



جامعة الجميع الذكية
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Project Management Technologies

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Section four - Chapter 11

PMG 312

S4 - Tools and techniques for developing the project plan

Ch. 11 - Introduction to risk

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- ❑ This chapter will offer a high-level overview of project risk concepts.
- ❑ In today's fast-moving global marketplace, risk management is critical to business assets, the jobs of employees, and ultimately an organization's survival.
- ❑ Why is this so critical? Done properly, risk management provides a way to reduce project outcome uncertainty by providing awareness of risks that are present, thereby minimizing future threats, seizing opportunities, and achieving optimum results.
- ❑ It also identifies the degree to which a risk may occur and the outcome it could have in terms of impacting the project's success.
- ❑ Risk planning begins with a series of steps designed to help approach, plan, and execute the risk management
- ❑ activities, which constitute the first major step in risk management and is the first objective of this chapter.
- ❑ The second process step involves the identification of risks by looking at a company's historical records to identify all previous risks encountered on past related projects, which is the second objective for this chapter.
- ❑ Risks are then further identified by various techniques designed to identify risks that have never been documented previously.



- ❑ There are many uncertainties with everything in life but planning for uncertainties can prevent or reduce negative outcomes, thus bringing about the term risk management.
- ❑ Risk can be thought of as unplanned events in the future that could occur.
- ❑ Project risk management is both the art and science of studying identification, analysis, and response to risk events throughout the life of a project.
- ❑ The objective is to increase the probability and impact of positive events and to decrease the probability and impact of events considered to be adverse to the project. Some risks that are inherent in the project goal can never be avoided. Also, all risks cannot be fully mitigated because of financial and practical limitations.
- ❑ 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.
- ❑ When it comes to business risks, organizations may benefit from having a PMO.
- ❑ A PMO supports a flexible, end-to-end project management process, which balances rigor with overhead cost.
- ❑ It makes tools and techniques available along with formal training to improve Project Manager competency.



- ❑ 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.
- ❑ The ultimate management vision of risk management is in understanding the realm of potential risks that can occur in the project as well as how each risk can affect project success.
- ❑ 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.
- ❑ Therefore, in some cases, a risk event can relate to a better approach, resulting in a better outcome that may not have been available when the project first began.

- ❑ 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. Therefore, the definitional components of a risk event are the possible events themselves, the probability that the event will occur, the impact of the event, and the frequency with which the event may occur.
- ❑ Risks are ever-present and although these can typically be significantly reduced, even the best risk management process cannot bring the total negative impact to 0%.
- ❑ 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.
- ❑ The wise Project Manager will realize that this management aspect of the project dynamic is a critical success factor and will treat it accordingly. For that reason, the risk is becoming a topic of increasing interest.

- ❑ The Securities and Exchange Commission (SEC) in 2010 required publicly traded companies to begin providing in their annual proxy statements to shareholders disclosures that provide information on the board's risk oversight role, and the Federal Financial Reform Legislation mandates risk committees to be in place for boards of financial institutions.
- ❑ Also, public bank holding companies with \$10 billion or more in assets are mandated by the Dodd–Frank Wall Street Reform and Consumer Protection Act of 2010 to form a board-level risk committee to focus on risks and strategies.
- ❑ This also mandates creation of a risk expert on the committee in the area of identifying, assessing, and managing risk exposures of large, complex firms.

project risk management



negative events



positive effects

- ❑ A risk management process identifies tools and techniques to aid in minimizing uncertainty through understanding, assessing, and managing the uncertainty inherent in projects. It is now recognized that formal processes related to this aspect of the project can have an effective impact on subsequent project events.
- ❑ As a result, a description of these actions becomes part of the content for the risk management section in the project plan and the basis to show how risk in a project environment is handled. These processes can include but cannot be limited to project planning areas such as cost estimation, earned value analysis, task allocation, and detailing how monitoring and control of the project is to be accomplished.
- ❑ Within the framework of a project and as referenced in the PMBOK® Guide, risk management consists of six major subordinate processes. The six model processes are listed below and are also displayed in Figure 11.1:
 - 1) Plan risk management. Consists of details outlining how to approach, plan, and execute the risk management activities for a project with the main output of this process being the risk management plan.
 - 2) Identify risk. This process defines the risk events that are likely to affect a project.
 - 3) Perform qualitative risk analysis. Prioritizes the identified events for subsequent further analysis or action by assessing their probability of occurrence and impact with the main output being to update the risk register.

