Chapter Overview

1) Overview – This chapter discusses the process for selecting which of the many projects an organization could pursue, it should pursue. It introduces techniques for evaluating and making the selection. The chapter also introduces concepts of risk and applies them to the analysis typically performed during the project selection process.

2) Project Management Maturity – Many organizations use maturity models to determine their level of mastery of project management processes and skills.

3) Project Selection and Criteria of Choice – Organizations should use consistent and rational tools to select among the myriad of projects from which they have to choose. There are many models for the selection process to choose from as well. Good criteria for choosing the selection model are:
   a) Realism – The model should take the organization’s situation into account including limits on people, facilities and capital.
   b) Capability – The model should be capable of dealing with the complexities of the organization’s environment.
   c) Flexibility – The model should work under a range of conditions.
   d) Ease of use – The model should be relatively easy to use and understand.
   e) Cost – The model should not be costly to use.
   f) Easy computerization – The model should be easy to capture on a computer.

4) The Nature of Project Selection Models – Models are useful tools to aid decision making. They are not, however, the decision maker, nor do they ever completely represent the reality confronting modern organizations. Any criteria developed for project selection should be weighted to represent the degree to which that factor contributes to the organization’s goals.

5) Types of Project Selection Models
   a) Nonnumeric Models – These models do not attempt to reduce the evaluation process to numbers, but instead look at other factors that make for “obvious” choices for that organization. This could include senior management mandates and regulatory necessities. Examples include The Sacred Cow, The Operating Necessity, The Competitive Necessity, The Product Line Extension, and Comparative Benefit Model.
   b) Numeric Models: Profit/Profitability – These models analyze the potential projects in terms of the single criteria of monetary return. The analysis may or may not include the time value of money. These include traditional measures such as Payback Period, Discounted Cash Flow (also referred to as Net Present Value), IRR, and Profitability Index.
c) Numeric Models: Scoring – These models analyze the potential projects based on multiple criteria the organization selects. The models use numeric scales to rate the projects against the desired criteria. Then the ratings can be analyzed using various techniques to determine the best choices. Examples include Uweighted 0-1 Factor Model, Unweighted Factor Scoring Model, Weighted Factor Scoring Model, and Window of Opportunity Analysis.

d) Choosing a Project Selection Model – The authors strongly favor using weighted scoring models.

6) Analysis Under Uncertainty – The Management of Risk – The text distinguishes between risk and uncertainty. Risk applies to events that have a known (or estimated) probability of occurrence. Uncertainty applies to events where there is insufficient data to estimate the probability of occurrence. For effective project management, decisions should be treated as risks rather than uncertainties. That is probabilities of occurrence, if not otherwise known, should be estimated for relevant issues and events.

a) Risk Analysis and Simulation – The techniques of risk analysis and simulation are applicable to several areas of project management including cost, schedule and resource. Software products make Monte Carlo simulation relatively easy to perform in conjunction with spreadsheets developed for project selection and analysis.

b) General Simulation Analysis – Simulation can be used to estimate the net present value resulting from prospective R&D projects. Overhead costs are generally not relevant to the decision and can be eliminated from the analysis. Simulation software has no opinion concerning the quality of the data or assumptions used to feed it so results must always be used with caution.

c) PsychoCeramic Sciences Revisited – The text has a lengthy and detailed example of the use of Crystal Ball® for the estimate of net present value in an environment of risk.

7) Comments on the Information Base for Selection – To use these selection techniques successfully a database of relevant input data must be created and maintained.

a) Accounting Data – Managers need to understand the assumptions behind accounting data to insure its relevance to the project selection process. In particular, standard cost models and the methods used to allocate overhead should be well understood.

b) Measurements – Estimation of expected performance against selection criteria involves different types of measurement. The actual usefulness of the different types is often counterintuitive to many people’s beliefs. In general, measurements must be numeric, reliable and valid.
i) Subjective vs. Objective – Subjective measurements are those without an external reference. An example would be the judging of gymnastics at the Olympics. Subjective measures are not inherently worse than objective ones.

ii) Quantitative vs. Qualitative – Quantities can be added together but qualities cannot. The amount of water in a bucket is quantitative; its density is qualitative. Qualitative measures are not inherently worse than quantitative.

iii) Reliable vs. Unreliable – Measurements are reliable if they are repeatable.

iv) Valid vs. Invalid – Valid measures accurately depict meaning of the measurement.

c) Uncertain Information – Techniques used to determine numeric weights and criteria scores for project selection can also be used for inputs to risk analysis models.

8) Project Portfolio Process (PPP) – The Project Portfolio Process is used to consistently and transparently select projects that match the organization’s goals. The process has eight steps:

a) Step 1: Establish a Project Council – The council is established to articulate strategic direction and allocate funds to projects it selects.

b) Step 2: Identify Project Categories and Criteria – Categories are established by the Council to insure that a variety of projects are pursued. Criteria for measuring prospective projects are established to form the framework for the selection process. Common categories used for classifying projects are:

i) Derivative projects – Projects that are only incrementally different from previous efforts.

ii) Platform projects – Projects that impact organization outputs or the processes that create them.

iii) Breakthrough projects – Projects that involve implementing new, sometimes “disruptive” technology.

iv) R&D projects – Projects used to acquire new knowledge or create new technology.

c) Step 3: Collect Project Data – Collect relevant data and assign scores to prospective projects.

d) Step 4: Assess Resource Availability – Analyze the availability of resources to execute the prospective projects.

e) Step 5: Reduce the Project and Criteria Set – Use multiple screens to narrow down the number of projects under consideration.
f) Step 6: Prioritize the Projects within Categories – Using the analysis developed, prioritize the projects within the previously identified categories. This again is to ensure that a variety of projects are pursued, not just the top few from a single, prioritized list.

g) Step 7: Select the Projects to be Funded and Held in Reserve – The best projects within each category are selected for implementation, holding some projects and some resources in reserve.

h) Step 8: Implement the Process – The results of the process must be recorded, and then widely communicated within the organization.

