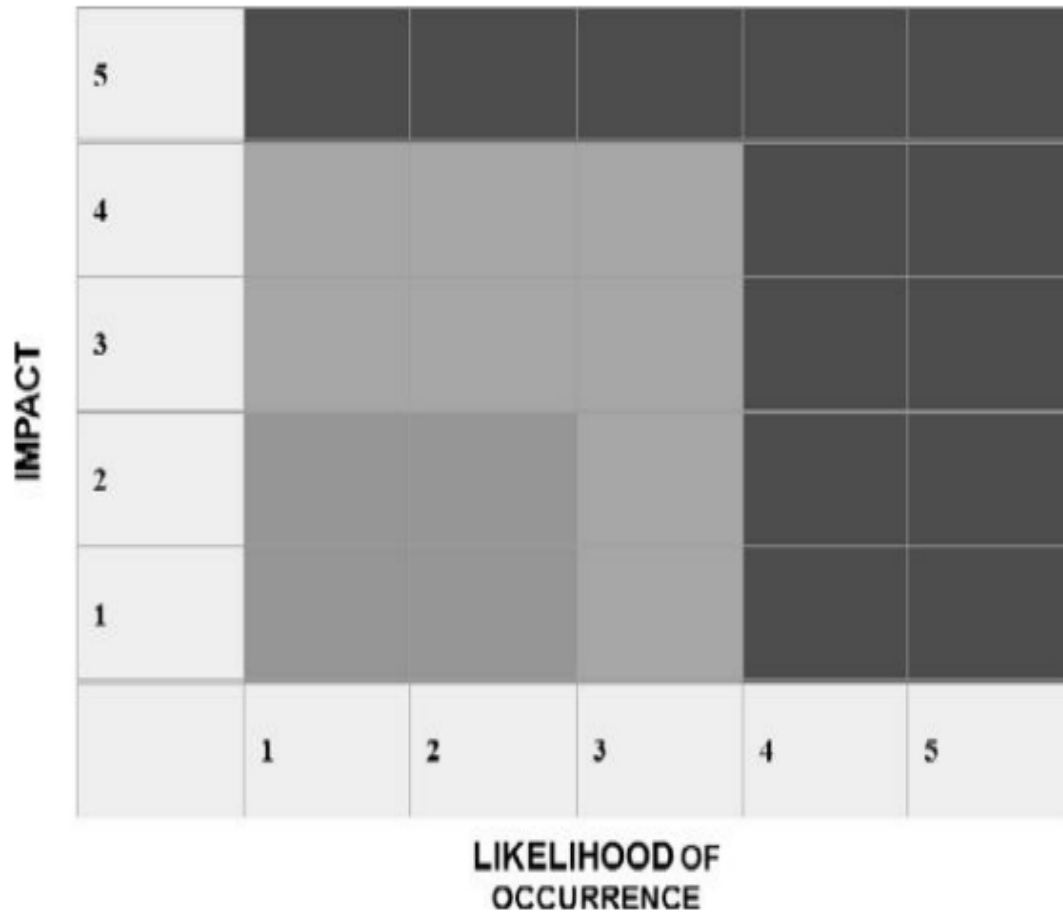
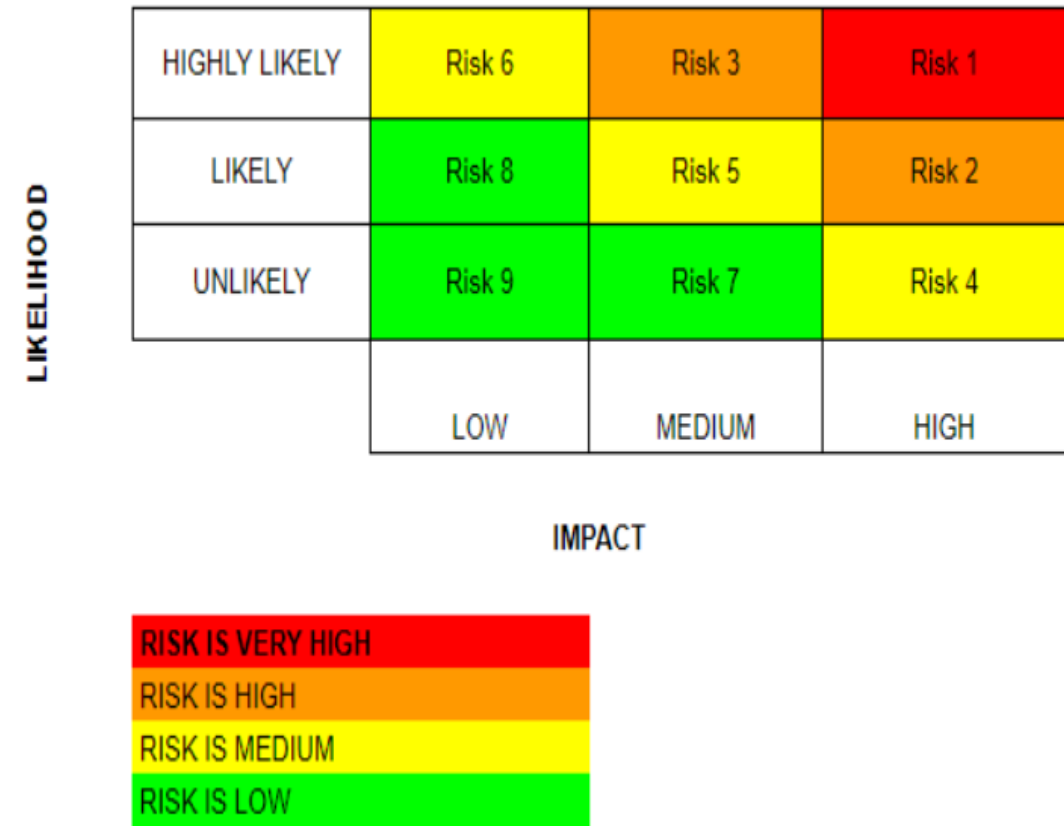