- 4) Perform quantitative risk analysis. Provides a quantification of the selected events to establish a measure of impact.
- 5) Plan risk responses. Develops options and actions to enhance opportunities and to reduce threats for the selected events. From the details resulting from the planned responses, various mitigation plans are established and a contingency reserve is established to handle the remaining potential events. All these details are recorded in the risk register.
- 6) Monitoring and control risks. This management process is designed to track both identified and unidentified new events. As these events are handled, the process monitors the effectiveness of the mitigation processes.

- ❑ This process' main outputs are recommended corrective and preventive actions, requested changes, updates to the risk register, and revisions to the project management plan.
- ❑ Time spent in producing the risk management plan before execution allows those involved to not be in a crisis mode when identifying the best way to manage future project risks.
- ❑ Individual organizations and industries have varying perceptions and tolerances of risks, which are influenced by their various safety cultures, management commitment to safety, inaccurate risk assessment, amount of control over a particular risk, and varying criteria for determining which risks are acceptable and past personal experiences with risks.
- ❑ There have been discussions related to organizations not spending adequate time on identifying, assessing, and managing the most important risks or being blindsided by unknown risks resulting in operational failures.

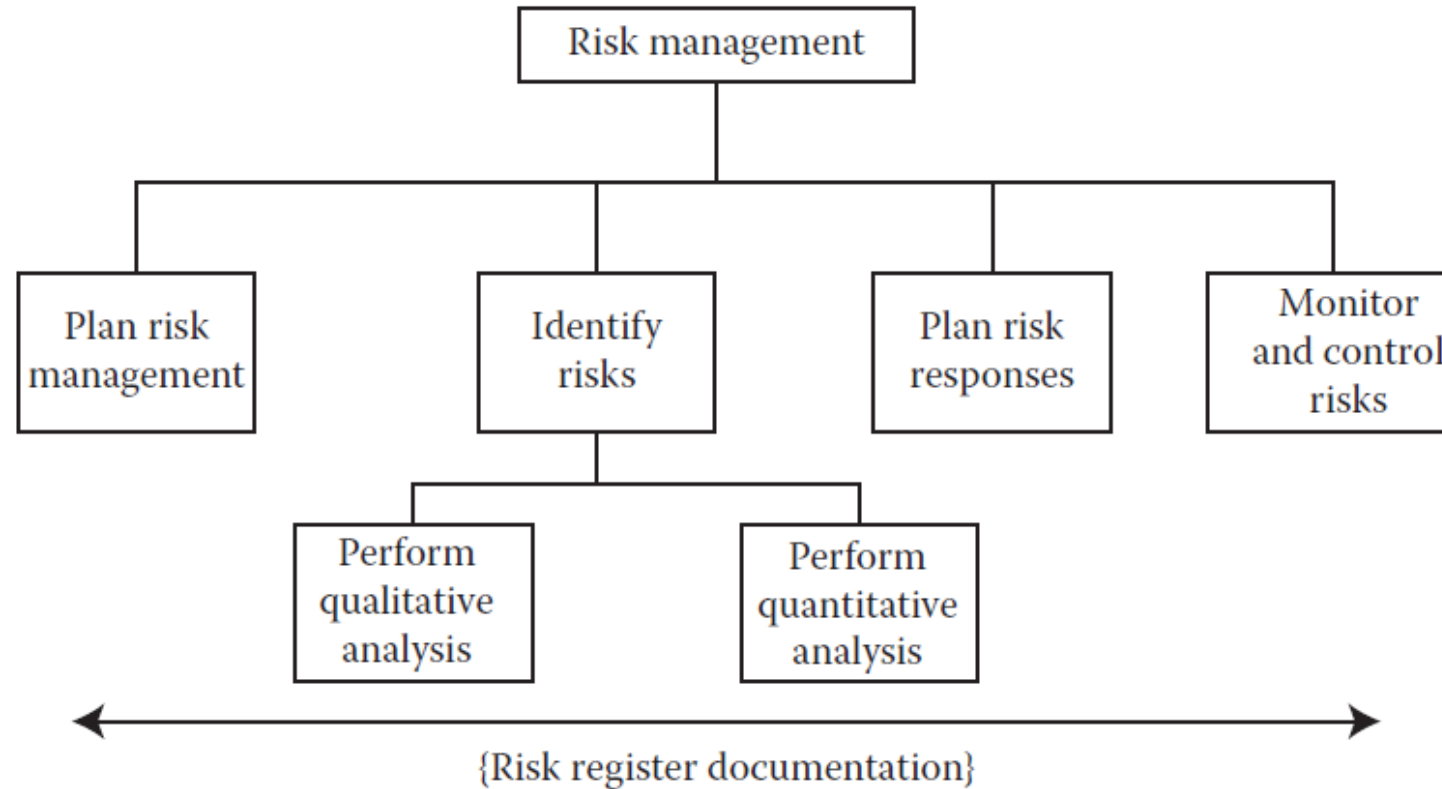


Figure 11.1 Risk management structure. (From Project Management Institute (PMI). 2008. Risk management structure. In *PMBOK® Guide*, 4th ed. Newtown Square, PA: Project Management Institute, Chapter 11.)



- ❑ 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.

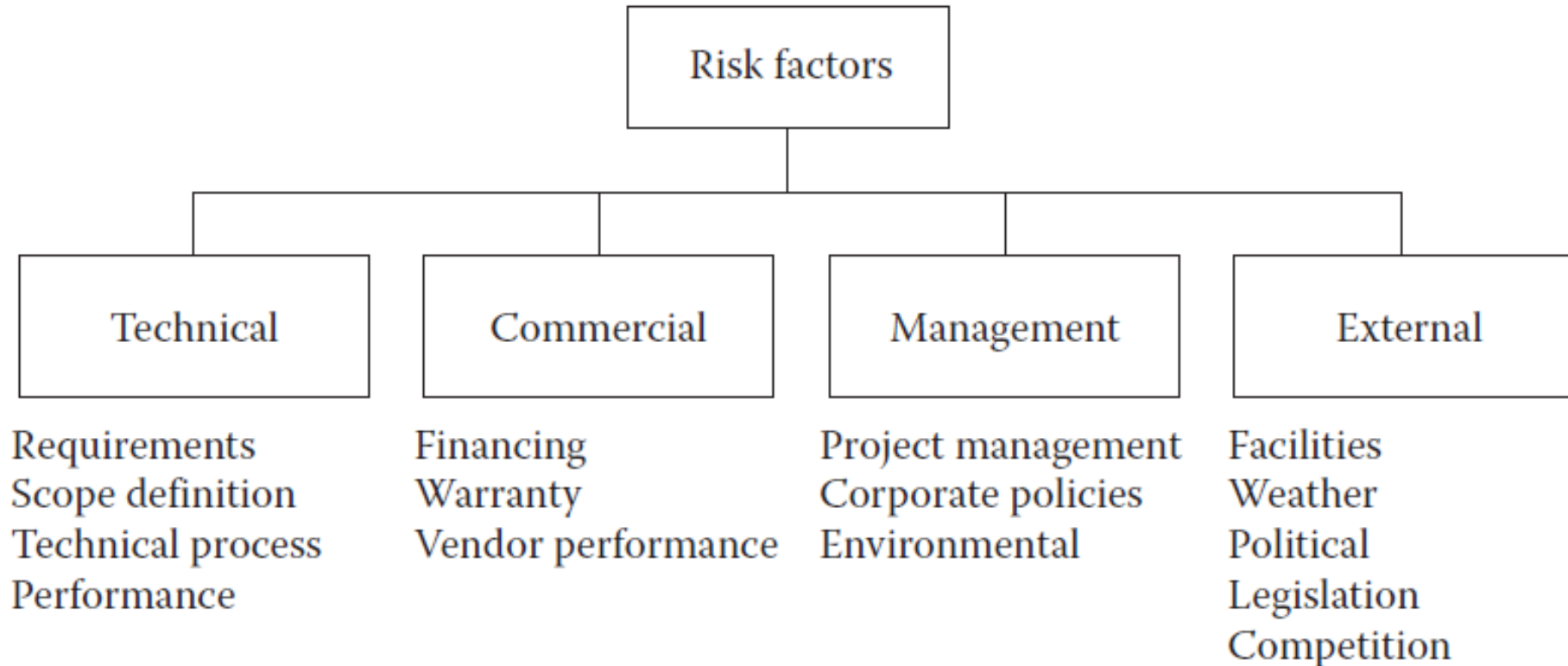


Figure 11.2 Risk breakdown structure. (From Richardson, G.L. 2010. *Project Management Theory and Practice*. New York: CRC Press, Taylor & Francis Group.)