9) Project Proposals – This section introduces the documentation necessary to present a prospective project to a selection process. The text equates the internal project selection process with that of a prospective customer using a Request for Proposal (RFP) or Request for Quote (RFQ) process. This is somewhat misleading, as organizations should have made a careful internal analysis (sometimes known as a bid/no bid decision) before submitting a proposal to a customer. In other words, the project is proposed twice: first internally to the organization to win support, and then, if it’s a “bid,” externally to the customer to win the job. The proposal documentation required by the customer is much different than that needed for the internal analysis. In fact, part of the bid/no bid analysis is evaluating the cost to prepare the RFP or RFQ knowing that the organization could lose. For large military or space projects the preparation costs can run into the millions of dollars. Regardless of whether it’s for internal or external consumptions, or for a technical or non-technical project, the proposal should be prepared with care.

a) The Technical Approach – This section summarizes what the problem is and how it will be approached by the project.

b) The Implementation Plan – This section summarizes the schedule, cost and resources estimated to complete the project.

c) The Plan for Logistic Support and Administration – This section summarizes the support that the project will need and how it will be administered.

Teaching Tips

Most students will benefit from in-class examples to make the material come alive. One area that will benefit from this approach is the use of Crystal Ball®. In spite of the hype of software makers, all students will not have the ability to sit down and use Crystal Ball® without some assistance. Demonstrating the example in the text with a computer and a projector will help students understand the process and generate a lot of good questions.

The other area that requires demonstration is the project selection process. Students need to see the criteria in action, and see how a real scoring model would work. A good way to accomplish these goals is to use the Pan-Europa Case Study
as an in-class exercise. There are a couple of ways to approach this. The simpler process would be to have the students read the case in advance. Then questions 1, 2, and 3 would be discussed with the class as a whole. Questions 4 and 5 would be addressed through pair-wise brainstorming (discussed in the Teaching Tips for Chapter 1). The student teams would take notes on their answers to these questions to then be discussed with the class as a whole. The result of this discussion would be used to come up with a class consensus view on the screens and criteria to be used for the project selection process. Then the students could go back to working in pairs (preferably the same ones as before) to apply the criteria and make their selections. Then another whole class discussion would be used to share each group’s results and see if a class consensus emerges. This whole process, depending on the vigor of the class would take 2-3 hours. It is important for the instructor to circulate during the small group discussions to keep the students on track and answer their questions. This is particularly important as there are multiple questions embedded in Questions 4 and 5, and students will have a tendency to get hung up on one to the exclusion of the others. The instructor may wish to suggest a time budget for each question to assist the group’s progress.

A more elaborate approach to this Case would involve students role-playing the members of the Pan-Europa board. Then the “board members” would have the opportunity to advocate their own projects and try to influence the selection process in their favor. Depending on the size of the class, this technique may not keep enough of the students involved. One way to address this would be to assign a team of students to each board member to assist them in establishing their position. Then the board member becomes essentially a spokesman for the group. Again, it’s important to alternate between whole class and small group activities to insure the maximum participation of each student. This could be accomplished by the groups meeting to discuss their position, a “presentation” to the whole class by each board member, then another group discussion of criteria, followed by presentations to the whole class of the recommended criteria with an undoubtedly vigorous discussion to follow.

A good reference case for this chapter follows:

9-305-101 Boeing 787: The Dreamliner (Harvard). This is an excellent strategy case, and is so recent that it the 787 is reported on in the papers and business magazines almost every week.

Material Review Questions

Question 1:

Refer to Section 2.8 of the text. A proposal should be responsive to the solicitation document that the buyer prepared during the solicitation process. Usually, a technical proposal will contain:
1) a description of the technical problem and the approach the performing organization will use to solve it.

2) the plan for implementing the project once it has been accepted.

3) the plan for logistic support and administration of the project.

4) a description of the group proposing to do the work, plus its past experience in similar work.

**Question 2:**

Managers often judge selection criteria by their own narrow interests. These could include their own advancement, or sub-optimizing the products and processes of their own department. This bias clearly could be to the detriment of the overall corporate goals and well being.

Refer to Section 2.2 of the text. Instead, the project selection models should be able to evaluate how well a project’s execution will contribute to the overall business strategy of the performing organization. Some commonly used standards of judgment include:

1) Realism
2) Capability
3) Flexibility
4) Ease of use
5) Cost of use
6) Easy computerization

**Question 3:**

Refer to Section 2.4 of the text. Both models are examples of nonnumeric models. Moreover, both models will tend to sustain an existing status quo and are subject to misuse in pursuit of hidden agendas of key stakeholders.

1) **Operating Necessity Model:** The operating necessity project is perceived as one necessary to maintain the status quo for operations. If the plant is flooded by a hurricane, it’s an operating necessity to dry it out and restore production. The advantage of this model is that it involves little data and fairly obvious decisions. The disadvantage is that relying on it to solve problems may mask a long-term issue that needs to be solved in a manner other than firefighting. Perhaps, for example, the plant needs to be moved to a different location to prevent too frequent flooding.

2) **Competitive Necessity Model:** The competitive necessity project is perceived as one necessary to keep from losing the current competitive position. For example, a video rental chain that operates in physical stores might decide to add an Internet based ordering facility to stay competitive with Internet-only operations. Again the decision making process can seem simple, but the danger is similar to the operating necessity model. The “obvious” decision on what to do quickly to
maintain a competitive position may, in fact, be the wrong thing to do in the long run.

Question 4:

Refer to Section 2.4 of the text. In the United States, the term “sacred cow” has become an idiom used to denote someone or something that is exempt from criticism. A senior manager’s blind loyalty to an obsolete product or process they introduced to the company long ago is an example of a sacred cow. Another example would be a company’s loyalty to a product line, like Hershey to chocolate, even if it were a money loser.

Question 5:

Refer to Section 2.4 of the text. Q-Sort is a nonnumeric technique managers can use to evaluate comparative benefits associated with a list of potential projects. This type of selection model is useful when a goal has many potential alternatives for implementation. For example, what experiments should NASA engineers include in the next Mars Probe? What projects should be included in the company’s R&D portfolio? Which archeology projects would best illustrate the lifestyle of the cave dwellers that inhabited Colorado in the first millennium AD?

A company may use this method to evaluate several projects to choose from. The potential projects could be grouped by the level of strategic importance, then by cost, then by time to complete. By using this method, the “best” projects to start could be selected using these criteria.

Question 6:

Refer to Section 2.3 of the text. Models, like projects, have characteristics that influence when a decision-maker should use the model.

