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# Project Schedule (Time) Management (Chapter 6)

Questions:

1. Why do you think schedule issues often cause the most conflicts on projects?
2. Why is activity definition the first process involved in project time management?
3. Why is it important to determine activity sequencing on projects? Discuss diagrams you have seen that are similar to network diagrams. Describe their similarities and differences.
4. Explain the difference between estimating activity durations and estimating the effort required to perform an activity.
5. Explain the following schedule development tools and concepts: Gantt charts, critical path method, PERT.
6. What do you think about adding slack to individual task estimates (sometimes called padding estimates)? What do you think about adding a project buffer for the entire project, as critical chain scheduling suggests? What are some ethical considerations when using slack and buffers?
7. How can you minimize or control changes to project schedules?
8. Why is it difficult to use project management software well?
9. What are the 6 processes for project time management?

Answers:

1. Schedule issues often cause the most conflicts on projects because of the difference in culture and religion and some countries even have a different attitude about schedules, so some people prefer following schedules while others don’t, and that could cause the most conflicts on projects since out of the triple constraints time is the least flexible because it passes no matter what happens on a project.
2. Activity definition is involved in project time management because it involves identifying the specific activities that must be done to produce the project deliverables which usually results in a more detailed WBS.
3. It’s extremely important and crucial to determine activity sequencing on projects because it determines the relationships or dependencies between activities, and without it you can’t use critical path analysis. There are two main techniques and methods to show activity sequencing: Arrow and Precedence diagramming methods. With the arrows methods the activities are represented with arrows with the nodes or circles as the starting/ending points and it can only show finish-to-start dependencies. Whereas the precedence method the activities are represented using boxes with the arrows showing the relationships between them, and it can show any of the four types of dependencies making it more popular than arrow method.
4. Estimating activity duration includes the actual amount of time worked on an activity plus elapsed time. Whereas estimating activity effort is the number of workdays or work hours required to complete a task.
5. Gantt Charts:

* Provide a standard format for displaying project schedule information by listing project activities and their corresponding start and finish dates in a calendar format. Symbols include a black diamond that represents a milestone, thick black bars which represent the summary tasks, lighter horizontal bars which represent the duration of tasks, arrows which represent the dependencies between tasks.

Critical Path Method:

* CPM is a network diagramming technique used to predict total project duration
* A critical path for a project is the series of activities that determines the earliest time a project can be completed.
* The critical path is the longest path through the network diagram and has the least amount of slack and float.

Program Evaluation and Review Technique (PERT):

* PERT is a network analysis technique used to estimate project duration when there is a high degree of uncertainty about the individual activity duration estimates
* PERT uses probabilistic time estimates
* PERT =

1. There are two main techniques for shortening schedules:

* Shortening durations of critical activities/tasks by adding more resources or changing their scope
* Fast tracking activities by doing them in parallel o overlapping them

1. Some people find it difficult to use project management software well because they don’t understand the concepts behind creating a network diagram, determining the critical path, or setting a schedule baseline, and people must avoid relying too much on sample files or templates when creating their unique project schedules.

* Planning Schedule Management
* Defining Activities
* Sequencing Activities
* Estimating Activity Durations
* Developing Schedule
* Controlling Schedule

# Project Cost Management

Questions:

1. Discuss why many information technology professionals may overlook project cost management and how this might affect completing projects within budget.
2. Explain some of the basic principles of cost management, such as profits, life cycle costs, tangible and intangible costs and benefits, direct and indirect costs, reserves, and so on.
3. Give examples of when you would prepare rough order of magnitude (ROM), budgetary, and definitive cost estimates for an information technology project. Give an example of how you would use each of the following techniques for creating a cost estimate: analogous, parametric, and bottom-up.
4. Explain what happens during the cost budgeting process.
5. Explain how earned value management (EVM) can be used to measure performance and speculate as to why it is not used more often. What are some general rules of thumb for deciding if cost variance, schedule variance, cost performance index, and schedule performance index numbers are good or bad?
6. What is project portfolio management? Can project managers use it with earned value management?
7. Describe several types of software that project managers can use to support project cost management.
8. What are the processes for the project time management?
9. Make a table for the formulas.