- ❑ Identifying the root cause of risk events identified will also help in an organization's understanding of the potential for risk, identification of additional risks, and making an informed decision to accept, avoid, mitigate, or transfer these risk(s).
- ❑ Let us take an example of a system that resides in Florida on a coast where hurricanes can hit, which therefore is classified as a known/unknown.
- ❑ Therefore, there is a defined probability that any particular section of Florida will experience a hurricane of some undefined magnitude.
- ❑ So, looking at historical records would provide insight into a method to help mitigate the negative consequences of this class of risk.
- ❑ Historical records from an organization or public records can help with this type of event quantification.
- ❑ This would initially alert the project to make sure that there is a safe backup system to handle potential operational downtime.
- ❑ At this point, since historical records from the organization only show the issue of temporary downtime, do we end the identification of risks stage or keep brainstorming other potential risk scenarios?
- ❑ The latter option is correct as the realities of life indicate that there are always new situations to consider.
- ❑ Realize that history may not be a complete educator for future situations.
- ❑ Therefore, the project team should be diligent in reviewing both historic and less obvious future situations in their identification process.
- ❑ The tough part of this is quantifying the likelihood and impact of any identified events.

- ❑ 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.
- ❑ The possible causes are identified by SMEs from each technical area who come together to brainstorm the problem. Finally, fishbone diagrams are useful tools to help organize ideas and show interrelationships between ideas.
- ❑ Table 11.1 focuses on the preliminary questions that should be discussed before accepting a project.
- ❑ Review the items indicated and modify the list if necessary.
- ❑ When more detail can be obtained about the project at the visioning stage, other documentation will be better such as defining the project scope, preparing a viable plan, and anticipating related risk events.
- ❑ The table will result in knowing where the project is weak in terms of where more information needs to be identified to enhance the probability of success.

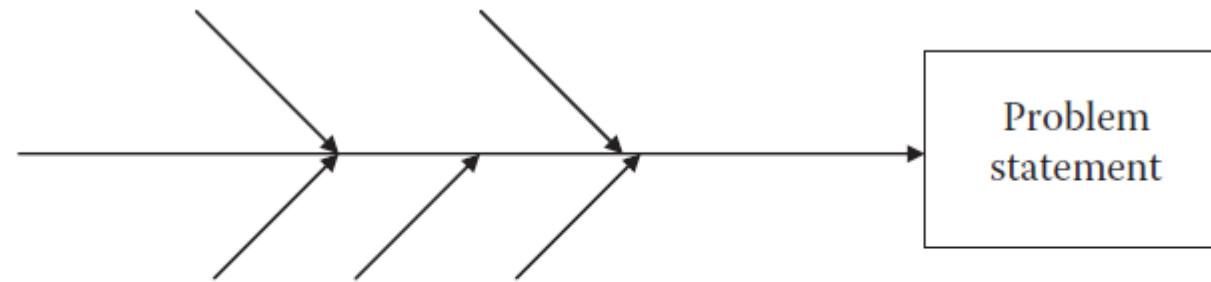


Figure 11.3 Bones (major cause categories). Note that there is no perfect set or number of “bone” categories—they can be modified to fit the problem.