Models cannot make decisions for its user. The user should understand the advantages and disadvantages of each model in reference to the goals associated with the scenario’s reality. Each model will provide a limited viewpoint about the reality it represents. It may be beneficial to consider the model’s appropriateness from different perspectives before actually using it to evaluate selection alternatives.

Although not specifically mentioned in the text, the following can influence as well:

1) The applicability of a model is one such characteristic that reflects the range of scenarios that the model can reasonably support.

2) The model should make a scenario more understandable by reducing its complexity. However, when a model reduces a scenario’s complexity, an important distortion of the scenario may also be experienced. The distortion may happen because many important factors have been left out of the model in order to make it easier to use or more understandable to the user.

3) Models are only as good as the data they receive. Bad data will lead to a bad analysis.
Question 7:
Refer to Section 2.6 of the text. In the context of this question, a measure is any standard of comparison or judgment. It is inaccurate to equate quantitative as being equivalent to a numeric comparison. It is also inaccurate to equate qualitative as being equivalent to a nonnumeric comparison. Thus, the true distinction is that you may apply the law of addition to quantities, but not to qualities.

1) A measurer can use the mathematical operation of addition to combine quantities. For example, the volume of water in one container can be added to the volume of water in a larger container.

2) A measurer cannot use the mathematical operation of addition to combine qualities. For example, the density of water will not be changed when the smaller container is poured into the larger container.

Question 8:
Refer to Section 2.4 of the text. The models in this question fall into the general category of profitability models.

1) Payback Period: This method assumes that the faster an investment can be recovered, the lower its risk to the performing organization. Therefore, its most glaring weakness is that it does not evaluate cash flows beyond the time required to recover the initial investment.

2) Discounted Cash Flow Method: This method assumes that an organization will use a required rate of return (hurdle rate) to justify a project’s selection. Also known as net present value (NPV), it considers both the amount and timing of cash flows that a project will generate.

3) Internal Rate of Return: This method considers the cash inflows and outflows in conjunction with a discount rate.

4) Profitability Index: Also called benefit-cost ratio. It is the NPV of all future expected cash flows divided by the initial investment.

Question 9:
Refer to Section 2.4 of the text. A profitability model will assess the financial gain on the use of capital during a period of operations. Profitability models as a general class of models have advantages and disadvantages that include:

1) Advantages:
   a) They are simple to use and to understand.
   b) Relevant data are available from the accounting system.
   c) Business decision-makers are familiar with the output formats.
d) The decision-maker, with few exceptions, will assume that the output of the model is absolute regarding a go or no go selection option. In this context, absolute indicates a lack of ambiguity regarding the appropriate decision.

e) Some profitability models can account for the amount, timing and risk of a project’s cash flows.

2) **Disadvantages:**

a) Except for risk factors, the models ignore other nonmonetary factors.

b) Some of the profitability models do not evaluate the timing of cash flows.

c) Present-value models have a short-term bias that tends to ignore long-run opportunities.

d) Payback models ignore cash flows beyond the time needed to recover the original investment.

e) Algebraically, the IRR can generate multiple solutions. However, modelers can address this problem by using graphical approximation techniques capable of producing a satisfactory level of accuracy for most planning purposes.

f) All models in this class are sensitive to data input errors, especially during the early periods of the project’s planning horizon.

g) Because all discounting models are nonlinear, decision-makers are seldom able to recognize the impact of errors in and changes to the values of parameters used in the models.

h) The definition of cash flow for a project is subject to some degree of ambiguity. Modelers will not always be able to apply the concept consistently when evaluating the financial aspects of a project.

**Question 10:**

Refer to Section 2.5 of the text. In this context, sensitivity is the change in an output variable produced when the modeler changes the value for an input parameter. Sensitivity analysis allows the analyst to determine how sensitive the decision is to changes in the input data. This is particularly useful when evaluating how uncertainty in the input data affects the model outputs.

**Question 11:**

Refer to Section 2.5 of the text. The text distinguishes between the two terms as follows:

- **Risk** is the condition when the probability of occurrence is known (or can be readily estimated) for each possible outcome relevant to the project.

- **Uncertainty**, in contrast, occurs when the probability of occurrence for outcomes is unknown.

The window-of-opportunity approach defines the goal criteria for performance, time, and cost and then evaluates options to see if the project can produce a satisfactory result.
Question 12:
Refer to Section 2.7 of the text. A portfolio contains projects undertaken to support business goals. The eight-step process of selection is:

1) Establish a project council.
2) Identify project categories and criteria.
3) Collect project data.
4) Assess resource availability.
5) Reduce the project and criteria set.
6) Prioritize the projects within categories.
7) Select the projects to be funded and held in reserve.
8) Implement the process.

Question 13:
Refer to the glossary of the text. In the context of the text, maturity is “the sophistication and experience of an organization in managing multiple projects”.

Question 14:
Refer to Section 2.5 of the text. The classic elements of risk analysis as defined in the PMBOK are (although they aren’t explicitly stated in the text):

- Identifying the potential risk events
- Performing analysis to determine their probability and impact
- Determining appropriate responses to those events deemed worthy of response
- Monitoring the response plans to insure performance

As described in the text, risk analysis is based on probability distributions. These utilize key parameters and variables that are associated with the decisions. In the application presented in this chapter, the manager has selected a single risk event, the project not generating planned cash flows in the future. Monte Carlo simulation is used to determine the probability and impact of this occurring. The response is to determine whether the risk is acceptable to the organization or not.

The manager would interpret the results by comparing them to other prospective projects. All else being equal, the project with the highest likely net present value is the better project to select.

Class Discussion Questions

Question 15:
Refer to Section 2.7 of the text.
1) **Low project management maturity:**
   a) Make managers aware of the number of projects both proposed and underway.
   b) Identify proposed projects that are not really projects so they can be handled using other processes.
   c) Have managers achieve consensus on what criteria should be used to select projects.
   d) Limit the number of projects so the important projects can get the resources and attention they need for success.
   e) Eliminate projects that by-passed a formal selection process and that may not provide benefits corresponding to their risks and/or costs.
   f) Avoid overloading the organization’s available capacity.
   g) Balance short, medium, and long-term returns.