Answers:

1. Many IT professionals overlook project cost management for mainly four reasons:

* Estimates are done too quickly and sometimes they are done before clear system requirements have been produced.
* People lack estimating experience especially for large projects, so they need training and mentoring before estimating the costs.
* Human beings are biased toward underestimation, so they forget to allow extra costs that might be needed for integration and testing on large IT projects.
* Management desires accuracy, so it’s important for project managers to develop good cost and schedule estimates and use their leadership and negotiation skills to stand by those estimates.
* Profits are revenues minus expenditures.
* Profit margin is the ratio of revenues to profits.
* Life cycle costing considers the total cost of ownership, or development plus support costs for a project.
* Cash flow analysis determines the estimated annual costs and benefits for a project and the resulting annual cash flow.
* Tangible costs or benefits are those that an organization can easily measure in dollars.
* Intangible costs or benefits are those that are difficult to measure in monetary terms, such as customer satisfaction.
* Direct costs are those that can be directly related to producing the products and services of the project.
* Indirect costs are those that are not directly related to the products or services of the project, but are indirectly related to performing the project.
* Reserves are dollars included in a cost estimate to reduce cost risk by allowing for future situations that are difficult to predict.
* Contingency reserves allow for future situations that may be partially planned for.
* Management reserves allow for future situations that are unpredictable.

1. Types of cost estimates:

* Rough Order of Magnitude (ROM) is used very early in the project life cycle around 3-5 years before completion, and it provides estimate of cost for selection decisions which is -50% to +100% accurate.
* Budgetary is used early around 1-2 years out and it puts dollars in the budget plans and is -10% to +25% accurate.
* Definitive is used later in the project around less than a year out and it provides details for purchases and estimates actual costs and it’s -5% to +10% accurate.

Cost Estimation Tools and Techniques:

* Analogous or top-down estimates: use the actual cost of a previous similar project as the basis for estimating the cost of the current project.
* Bottom-up estimates: involve estimating individual work items or activities and summing them to get a project total.
* Parametric modeling uses project characteristics (parameters) in a mathematical model to estimate project costs.

1. Cost budgeting involves allocating the project cost estimate to individual work items over time which makes the WBS a requirement to the cost budgeting process since it defines the work items, and the important goal is to produce a cost baseline (cost estimates + contingency reserve).
2. EVM is a project performance measurement technique that integrates scope, time and cost data that involves calculating three values (PV, AC, EV) for each activity or summary activity from a project’s WBS. If the cost variance (CV) is negative or the CPI is less than 100% this means that the project cost is more than what was planned (over budget), and if the schedule variance (SV) is negative or the SPI is less than 100% this means that the project is taking longer than planned (behind schedule).
3. Several types of software that project managers can use to support project cost management are: Spreadsheets, sophisticated and centralized financial applications software, Project management software, Portfolio management software.
4. The four processes of project cost management are:

* Planning cost management: determining that the policies, procedures, and documentation that will be used for planning, executing, and controlling project cost.
* Estimating costs: developing an approximation or estimate of the costs of the resources needed to complete a project.
* Determining budget: allocating the overall cost estimate to individual work items to establish a baseline for measuring performance.
* Controlling costs: controlling changes to the project budget

|  |  |  |  |
| --- | --- | --- | --- |
| CPI | EV | / | AC |
| SPI | EV | / | PV |
| CV | EV | - | AC |
| SV | EV | - | PV |
| EAC | BAC | / | CPI |
| Estimate time to complete | Original time estimate | / | SPI |

Exercises:

1. Given the following information for a one-year project, answer the following questions. Recall that PV is the planned value, EV is the earned value, AC is the actual cost, and BAC is the budget at completion.