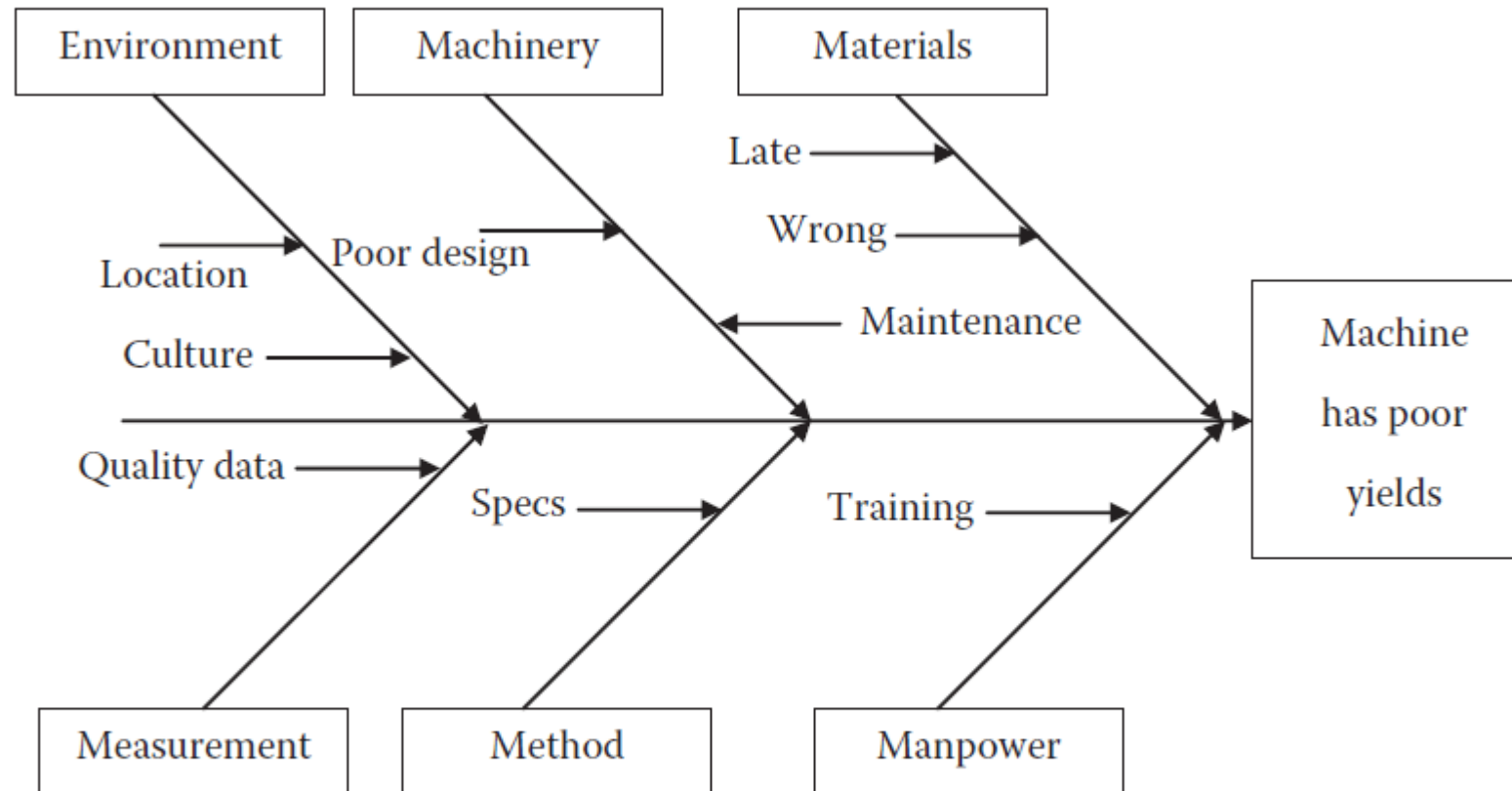


Figure 11.4 Fishbone diagram to examine poor process output.

Section four

Ch. 11

Identification tools

Table 11.1 Probability of Success

	A	B	C	D	E
	Weights	Example	Example	Project	Project
Questions to ask about a specific project	Success weight High = 5, Medium = 3, Low = 1	Answer Yes = 1, No = 0	Success value $A \times B$	Answer Yes = 1, No = 0	Success value $A \times D$
A project is part of the organization's business strategy	5	1	5	1	5
A project sponsor exists	3	1	3	1	3
The project schedule is reasonable	5	0	0	1	5
Project processes are known by the team members	5	1	5	1	5
Risks have been identified	3	0	0	1	3
The project is well documented	5	1	5	0	0
The project has a detailed communications plan	5	1	5	0	0
Status meetings are held for the project team	5	1	5	0	0
Is the project already started?	3	1	3	1	3
All project documentation is accessible to the team	1	0	0	1	1
Is the project to be completed offsite or is additional space needed?	3	0	0	0	0
Total = Sum of the rows	43	7	31	7	25
Probability of success^a =	$C \text{ Total} \div A \text{ Total} = 72.1\%$			$E \text{ Total} \div A \text{ Total} = 58.1\%$	

Instructions: Fill in the questions that apply to your project. Adjust the weights to what is appropriate for your organization and project as the below only displays weights as an example. Fill in the numbers for the specific project under columns "D" and "E" and perform the calculations.