Figure 22.1 Qualitative risk analysis scorecard tool.

Qualitative Risk Analysis



Qualitative tools and techniques

Section Six Ch. 22

Quantitative risk assessment

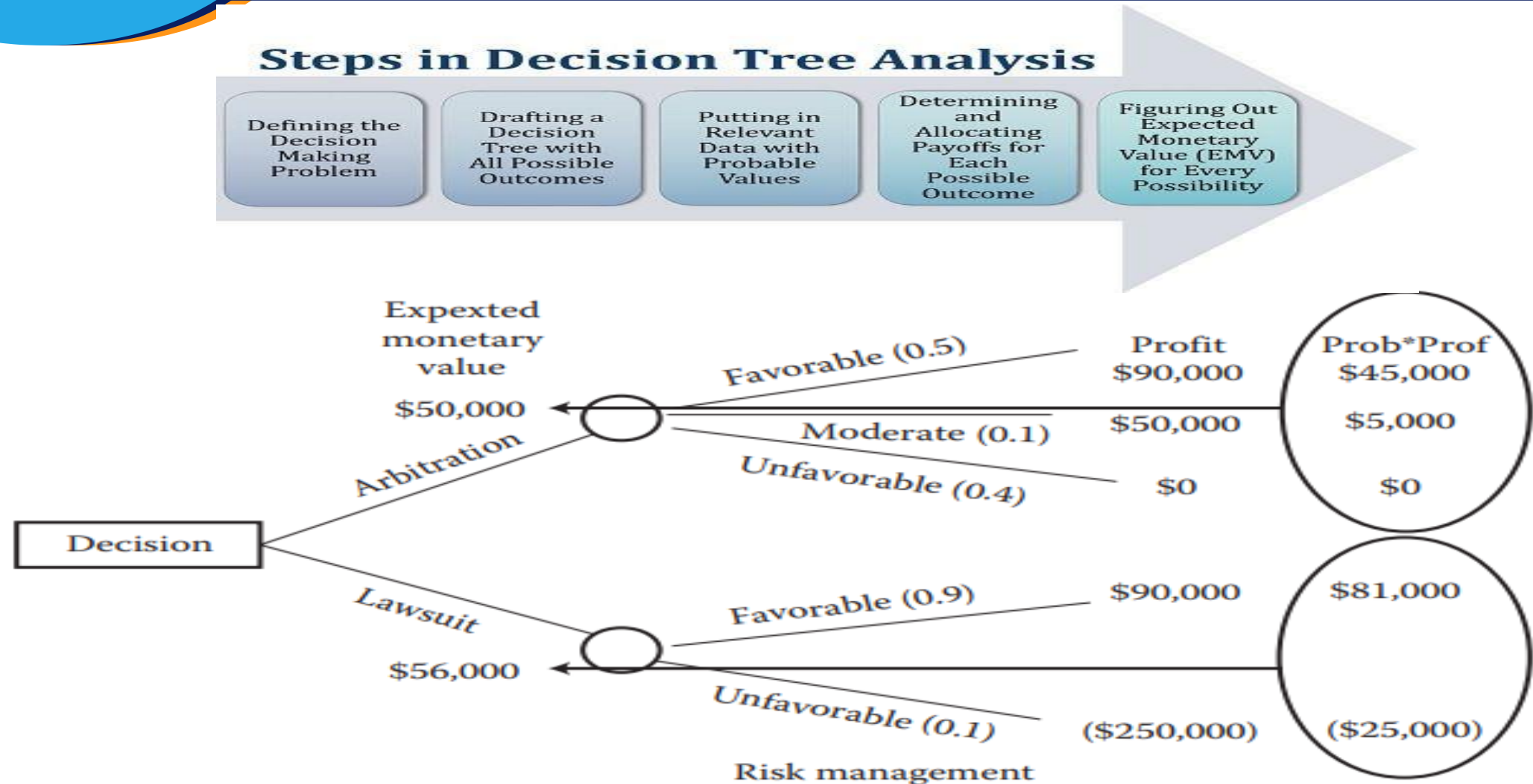


Figure 22.2 Sample decision tree analysis. (From Richardson, G.L. 2010. *Project Management Theory and Practice*. New York: CRC Press, Taylor & Francis Group.)

Section Six

Ch. 22

Quantitative risk assessment

- ❑ Sensitivity analysis can be in the form of a tornado diagram that ranks the project activities in order of significance for, say, critical path.
- ❑ The tornado diagram helps decide where to focus attention.