PV = $23,000

EV = $20,000

AC = $25,000

BAC = $120,000

1. What is the cost variance, schedule variance, cost performance index (CPI), and schedule performance index (SPI) for the project?
2. How is the project doing? Is it ahead of schedule or behind schedule? Is it under budget or over budget?
3. Use the CPI to calculate the estimate at completion (EAC) for this project. Is the project performing better or worse than planned?
4. Use the schedule performance index (SPI) to estimate how long it will take to finish this project.
5. Assume you have completed three months of the project. The BAC was $200,000 for this six-month project. Also assume the following:

PV = $120,000

EV = $100,000

AC = $90,000

1. What is the cost variance, schedule variance, cost performance index (CPI), and schedule performance index (SPI) for the project?
2. How is the project doing? Is it ahead of schedule or behind schedule? Is it under budget or over budget?
3. Use the CPI to calculate the estimate at completion (EAC) for this project. Is the project performing better or worse than planned?
4. Use the schedule performance index (SPI) to estimate how long it will take to finish this project.

# Project Quality Management

Questions:

1. What are the scope aspects of IT projects that affect quality?
2. What are the main processes included in project quality management?
3. What are benchmarks, and how can they assist in performing quality assurance? Describe typical benchmarks associated with a college or university.
4. What are the three main categories of outputs for quality control?
5. Discuss the three suggestions for improving information technology project quality that were not made in this chapter.
6. What are the 4 different tools and 2 different techniques used for quality control

Answers:

1. Functionality, which is the degree to which a system performs its intended function. Features, which are the system’s special characteristics that appeal to users. System outputs, which are the screens and reports the system generates. Performance, which addresses how well a product or service performs the customer’s intended use. Reliability, which is the ability of a product or service to perform as expected under normal conditions. Maintainability, which addresses the ease of performing maintenance on a product.
2. There are 3 main processes included in project quality management:

* Quality planning, which identifies which quality standards are relevant to the project and how to satisfy them.
* Quality assurance, which involves evaluating overall project performance to ensure that the project will satisfy the relevant quality standards.
* Quality control, which includes monitoring specific project results to ensure that they comply with quality standards and identifying ways to improve overall quality.

1. Benchmarking generates ideas for quality improvements by comparing specific project practices or product characteristics to those of other projects or products within or outside the performing organization.
2. The three main categories of outputs for quality control are:

* Acceptance decisions: accept or reject
* Rework: action taken to bring rejected items into compliance with product requirements, specifications, or other stakeholder expectations.
* Process adjustments: correct or prevent further quality problems based on the quality control measurements.

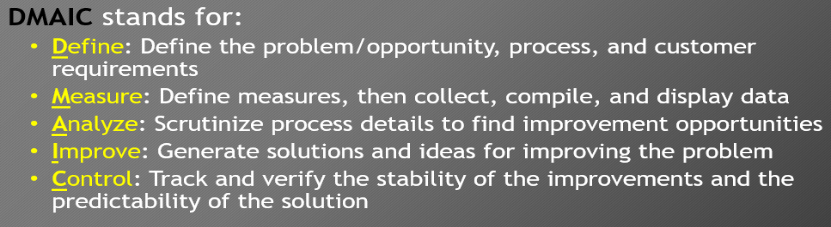
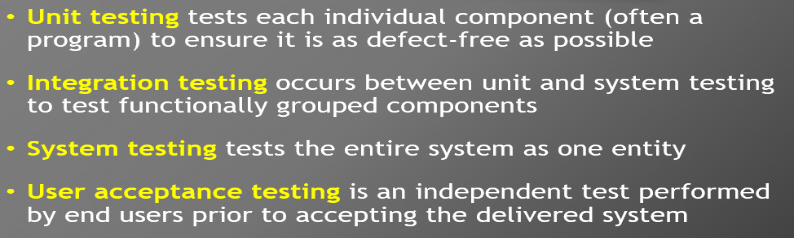
1. There are three suggestions for improving IT project quality:

* Establish leadership that promotes quality, for a large percentage of quality problems are associated with management and not technical issues.
* Focus on organizational influences and workplace factors that affect quality, for a dedicated workspace and a quiet work environment are key factors to improving a programmer’s productivity.
* Follow maturity models, which are frameworks for helping organizations improve their processes and systems. The first type of model called “The Software Quality Function Deployment Model” (SQFD) focuses on defining user requirements and planning software projects. The second model called “Capability Maturity Model Integration” (CMMI) is a process improvement approach that provides organizations with the essential elements of effective processes.

1. Tools:

* Cause-and-Effect Diagram:
* Help you find the root cause of a problem
* Also known as fishbone or Ishikawa diagrams
* Control Charts:
* Graphic display of data that illustrates the results of a process over time
* The main use of control charts is to prevent defects, rather than to detect or reject them
* Allows to determine whether a process is in control or out of control
* You can use the quality control charts and the seven-run rule to look for patterns in data. The seven-run rule states that if seven data points in a row are all below the mean, above the mean, or are all increasing or decreasing, then the process needs to be examined for non-random problems.
* Check sheet:
* Used to collect and analyze data
* Sometimes called a tally sheet or checklist depending on its format
* This information might be useful in improving the process for handling complaints
* Flowcharts:
* Graphic displays of the logic and flow of processes that help you analyze how problems occur and how processes can be improved
* Show activities, decision points, and the order of how information is processed

Techniques:

* Six Sigma Principles:
* A comprehensive and flexible system for achieving, sustaining, and maximizing business success through process improvement
* The goal is the near elimination of defects from any process, product or service
* The target of perfection is the achievement of no more than 3.4 defects per million opportunities
* Follows a five-phase improvement process called DMAIC:
* Testing:
* Many IT professionals think of testing as a stage that comes near the end of a project, however it should be done during almost every phase of the project life cycle.
* There are 4 types of tests:

# Project Human Resources Management

Questions:

1. Discuss the changes in the job market for information technology workers. How does the job market and current state of the economy affect human resource management?
2. Summarize the processes involved in project human resource management.
3. Describe RAM, OBS, Staffing management plan, resource histogram.
4. Discuss the difference between resource loading and resource leveling, and provide an example of when you would use each technique.
5. Explain two types of team-building activities.
6. Summarize different tools and techniques project managers can use to help them manage project teams. What can they do to manage virtual team members?
7. What are the conflict management methods.

Answers:

1. During the late 1990s, the IT job market became extremely competitive, and today many organizations again face a shortage of IT staff, but regardless of the current job market, acquiring qualified IT professionals for teams is critical and crucial.
2. **Planning resource management:** identifying and documenting project roles, responsibilities, and reporting relationships

**Estimating activity resources:** Tools that can assist in resource estimating: Expert judgment, Various estimating approaches, Data analysis, Project management software, Meetings.

**Acquiring resources:** getting the needed personnel assigned to and working on the project

**Developing the project team:** building individual and group skills to enhance project performance

**Managing the project team:** tracking team member performance, motivating team members, providing timely feedback, resolving issues and conflicts, and coordinating changes to help enhance project performance

**Controlling resources:** Ensuring physical resources assigned to the project are available as planned. Also involves monitoring the planned versus actual resources utilization and taking corrective actions as needed

1. A responsibility assignment matrix (RAM) is a matrix that maps the work of the project as described in the WBS to the people responsible for performing the work as described in the OBS

An organizational breakdown structure (OBS) is a specific type of organizational chart that shows which organizational units are responsible for which work items.