2) **High project management maturity:**
   a) Prioritize the list of available projects.
   b) Limit the number of projects so the important projects can get the resources and attention they need for success.
   c) Identify projects that best fit the organization’s goals and strategy.
   d) Identify projects that support multiple organizational goals and cross-reinforce other important projects.
   e) Eliminate projects that incur excessive risk and/or cost.
   f) Balance short, medium, and long term returns.
   g) Balance the resources with the needs of the organization.

**Question 16:**
Refer to Section 2.4 of the text. It attempts to estimate the opportunity cost of performing the project now versus deferring its execution to some time in the future. The cost of the project is reduced by deferring it and there may also be a reduction in uncertainty.

**Question 17:**
Refer to Section 2.4 of the text. The profitability models evaluate the financial impact of using assets to generate an operating cash flow. As such, the profitability model is primarily a single criterion numeric model. The scoring models evaluate multiple criteria by converting their values to a normalized scale that facilitates making a holistic decision capable of using both numeric and nonnumeric variables. Any scoring model can include profitability as a criterion, thus getting the best of both worlds.

**Question 18:**
Risk analysis can be used for any situation where a decision must be made with data that is not certain. Anytime there is a range of possible outcomes, and a probability can be
estimated for each one, risk analysis is a valuable tool. One classic tool used in this situation is a decision tree that organizes the calculation of the expected value of each possible outcome.

**Question 19:**

1) **Capital Investment with Discounted Cash flow:** For short-term capital projects, the impact of discounting rates may be insignificant to the overall project. Discounting is a nonlinear algorithm that increases its impact as the duration of a project increases. On long-term capital projects, the discounting models can be quite elaborate and may even drive work plans by delaying one or more expenditures to increase return on investment.

2) **Simulation Models:** Simulation models are easy to misuse, but when used properly can be very helpful. For most applications suitable for such an analysis, the project manager should seek competent advice from someone who has demonstrated expertise in creating and manipulating these models. Simulation models, as will be discussed later, can also be used to estimate the probability of the project completing within a given time frame at a given cost. Some organizations will require that such analysis be included in proposals they receive from prospective bidders.

**Question 20:**

There are several reasons why managers may underutilize these techniques:

1) In many organizations, the project managers are self-taught, so they may be unaware of these techniques.

2) Even if some of the managers are aware, their senior management may not be familiar or comfortable with selection models.

3) The managers may not think the models are worth the time and trouble. They believe that they get good enough results with the techniques (or lack thereof) they currently use.

4) Managers may believe that using analytic techniques will reduce their personal ability to influence the selection process. They may not want to give up their perceived power.

**Question 21:**

Uncertainty models can be classified as one of a variety of models depending on how they are used. Uncertainty in this context means that the analyst has not estimated the probability of occurrence of something related to the project. This could be cost, cash flow, schedule, customer satisfaction, or environmental catastrophe. The list is endless. Since any of these factors could be part of a selection model, uncertainty and how it is handled could affect them all.

**Question 22:**

Refer to Section 2.6 of the text.

1) **Validity:** A piece of information actually means what we believe it to mean.
2) **Reliability:** A demonstration of consistent performance that is stable and predictable.

In the not too distant past, the Mars Climate Orbiter was lost because invalid data was used to estimate its distance from the planet’s surface during the orbital insertion process. The spacecraft’s navigation team believed that the software they were using was producing results in the metric system. Even though the software specification did call for metric, the software actually used imperial units. The software performed its calculations predictably, but the results were invalid to the users.

**Question 23:**

Refer to Section 2.6 of the text. In the context of this question, we are referring to the type of measurement standard. A reference to an “external” standard is objective while a reference to an “internal” standard is subjective.

In the recent judging for the building to replace the World Trade Center, an objective measure for selecting the winning design would be the volume of office space created, measured in square meters. A subjective measure would be the votes of a panel of experts as to the aesthetics of the design.

**Question 24:**

Refer to answer 22 of this book and to Section 2.6 of the text. The short answer is yes. Total reliability means getting the same answer every time. The answer may not be useful, which makes it invalid.

**Question 25:**

Project management maturity measures the ability of the organization to manage projects; it doesn’t distinguish between a multiple and a single project environment.

**Question 26:**

Refer to Section 2.4 of the text. When an organization can describe a project in terms of a compelling need for action, and when the called-for action will produce benefits in rough proportion to the costs of executing the project, nonnumeric selection models will often be adequate to approve the project. The compelling reason may be responding to an emergency situation like a flood. There isn’t a lot of need to analyze the necessity for a response so non-numeric criteria are fine. In other cases, numeric methods may be more suited as in a case where cost estimates can be obtained.

**Question 27:**

A number of ethical issues can come up during the RFP process, such as:

- Gaining confidential knowledge of a competitor’s data or the customer’s criteria.
- Deliberately bidding below cost to win the job believing that the real money will be made in charging the customer for changes.
- Bribes or other favors to the people who choose the winning proposal.
- Collaborating with the competition (or the customer) to set the bids to favor a pre-selected winner.
Question 28:

The hurdle rate used to compute NPV in Table 2-4 of the text is 15%. A positive NPV means that cash inflows exceed cash outflows after they have been adjusted for the time value of money. By definition, NPV is the difference between discounted cash inflows and discounted cash outflows. In this case, the cash inflows generate a surplus cash flow ($10,968) above that required to cover the 15% hurdle rate with 3% inflation.

Question 29:

When using the Crystal Ball® forecast display, the left triangular slider can be moved to the right until the corresponding box reads $20,000. The cumulative probability, labeled “Certainty” will then be showing the probability of exceeding $20,000.

Question 30:

The original estimate was derived from the most likely values. The distribution for each year, however, is skewed toward the low side. In other words, the Minimum is farther away from the Most Likely than the Maximum for each year. When Crystal Ball® applies the triangular distribution during the simulation, the output is then skewed toward the low side. A pessimistic view of cash flow is probably more realistic because of the complexity of the prospective project.

Question 31:

This visual display combines a number of important factors in an easy to understand format. They include the number and type of projects, their relative size, timing, history and where they fall on the scales of innovation for both products and processes. It is also easy to see gaps and excesses in each category as well as the mix among the categories and the degree of product and process change. This graphic allows comparison of the types of projects being conducted, the number of projects in each type with the relative size of the resources and investments. Different project portfolios’ proposals can be readily compared for discussion purposes or with past years’ selections.