- ❑ An example of a tornado diagram is shown in Figure 22.3.

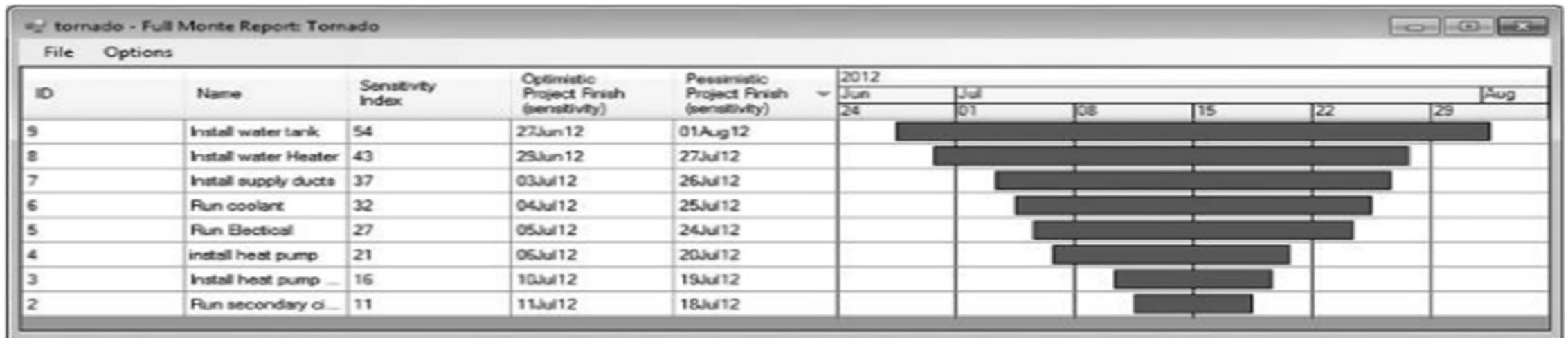


Figure 22.3 Tornado diagram. (From Barbecana, Inc. 2011b. Full Monte™ User

- ❑ Following a plan that was written in advance helps the team be proactive with the goal of enhancing opportunities and reducing threats to the project's objectives.
- ❑ Plan risk responses. Develops options and actions to enhance opportunities and to reduce threats for the selected events.
- ❑ The four different risk strategies are accept risk, avoid risk, mitigate risk, and transfer risk.