A staffing management plan describes when and how people will be added to and taken off the project team

A resource histogram is a column chart that shows the number of resources assigned to a project over time

1. Resource loading refers to the number of individual resources an existing schedule requires during specific time periods. It helps project managers develop a general understand of the demands a project will make on the organization’s resources and induvial people’s schedules. Resource leveling is a technique for resolving resource conflicts by delaying tasks, and the main purpose of resource leveling is to create a smoother distribution of resource usage and reduce overallocation.
2. Physical Challenges:

* Military basic trainings, boots camp, etc.…

Psychological preference indicator tools:

* Mental team building activities such as Myers-Briggs Type Indicator, Wilson Learning Social Styles Profile DISC

1. Tools and Techniques are:

* Observation and conversation
* Project performance appraisals
* Interpersonal skills
* Conflict management

1. **Confrontation**: Directly face a conflict using a problem-solving approach

**Compromise**: Use a give-and-take approach

**Smoothing**: De-emphasize areas of difference and emphasize areas of agreement

**Forcing**: The win-lose approach

**Withdrawal**: Retreat or withdraw from an actual or potential disagreement

**Collaborating**: Decision makers incorporate different viewpoints and insights to develop consensus and commitment

# Project Communication Management

Questions:

1. What items should a communications management plan address? How can a stakeholder analysis assist in preparing and implementing parts of this plan?
2. Discuss the advantages and disadvantages of different ways of distributing project information.
3. What are some of the ways to create and distribute project performance information?
4. What are the processes involved in project communication management?

Answers:

1. Project communications management involves communications planning, information distribution, performance reporting, and stakeholder management. A communications management plan of some type should be created for all projects. A stakeholder analysis for project communications help determine communications needs for different people involved in a project.

|  |  |  |
| --- | --- | --- |
|  | Advantages | Disadvantages |
| Face-to-face | Allows for instant feedback, gauge reactions | Might be expensive, high maintenance |
| Digital | Faster communication, cheaper and easier to record | Risk of data loss, unauthorized access |
| Hard copy | Edited and revised several times, permanent record | Storage is complex, requires paper |

1. Performance reporting keeps stakeholders informed about how resources are being used to achieve project objectives

**Status reports** describe where the project stands at a specific point in time

**Progress reports** describe what the project team has accomplished during a certain period of time

**Forecasts** predict future project status and progress based on past information and trends

1. **Planning communications management**: Determining the information and communications needs of the stakeholders

**Managing communications:** Creating, distributing, storing, retrieving, and disposing of project communications based on the communications management plan

**Controlling communications**: Monitoring and controlling project communications to ensure that stakeholder communication needs are met

# Project Risk Management

Questions:

1. What are some questions that should be addressed in a risk management plan?
2. Discuss the common sources of risk on information technology projects and suggestions for managing them. Which suggestions do you find most useful? Which do you feel would not work in your organization? Why?
3. What is the difference between using brainstorming and the Delphi Technique for risk identification? What are some of the advantages and disadvantages of each approach?
4. Describe the contents of a risk register and how the risk register is used in several risk management processes.
5. Describe how to use a probability/impact matrix and the Top Ten Risk Item Tracking approaches for performing qualitative risk analysis. How could you use each technique on a project?
6. Explain how to use decision trees analysis for quantifying risk. Give an example of how you could use each technique on an information technology project.
7. Provide realistic examples of each of the risk response strategies fore both negative and positive tasks.
8. List the tools and techniques for performing risk monitoring and control.
9. How can you use Excel to assist in project risk management? What other software can help project teams make better risk management decisions?
10. What are the processes involved in project risk management?

Answers:

* How will risk management be performed on this project?
* What are the estimated costs and schedules for performing risk-related activities?
* Is there a risk breakdown structure for the project?
* How have the stakeholder’s tolerance for risk changed?
* How will the team track risk management activities?