Question 32:

Unlike the aggregate plan, the Plan of Record records the results of the selection process. It shows the mix across categories with the priority and resource needs (headcount) of each project. The Plan of Record also shows “out-plan” projects, those that show promise but haven’t yet made it through the decision process. This gives visibility to a pool of possible projects if one of the chosen ones terminates early for some reason. It also displays the relative priority and the rough schedule of performance for the selected projects.

Questions for Project Management in Practice

Implementing Strategy through Projects at Blue Cross/Blue Shield
Question 33:
The approach is top down in that the goals are still set by the senior management team. Using this approach, however, the senior management team is able to express their strategic desires through the specific projects they select and monitor. This ties together the day-to-day activities with the strategic point of view.

Question 34:
The role of projects and their management is to execute the activities that will bring life to the corporate strategic vision. Using projects as opposed to functional organizations leads to a number of benefits including:
Lower costs
Better management of projects
Improved project success

Question 35:
This system will give on-going visibility of the status of projects to important members of the senior management team. This keeps senior management grounded in the problems associated with executing real projects. It benefits the project teams by giving them the benefit of senior management’s experience as the projects encounter issues during execution. It insures senior management support for the project results while exposing the talents of the project teams to them.

Project Selection for Spent Nuclear Fuel Cleanup

Question 36:
It is likely that some stakeholders simply did not believe the data because they mistrusted its source. Others probably had very real fears that the proposed solutions would only worsen the situation.

Question 37:
The presented data suggest that authorities were less than honest in past dealings with some of the stakeholders.

Question 38:
1) Option 1 simply puts a band-aid on the problem by leaving the containers at their present location, albeit in a second shell. Most stakeholders would probably view this as unacceptable.

2) Option 2 is an example of one possible definition for insanity - doing the same thing over again and expecting a different result. Most stakeholders probably would recognize the potential for future leaks of a similar nature to the present situation.

3) Option 4 transfers the problem to another location and certainly raises some interesting ethical dilemmas for the stakeholders.
Question 39:
Option 3 repackages the fuel until the government can reprocess it during a 40-year period. The repackaging should prevent leaks until well after reprocessing has been completed.

Question 40:
No. Special products divert management and workers’ attention and either require a different process to produce the product, or hinder the improvement of standard processes to produce the standard products.

On the other hand, it might be a good idea to choose some of the projects with a higher potential payoff in order to diversify the project portfolio.

Question 41:
Part of the problem in this dilemma is defining what the investment is. Too often return on investment (ROI) is narrowly interpreted to mean physical facilities, ignoring the firm’s investment in people, maintenance, research, development, skills, training, etc. Any manager can look good on short term ROI measures by quickly eliminating all these long term investments, but the firm will eventually wither and go bankrupt.

Question 42:
In either situation, the critical issue is the break in a levee, whether due to a broad wave hitting the levee wall or an earthquake splitting the wall. The chances, location, and seriousness of each would vary with the natural disaster and surrounding topography of course.

Question 43:
Clearly, the probability of each type of disaster such as the hurricane strength and the earthquake Richter value would come into play, as well as the frequency of each disaster per year. Then, the probability of various amounts of water leakage and the location of such relative to the local situation would be analyzed.
Problems

Problem 1:
1) *Project A*: Payback Period = $250,000/$75,000 = 3.3 years.
2) *Project B*: Payback Period = $150,000/$52,000 = 2.9 years
3) Project B is better because it has a shorter payback period.

Problem 2:
Question 2 should be removed since this information is not provided in the 7th edition of the book.

Problem 3:

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Problem 4:

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<th>i = 24%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Cashflow</td>
</tr>
<tr>
<td>PVIF</td>
</tr>
<tr>
<td>PV $</td>
</tr>
<tr>
<td>NPV</td>
</tr>
</tbody>
</table>

The addition of 4% inflation makes the investment unfavorable at a hurdle rate of 20%.

Problem 5:

1) *Problem 3 PI*:

| Discounted Cash Outflows | $75,000 |
| Discounted Cash Inflows  | $75,502 |
| Profitability Index      | 1.007   |

2) *Problem 4 PI*:

| Discounted Cash Outflows | $75,000 |
| Discounted Cash Inflows  | $69,271 |
| Profitability Index      | 0.924   |
Problem 6:

<table>
<thead>
<tr>
<th>Year</th>
<th>Pessimistic</th>
<th>Most Likely</th>
<th>Optimistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$(65,000)</td>
<td>$(65,000)</td>
<td>$(65,000)</td>
</tr>
<tr>
<td>1</td>
<td>$14,000</td>
<td>$20,000</td>
<td>$22,000</td>
</tr>
<tr>
<td>2</td>
<td>$19,000</td>
<td>$25,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>3</td>
<td>$27,000</td>
<td>$30,000</td>
<td>$36,000</td>
</tr>
<tr>
<td>4</td>
<td>$32,000</td>
<td>$35,000</td>
<td>$39,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Used</th>
<th>PVIF</th>
<th>PV$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$(65,000)</td>
<td>1</td>
<td>$(65,000)</td>
</tr>
<tr>
<td>$20,000</td>
<td>1.200</td>
<td>$16,667</td>
</tr>
<tr>
<td>$25,000</td>
<td>1.44</td>
<td>$17,361</td>
</tr>
<tr>
<td>$30,000</td>
<td>1.728</td>
<td>$17,361</td>
</tr>
<tr>
<td>$35,000</td>
<td>2.0736</td>
<td>$16,879</td>
</tr>
</tbody>
</table>

Rate: 20%

NPV: $3,268

The column labeled “Used” indicates the cash flow value used to calculate the net present value.

The profitability index is the sum of the discounted cash flows divided by the initial investment. For this problem it is the sum of the PV’s for years 1-4 divided by $65,000 or:

$$\frac{68,268}{65,000} = 1.05$$

Since the value is greater than one, the project should be accepted (assuming everything else is equal).