- ❑ A risk be accepted if the likelihood of the risk occurring and the financial impact to the project are both low.
- ❑ If the likelihood of the risk occurring and the financial impact to the project are both high, the risk be avoided.
- ❑ Furthermore, if the likelihood of the risk occurring is high and the financial impact to the project is low, the risk mitigation strategy may be the best decision.
- ❑ Finally, if the likelihood of the risk occurring is low and the financial impact to the project is high, a risk-avoidance strategy may be best.

Chapter 21, 23, 24- L10



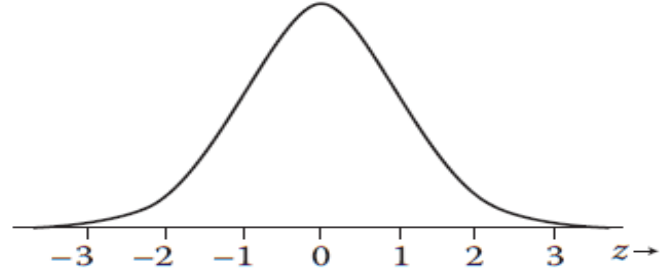
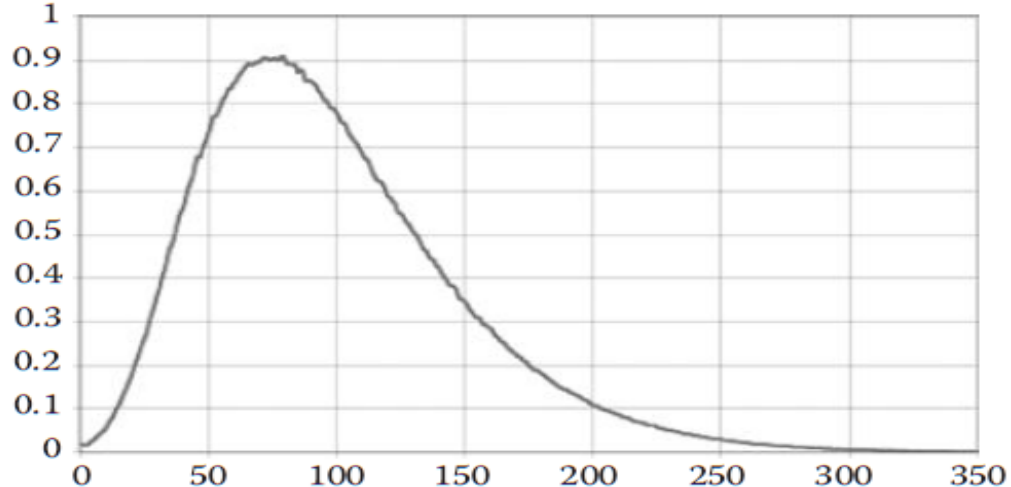
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- ❑ The goal here is to describe modeling and simulation as it pertains to the project model.
- ❑ The modeling methodology will be based on Monte Carlo type random value generation used to simulate variable performance for specific tasks.
- ❑ Uncertainty is simulated using a computational algorithm tool such as Monte Carlo, which allows real-world phenomena to behave in variable forms.
- ❑ Full Monte is an MS Project add-in software utility that uses the Monte Carlo technique to produce time and cost analysis of a project model.
- ❑ Customized software such as this is extremely helpful in gaining a better understanding of the uncertainty present within the project environment.
- ❑ One of the outputs of simulation modeling is sensitivity analysis, which can be used in determining which risks have the most potential impact on the project.

- ❑ Monte Carlo defines uncertainty through a probability distribution specification for each project task.
- ❑ From this, it can evaluate plan status by sampling each task with randomly generated values over thousands of cycles, and calculating values, again and again, using different random values from the probability functions.
- ❑ The iterative analysis process results in a histogram distribution of possible outcomes.
- ❑ Probability distributions for model components provide a realistic method for an improved understanding of real-world system behavior.

How does Monte Carlo work?