1. Information technology projects often involve several risks: lac of user involvement, lack of executive management support, unclear requirements, poor planning, and so on. Lists developed by the Standish Group and other organizations can help you identify potential risks on information technology projects.
2. Brainstorming/Focus Group is a technique by which a group attempts to generate ideas or find a solution for a specific problem by amassing ideas spontaneously and without judgment. Be careful not to overuse or misuse brainstorming. The Delphi Technique is used to derive a consensus among a panel of experts who make predictions about future developments. Provides independent and anonymous input regarding future events
3. A risk register is: A document that contains the results of various risk management processes and that is often displayed in a table or spreadsheet format. A tool for documenting potential risk events and related information.

It contains:

* An identification number for each risk event
* A rank for each risk event
* The name of each risk event
* A description of each risk event
* The category under which each risk event falls
* The root cause of each risk

1. A probability/impact matrix or chart lists the relative probability of a risk occurring on one side of a matrix or axis on a chart and the relative impact of the risk occurring on the other. List the risks and then label each one as high, medium, or low in terms of its probability of occurrence and its impact if it did occur. Top Ten Risk Item Tracking is a qualitative risk analysis tool that helps to identify risks and maintain an awareness of risks throughout the life of a project.

List the current ranking, previous ranking, number of times the risk appears on the list over a period of time, and a summary of progress made in resolving the risk item.

1. A decision tree is a diagramming analysis technique used to help select the best course of action in situations in which future outcomes are uncertain. Estimated monetary value (EMV) is the product of a risk event probability and the risk event’s monetary value. You can draw a decision tree to help find the EMV.
2. The four basic responses to risk are avoidance, acceptance, transference, and mitigation. The four basic response strategies for positive risks are risk exploitation, risk sharing, risk enhancement, and risk acceptance.
3. Tools and techniques for monitoring risks include data analysis, audits and meetings.
4. Spreadsheet software, such as Excel, is a common tool for performing sensitivity analysis. Sensitivity analysis is a technique used to show the effects of changing one or more variables on an outcome. Several Types of software can assist in project risk management. Monte Carlo-based simulation software is a particularly useful tool for helping get a better idea of project risks and top sources of risk or risk drivers.

* Planning risk management
* Identifying risks
* Performing qualitative risk analysis
* Performing quantitative risk analysis
* Planning risk responses
* Implementing risk responses
* Monitoring risk

# Project Procurement Management

Questions:

1. List five reasons why organizations outsource. Why is there a growing trend in outsourcing, especially offshore?
2. Explain the make-or-buy decision process.
3. What are the main types of contracts if you decide to outsource? What are the advantages and disadvantages of each?
4. What is involved in the process of requesting seller responses? How do organizations decide whom to send RFPs or RFQs?
5. List two suggestions for ensuring adequate change control on projects that involve outside contracts.
6. What are the processes involved in project procurement management?

Answers:

1. Organizations outsource to reduce costs, focus on their core business, access skills and technologies, provide flexibility, and increase accountability. It is becoming increasingly important for IT professionals to understand project procurement management.
2. Make-or-buy analysis is a general management technique used to determine whether an organization should make or perform a particular product or service inside the organization or buy from someone else.
3. The basic types of contracts are fixed price, cost reimbursable, and time and material. Fixed-price contracts involve a fixed total price for a well-defined product and entail the least risk to buyers. Cost-reimbursable contracts involve payments to suppliers for direct and indirect actual costs and require buyers to absorb some of the risk.
4. Organizations often do an initial evaluation of all proposals and bids and then develop a short list of potential sellers for further evaluation. It is customary to have contract negotiations during the source selection process. Sellers on the short list often prepare a best and final offer (BAFO). Final output is a contract signed by the buyer and the selected seller.
5. Changes to any part of the project need to be reviewed, approved, and documented by the same people in the same way that the original part of the plan was approved. Project managers and teams should stay closely involved to make sure the new system will meet business needs and work in an operational environment.

**Planning procurement management**: Determining what to procure and when and how to do it

**Conducting procurements**: Obtaining seller responses, selecting sellers, and awarding contracts

**Controlling procurements**:Managing relationships with sellers, monitoring contract performance, making changes as needed and closing out contracts