Problem 7:

<table>
<thead>
<tr>
<th>Year</th>
<th>Pessimistic</th>
<th>Most Likely</th>
<th>Optimistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$(65,000)</td>
<td>$(65,000)</td>
<td>$(65,000)</td>
</tr>
<tr>
<td>1</td>
<td>$14,000</td>
<td>$20,000</td>
<td>$22,000</td>
</tr>
<tr>
<td>2</td>
<td>$19,000</td>
<td>$25,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>3</td>
<td>$27,000</td>
<td>$30,000</td>
<td>$36,000</td>
</tr>
<tr>
<td>4</td>
<td>$32,000</td>
<td>$35,000</td>
<td>$39,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Used</th>
<th>PVIF</th>
<th>PV$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$(65,000)</td>
<td>1</td>
<td>$(65,000)</td>
</tr>
<tr>
<td>$20,000</td>
<td>1.200</td>
<td>$16,667</td>
</tr>
<tr>
<td>$25,000</td>
<td>1.44</td>
<td>$17,361</td>
</tr>
<tr>
<td>$30,000</td>
<td>1.728</td>
<td>$17,361</td>
</tr>
<tr>
<td>$35,000</td>
<td>2.0736</td>
<td>$16,879</td>
</tr>
</tbody>
</table>

Rate: 20%

NPV: $3,268

Now the green (or shaded) cells in the column labeled “Used” (with the exception of the initial investment of $65,000) are calculated by Crystal Ball® using a triangular distribution with the end points selected based on the pessimistic and optimistic values given. The setup for year one looks like this:
The net present value is then calculated for each of 1000 trials and results are displayed by designating the NPV cell as a forecast. Typical results look like this:

By adjusting the triangular sliders it can be seen that the chance of the NPV exceeding $0 (and the hurdle rate) is about 87%. The mean value for this distribution is $2770.
Problem 8:

<table>
<thead>
<tr>
<th>Year</th>
<th>Pessimistic</th>
<th>Most Likely</th>
<th>Optimistic</th>
<th>Inflation</th>
<th>Used</th>
<th>PVIF</th>
<th>PV$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$ (65,000)</td>
<td>$ (65,000)</td>
<td>$ (65,000)</td>
<td>-</td>
<td>$ (65,000)</td>
<td>1</td>
<td>$ (65,000)</td>
</tr>
<tr>
<td>1</td>
<td>$ 14,000</td>
<td>$ 20,000</td>
<td>$ 22,000</td>
<td>2%</td>
<td>$ 20,000</td>
<td>1.220</td>
<td>$ 16,393</td>
</tr>
<tr>
<td>2</td>
<td>$ 19,000</td>
<td>$ 25,000</td>
<td>$ 30,000</td>
<td>2%</td>
<td>$ 25,000</td>
<td>1.4884</td>
<td>$ 16,797</td>
</tr>
<tr>
<td>3</td>
<td>$ 27,000</td>
<td>$ 30,000</td>
<td>$ 36,000</td>
<td>2%</td>
<td>$ 30,000</td>
<td>1.8158</td>
<td>$ 16,521</td>
</tr>
<tr>
<td>4</td>
<td>$ 32,000</td>
<td>$ 35,000</td>
<td>$ 39,000</td>
<td>2%</td>
<td>$ 35,000</td>
<td>2.2153</td>
<td>$ 15,799</td>
</tr>
</tbody>
</table>

Rate: 20%

Now the column labeled “Inflation” has been added. Each of these cells is individually calculated by Crystal Ball® with a normal distribution using a standard deviation of 0.33% to allow different inflation values for each year. The result is added to the “PVIF” calculation used to determine the individual PV results.

Now the forecast values for NPV look like this:

The probability that the NPV exceeds $0 is about 50%. The mean value for this distribution is -$85. This analysis indicates that there is only a 50-50 chance that the project will qualify (meet the hurdle rate).
Problem 9:

In this example, Method C has the highest score, so the decision-maker would regard it as the best option. The instructor should emphasize that it is not necessary for the weights to sum to 100. It is only necessary that the model use the same scoring categories to evaluate each option.

Problem 10:

a) Implementation risks = 10 and cultural differences = 25

Due to the changes in weights for implementation risks and cultural differences, Method B is now the best option.

b) Using the initial values from problem 6, make the changes so that Method A implementation risks = 3 and Method C cultural differences = 2.
The change for A’s implementation risks grade was not sufficient to replace Method C as the best option. The grade for cultural differences at Method C had already been set to 2 in the initial evaluation of the problem.

c) Using the initial values from problem 6, insert Tax considerations = 15 and A = 3, B = 2, and C = 1.

Due to the insertion of tax considerations, Methods B and C are now the best options.
Problem 11:

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
<th>Grade</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class of clientele</td>
<td>1.000</td>
<td>2 3 1 3</td>
<td>2.000 3.000 1.000 3.000</td>
</tr>
<tr>
<td>Rent</td>
<td>0.900</td>
<td>3 2 1 3</td>
<td>2.700 1.800 0.900 2.700</td>
</tr>
<tr>
<td>Indoor mall</td>
<td>0.855</td>
<td>3 1 3 1</td>
<td>2.565 0.855 2.565 0.855</td>
</tr>
<tr>
<td>Traffic volume</td>
<td>0.720</td>
<td>3 2 3 1</td>
<td>2.160 1.440 2.160 0.720</td>
</tr>
</tbody>
</table>

**Total Score** 9.425 7.095 6.625 7.275

Based upon the evaluation of categories, Nina should select Mall Option 1.

Problem 12:

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
<th>Grade</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class of clientele</td>
<td>1.000</td>
<td>2 3 1 3</td>
<td>2.000 3.000 1.000 3.000</td>
</tr>
<tr>
<td>Rent</td>
<td>0.900</td>
<td>3 2 3 3</td>
<td>2.700 1.800 2.700 2.700</td>
</tr>
<tr>
<td>Indoor mall</td>
<td>0.855</td>
<td>3 1 3 1</td>
<td>2.565 0.855 2.565 0.855</td>
</tr>
<tr>
<td>Traffic volume</td>
<td>0.720</td>
<td>3 2 3 1</td>
<td>2.160 1.440 2.160 0.720</td>
</tr>
</tbody>
</table>

**Total Score** 9.425 7.095 8.425 7.275

Change the grade for Location 3’s rent to 3.

Due to the rent change, Location 3 moves up from last place to second place based upon the grades assigned to the evaluated categories.
Problem 13:

For the triangular distribution, the input values are contained in spreadsheet cells B3:D6 for the Windows platform and in cells F3:H6 for the UNIX platform. (The cell references are for the problem’s source data in the student’s textbook.)