^a Every organization will have to identify the desired probability of success as some organizations will be more comfortable than others with lower probability of success percentages. If the percentage falls less than the desired for a particular organization, then an action plan is needed to change the key "No" answers to a "Yes."

- ❑ Another tool is the risk assessment checklist displayed in Table 11.2, which should also be generated at the beginning of a project and updated on at least a monthly basis for comparison purposes to monitor the risk management process. This tool requires the use of the following guidelines in generating and updating the checklist:
 - Update the items as needed. If the project does not use the item, delete it and add new items as required.
 - Identify the correct weight appropriately and use the range for lows (L) as 1–3, for mediums (M) as 4–7, and for highs (H) as 8–10.
 - For each item, enter the assessment grade in one of the three columns (low, medium, or high). Enter the same number in the R (risk factor) column.
 - When completed, analyze what is happening over time and take corrective action (i.e., rank the top 10 risks and put a risk containment plan together with the project team).

Section four

Ch. 11

Identification tools

Table 11.2 Risk Assessment Checklist

Number	Areas	H	M	L	R
1	Requirements definition				
2	Requirements change				
3	System performance requirements				
4	Design level of detail				
5	Project planning				
6	Application complexity				
7	Experience with system application				
8	Hardware products				
9	Software products				
10	Telecommunications/network				
11	Interfaces with other systems				
12	Schedule				
13	Workload estimate				
14	Project management				
15	Project resources				
16	External dependencies				
17	Customer expectation				
18	Customer involvement				
19	Subcontractor involvement				
20	Statement of work				
21	Acceptance				
22	Terms and conditions				
23	Productivity rates				
24	Baselines				
		Totals			
		Last month's totals			
		Original totals			



- ❑ The primary documentation output of the risk identification phase is the risk register.
- ❑ This document is a formal repository source for capturing the project knowledge regarding risks and their status.
- ❑ Table 11.3 displays a sample risk register as a tool for documenting potential risk events and related information.
- ❑ The name of the risk is listed under the risk column along with a description.
- ❑ A risk may fall under a particular category (Categ.) such as technology, facilities, and so on, and can have the category defined.
- ❑ Other information pertaining to the specific risk can be identified well such as the root cause of the risk or any triggers that can signal activation of the event. The term trigger is used and can be defined as an early warning sign that a risk has occurred or is about to occur.
- ❑ An identified item in the risk register is a risk event and its corresponding trigger.
- ❑ A planned response to the risk can also be tracked in the risk register along with the risk owner, the responsible person for handling the risk, and the probability and impact assessment.
- ❑ Last, the status column is used to signal the status of the event through the life cycle.

Table 11.3 Sample Risk Register Format

Number	Rank	Risk	Descr.	Categ.	Root cause	Triggers	Potential response	Risk owner	Probability	Impact	Status
R6	1										
R43	2										
R21	3										

Source: Adapted from Richardson, G.L. 2010. *Project Management Theory and Practice*. New York: CRC Press, Taylor & Francis Group.

- ❑ Risk planning begins with a series of steps designed to help approach, plan, and execute the risk management activities, which constitutes the first major step in risk management.
- ❑ The second process step involves the identification of risks by looking at a company's historical records to identify all previous risks encountered on past related projects, which was the second objective of this chapter.

❑ Review questions

- 1) Name and briefly describe the six steps in the project risk management process.
- 2) Describe how risks for a project can be identified and categorized.

❏ EXERCISES

- Using the car case study, produce the following:
 - 1) Risk planning: Develop a risk management plan that the formula TwoProject Team can use throughout their project. Examples of risk management plans can be found in Appendix C.
 - 2) Risk assessment—Risk identification: Log (risk register) identifying five risks affiliated with the car project. An example of risk logs can be found in Appendix C.

- ❑ Beasley, M.S., B.C. Branson and B.V. Hancock. 2010. Are you identifying your most significant risks? *Strategic Finance* November:29–35.
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- ❑ Vargas-Hernandez, J.G. 2011. Modeling risk and innovation management. *Advances in Competitiveness Research* 19(3–4):45–57.

The End..

Thank You



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