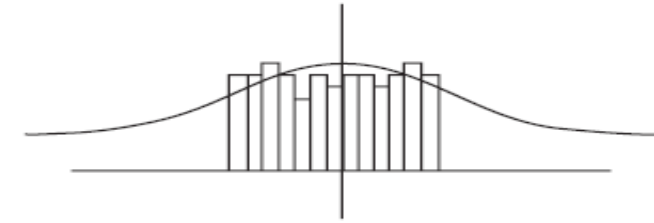
Table 21.1 Probability Distribution Types

Type of probability distribution	Description	Visual
Normal	The symmetrical bell-shaped curve is concentrated in the center and decreases on either side with the values in the middle near the mean most likely to occur. It has less of a tendency to produce unusually extreme values, compared to some other distributions. It describes natural phenomena such as inflation or individual's weights	
Lognormal	This curve has values that are positively skewed. It is used to represent values that do not go below zero but have unlimited positive potential. Examples of variables described by lognormal distributions include real estate property values, stock prices, and oil reserves	

How does Monte Carlo work?

Uniform

All values have an equal chance of occurring such as tossing a coin with equal chances of getting heads or tails. The minimum and maximum values need to be identified



Triangular

It favors the most likely value and gets its name because the most likely value that is referred to as the mode creates the top point of the triangle. There is no requirement that the distribution is symmetrical about the mean and therefore depending on the estimates for minimum, maximum and most likely, the shape of the triangle may be skewed to the left (minimum) or right (maximum) values. Although the triangular distribution can model a variety of different circumstances, it can produce too great a value for the mean of the risk analysis where the maximum for the distribution is very large. An example of variables include past historical data such as sales

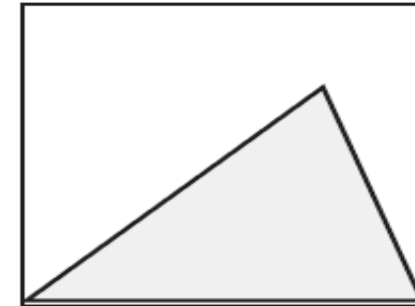


Table 21.1 (continued) Probability Distribution Types

Type of probability distribution	Description	Visual
PERT-Beta	This distribution is used for identifying risks to the project as well as cost models to predict the likelihood of the project in meeting specific goals. The PERT also known as PERT-Beta, which is a version of the formal beta distribution, yet requires the same three parameters as the triangle distribution consisting of the minimum, mode, and maximum. An example usage is to describe the duration of a project task	
Discrete	This distribution is used when there is a specific probabilistic value that occurs with each event. For example, flipping a coin 20 times will result in specifically 0–20 tails occurring as opposed to 2.3 times a tails occurring (as this is not possible because it is either heads or tails). An example might be the number of accidents on a college campus in a given month	