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Windows Platform Value</th>
<th>Unix Platform Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>$513,218</td>
<td>$506,365</td>
</tr>
<tr>
<td>Median</td>
<td>$503,879</td>
<td>$500.776</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>$54,608</td>
<td>$66,011</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.49</td>
<td>0.30</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.62</td>
<td>2.42</td>
</tr>
<tr>
<td>Range Width</td>
<td>$277,169</td>
<td>$330,473</td>
</tr>
<tr>
<td>Minimum Value</td>
<td>$399,295</td>
<td>$360,049</td>
</tr>
<tr>
<td>Maximum Value</td>
<td>$676,464</td>
<td>$690,522</td>
</tr>
</tbody>
</table>

Figure 2.10 Results of Crystal Ball Simulation. (Ref. p. 273 Project Management in Practice [Mantel, Meredith, Shafer, Sutton; John Wiley & Sons, 2001.])

The UNIX platform offers a better (lower) potential cost but also exhibits higher uncertainty (range, standard deviation) around the expected (mean) costs. In addition to simulated cost and the company’s philosophy towards accepting risk, the selection decision should consider the alliances and partnerships available to support the selected platform.

Incidents for Discussion

Portillo, Inc.

This case is a good lead in to the whole subject of estimates. The students should, even at the college level, be able to share experiences of estimate being manipulated either up or down to support an agenda. This could be his or her own inflating of how long it will take to get something done, or a supervisor arbitrarily cutting budgets.

Ms. Portillo has discovered a fundamental truth about estimates, namely that they are always wrong. While the estimates that have been used to base the business decisions on may be technically wrong, she needs to ask whether they have still been useful. In other words do the errors and biases cancel each other out enough to still lead to the right decision for the business? Nonetheless she needs to share her findings with the Committee. Here are some things to do to improve the accuracy of the estimates:

1. For the projects that are selected, compare the actual outcomes to the estimates to develop a database of estimating bias. The techniques for this are described in Chapter 7.

2. Train her managers on a consistent tool set and process for estimating and then follow it.
3. Allow the management team to challenge each other’s estimates during the project selection process. An alternative would be to prohibit the sponsor from taking part in the decision for his or her product.

4. Bring in outside consultants to independently estimate selected projects.

**L & M Power**

This case is a good opportunity, particularly for college students, to try and put themselves in the place of a company promoting a high visibility project. What are all the factors that must be considered to have both the reality and perception of a successful project? How should these factors be considered in the internal process of selecting a project?

These are expensive, high visibility projects dealing with politically sensitive issues. The financial model has some useful information, but using it by itself would lead to a woefully inadequate selection process. This simple financial model does not take into account legal, environmental, safety or community issues. It says nothing about the risk of either project completing within cost and schedule, or the risk of problems in the subsequent operations. It’s not clear how this project fits into the organization’s long-term goals, and this model does nothing to further that knowledge.

**CASE: Pan-Europa Foods S.A.**

**Question 1:**

1) Pan-Europa is currently trading at a price below comparable companies. This is because of reduced profitability and a failure to gain sufficient market share for new products. As analysts are giving a “sell” signal, raiders are potentially buying up the stock. Clearly then they must pursue strategies that drive up their stock price. This includes increasing net income and gross sales.

2) Pan-Europa needs to capitalize on their hard won increased market share.

3) Humboldt and Morin should be leading the charge on this strategy.
Question 2:
Exhibit 3 presents three different ways to look at the data. While the NPV at the minimum accepted ROR includes a risk premium, it doesn’t correct for the varying durations of the project. Instead the best available data would be the Equivalent Annuity that corrects for the project durations. Using this analysis the preferred project would be 11, the Strategic Acquisition. Then following in order would be:

- Eastward Expansion
- Snack Foods
- Southward Expansion
- Inventory Control System
- Artificial Sweeteners
- New Plant
- Expanded Plant
- Automation and Conveyor System
- Expand Truck Fleet
- Effluent Treatment Program (which has no NPV)

While the Effluent Treatment Program has no formal NPV it can be considered an investment of 4M now to save a cost of 10M in 4 years.

Question 3:
There are many aspects that could invalidate the simple NPV analysis of the projects. They include:

1) Risk
2) Political considerations
3) Regulatory issues including health, safety and environmental
4) Incompatibility with corporate strategy
5) Resource availability
6) Impact on brand or corporate image
7) Quality and certainty of the data used for analyzing the various projects
8) Synergies between the projects

Different analysis techniques and different assumptions can be used to correct for the various factors that affect each project differently. For example:

- The time value of money can be accounted for by using discounting methods such as NPV or IRR.
- Unequal lifetimes of the projects can be accounted for by calculating the NPV to infinity or using Equivalent Annuities
- Risk can be accounted for (at least financially) by increasing the hurdle rate.
The different project sizes can be accounted for by multiplying the NPV by the ratio of the size of the projects or by using a profitability ratio.

**Question 4:**

1) Project 6, the effluent water treatment plants is a “must do” project to meet regulatory requirements; it’s just a question of when. Project 5 is potentially one as well depending on the regulatory environment that Pan-Europa’s safety record is measured in. Both safety and environment may be significant issues to the corporation’s image and stockholders which would tend to elevate their importance.

2) Projects that involve small technology changes like expanding the truck fleet would have low risk. Increasing levels of technological sophistication such as automation or introducing artificial sweeteners into products would also increase implementation risks. Another risk area for any producer in a capitalist environment is attempting to increase markets with new products in new areas. The prospective customers may simply choose to not buy the product. Other elements of risk include project size, complexity and length of the period of return.

3) There are real synergies between the plant expansion/additions, automation, truck upgrade and the geographic expansion projects.

4) Projects that have nonquantitative costs and benefits would include:

- Projects that impact the company’s regulator compliance such as effluent treatment (environment) and warehouse automation (safety).
- Several of the projects could impact the company’s image. For example, the snack food rollout could be positive because of its wholesome connotations while the acquisition of the schnapps brand could be negative. The effluent project could be positive by showing the company’s willingness to act on environmental concerns early. Similarly the automation project could be cast a positive step towards increased safety. The plant expansion project may be positive or negative depending on whether the community reacts to new jobs or factory encroachment.