Enterprise project management office-EPMO - Introduction

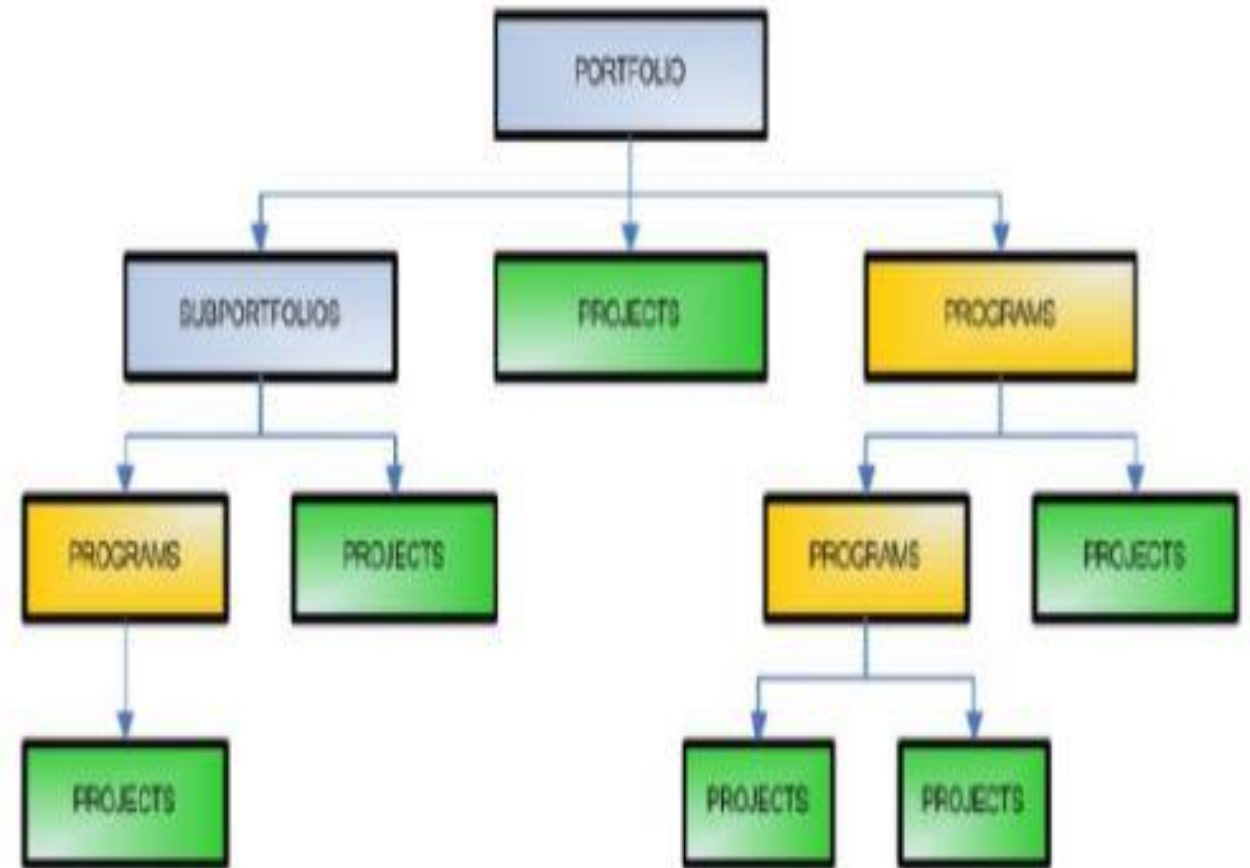
- ❑ The EPMO is created to assist in decisions related to making sure the right organizational projects are done at the right time, with the right tools and templates, and that they contribute to the organization's strategic plans.
- ❑ The following list summarizes 16 common reasons why this organizational initiative may suffer from mediocre success:

❑ What is the difference between project program and portfolio management?

- A program is a group of projects that are similar or related to one another, and which are often managed and coordinated as a group instead of independently.
- A portfolio is a group of different programs and/or projects within the same organization, which may be related or unrelated to one another.
- Generally, a project represents a single, focused effort.
- Programs are collections of projects together that constitute a complete package of work. The program's overall objectives are achieved through the complementarity of the various projects.
- <https://www.simplilearn.com/difference-between-projects-and-programs-article>

❑ What is the difference between project program and portfolio management?

- A portfolio organizes programs, projects, sub-portfolios, sub-programs, and operations to facilitate business benefits
- <https://www.simplilearn.com/difference-between-projects-and-programs-article>



❑ What is the difference between project program and portfolio management?

- A portfolio organizes programs, projects, sub-portfolios, sub-programs, and operations to facilitate business benefits
- <https://www.simplilearn.com/difference-between-projects-and-programs-article>



- ❑ The EPMO must have a management-level steering committee for selecting and monitoring strategic and nonstrategic projects and the members would consist of at least
 - EPMO director (i.e., provides meeting agendas and a list of decisions that must be made)
 - VP vice president of business, CFO, and/or CEO
 - Key members from each one of the businesses (could be high-level and/or middle management)
 - CIO or key VP and a few key support members from IT
 - SMEs who would be added for key projects when expertise is needed

- ❑ These changes in thinking and implementation processes will not happen overnight.
- ❑ The steering committee needs to define what projects belong to what programs and what programs belong to what portfolios.
- ❑ Also, they need to define what projects meet short-term and long-term strategic goals and be able to prioritize the aggregates since there are limited resources available.
- ❑ The selection goal is to pursue high-value priority projects first before the lower-value (or no-value) projects, which would quickly drain the resource pool.

- ❑ Lower-value projects could be dropped or moved to the future.
- ❑ One of the tougher roles of the steering committee is to decide to kill a project that is underway because it is not evolving as planned, or the environment has changed since it started.
- ❑ This should not be looked at as an admission of failure but seen as improving the pursuit of organizational goals by reallocating project resources to more important projects that have a bigger impact and/or payback.

In Conclusion

Be ready for the Final Exam



I feel confident! I can do it on my own.



I feel okay. I need a bit of help.



I do not know what to do. I need help.



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Thank You



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