**Question 5:**

1) I would recommend four screens be applied using the following factors:

- Is the project a “Must Do” for reasons outside of the company’s control?
  - Criteria – Yes/No

- Does the project meet the company policy for minimum IRR?
  - Criteria –Yes/No

- Does the project meet the company policy for maximum payback period?
  - Criteria – Yes/No
- Does the project incur excessive risk?
  - Criteria – Yes/No
- Does the project meet the current corporate strategy?
  - Criteria - Yes/No

2) Using these screens and criteria the following projects would be eliminated outright:

- Truck Fleet (1) because it does not meet the minimum IRR and exceeds the maximum payback period dictated by company policy.
- New Plant (2), Plant Expansion (3), Artificial Sweetener (4) and Plant Automation (5) all because they exceed the maximum payback period dictated by company policy.
- Strategic Acquisition (11) and Artificial Sweetener (4) would both be eliminated due to excessive risk.
- Strategic Acquisition (11) would also be eliminated because it does not match the current strategy.

**Question 6:**

The projects would be arrayed as follows using the categories:

![Diagram of project categories]

<table>
<thead>
<tr>
<th>Major</th>
<th>Breakthrough</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D</td>
<td></td>
<td>Extensive</td>
</tr>
<tr>
<td>Strategic Acquisition</td>
<td></td>
<td>Product Changes</td>
</tr>
<tr>
<td>Artificial Sweetener</td>
<td></td>
<td>Minor</td>
</tr>
<tr>
<td>Plant Automation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Question 7:
Applying the criteria to the projects would yield the following recommendations for the 1993 projects:

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Cost</th>
<th>Screen 1</th>
<th>Screen 2</th>
<th>Screen 3</th>
<th>Screen 4</th>
<th>Screen 5</th>
<th>1993 Selections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Expand Truck Fleet</td>
<td>22</td>
<td>No</td>
<td>Not Ok</td>
<td>Not Ok</td>
<td>Ok</td>
<td>Ok</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>New Plant</td>
<td>30</td>
<td>No</td>
<td>Ok</td>
<td>Not Ok</td>
<td>Ok</td>
<td>Ok</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Expanded Plant</td>
<td>10</td>
<td>No</td>
<td>Ok</td>
<td>Not Ok</td>
<td>Ok</td>
<td>Ok</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Artificial Sweetener</td>
<td>15</td>
<td>No</td>
<td>Ok</td>
<td>Not Ok</td>
<td>Not Ok</td>
<td>Ok</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Automation and Conveyor</td>
<td>14</td>
<td>No</td>
<td>Ok</td>
<td>Not Ok</td>
<td>Ok</td>
<td>Ok</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Effluent Treatment</td>
<td>4</td>
<td>Yes</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Eastward Expansion</td>
<td>20</td>
<td>No</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>Southward Expansion</td>
<td>20</td>
<td>No</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>20</td>
</tr>
<tr>
<td>9</td>
<td>Snack Foods</td>
<td>18</td>
<td>No</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>18</td>
</tr>
<tr>
<td>10</td>
<td>Inventory Control</td>
<td>15</td>
<td>No</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>Strategic Acquisition</td>
<td>40</td>
<td>No</td>
<td>Ok</td>
<td>Ok</td>
<td>Not Ok</td>
<td>Not Ok</td>
<td></td>
</tr>
</tbody>
</table>

These projects would total 77 million ECU, leaving a prudent reserve for unforeseen circumstances.

Reading: From Experience: Linking Projects to Strategy

Question 1:
Two thirds of the revenue at HP is derived from products introduced within the past two years. Projects are an important component of business strategy to sustain profitable products in a dynamic marketplace.

Question 2:
The team should establish criteria that support business goals rather than personal agendas. The financial selection criteria are intended to ensure that the projects generate a sufficient return on investment within a defined time frame. They are also intended to recognize that financial success is reflected in the portfolio of projects rather than in the financial contributions of individual projects.

As suggested in Figure 3, financial criteria are an important but small part of the business value created by projects. Senior managers recognize the value of qualitative contributions to business value, so it is not always necessary to quantify a project’s contributions to business value.

Question 3:
The objective is to select the right mix of projects required to support business success. Prioritizing projects and selecting the vital few from the necessary many help to get more work done in support of business goals. By carefully defining criteria, people are aided in developing an understanding of the company’s strategy and the types of projects required to achieve success. From the improved understanding, proposed projects will be better aligned with business objectives.
Question 4:
The Plan of Record records the results of the selection process. It shows the mix across categories with the priority and resource needs (headcount) of each project. The Plan of Record also shows “out-plan” projects, those that show promise but haven’t yet made it through the decision process. This gives visibility to a pool of possible projects if one of the chosen ones terminates early for some reason. It also displays the relative priority and the rough schedule of performance for the selected projects.

The aggregate project plan combines a number of important factors in an easy to understand visual format. As described in the text, this includes the number and type of projects, their relative size, timing, history and where they fall on the scales of innovation for both products and processes. It is easy to see gaps and excesses in each category as well as the mix among the categories and the degree of product and process change. This graphic allows comparison of the types of projects being conducted, the number of projects in each type with the relative size of the resources and investments. Different project portfolios’ proposals can be readily compared for discussion purposes or with past years’ selections.

Question 5:
They should be considered for inclusion when it is favorable for the company to do so. For example, if missing data becomes known, the project may be reconsidered. Or, if another project is cancelled or completed, the freed-up funds could be applied to an out-plan project. Additionally, out-plan projects might be placed in the pipeline during a review of the portfolio of projects.

Question 6:
It reduced the number of projects authorized for execution and probably changed the mix of projects approved for execution. In one case, the reported reduction decreased the pipeline projects from 120 to 30. In another area, the projects were decreased from 50 to 17.

HP would be more mature than organizations that lacked a project selection process attempting to link business success to project strategies. The discipline and focus provided by techniques described in the article are indicators of a high level of project management maturity.

Question 7:
New proposals have been altered to address the measurable criteria used to select projects. This has helped to focus behavior on activities that win for the business. It also uses the portfolio approach to help manage risks inherent in generating revenues from outputs produced by projects. In addition to numeric criteria, nonnumeric projects are handled in a separate category of projects. Also refer to the answers for questions 2 and 3 of this reading assignment.