

Project Management

A Practical Guideline to Project Management.

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1 An Introduction to Project Management

1.1 Introduction

Many people and organizations today have a new or renewed interest in project management. In the past, project management primarily focused on providing schedule and resource data to top management in the military and construction industries. Today's project management involves much more, and people in every industry and every country manage projects. New technologies have become a significant factor in many organizations, and the use of interdisciplinary and global work teams has radically changed the work environment.

The following statistics demonstrate the significance of project management in today's society:

- A 2001 report showed that the United States spends \$ 2.3 trillion on projects every year, and the world as a whole spends nearly \$ 10 trillion on projects of all kinds. Projects, therefore, account for about one-fourth of the United States' and the world's gross domestic product.
- In 2006 PricewaterhouseCoopers surveyed 200 companies from 30 different countries about their project management maturity and found that over half of all projects fail. They also found that only 2.5% of corporations consistently meet their targets for scope, time, and cost goals for all types of projects.¹
- In 2007, the average total annual compensation for a senior project manager was \$104,776 in the United States, \$111,412 in Australia, and \$120,364 in the United Kingdom. The average total annual compensation of a program manager was \$122,825 in the United States, \$133,718 in Australia, and \$165,489 in the United Kingdom. The average total compensation for a project management office (PMO) director was \$134,422 in the United States, \$ 125,197 in Australia, and \$ 210,392 in the United Kingdom.
- Project management certification continues to be one of the most popular certifications throughout the world, with over 220,000 active Project Management Professionals by the end of 2006. Certified individuals averaged a 16% pay increase from 2004 to 2005.

Many organizations claim that using project management provides advantages, such as

- Better control of financial, physical, and human resources
- Improved customer relations
- Shorter development times
- Lower costs
- Higher quality and increased reliability
- Higher profit margins
- Improved productivity
- Better internal coordination
- Higher worker morale

1.2 History of Project Management

Project management has been practiced since early civilization. Until 1900 civil engineering projects were generally managed by creative architects and engineers themselves, among those for example Vitruvius (1st century BC), Christopher Wren (1632–1723), Thomas Telford (1757-1834) and Isambard Kingdom Brunel (1806–1859). It has been since the 1950's, that organizations started applying systemic project management tools and techniques to complex projects.

The Manhattan Project, which the United States military led to develop the atomic bomb, is considered to be the first project to use "modern" project management. General Leslie R. Groves was the project manager in charge of the overall management of the project's mission, schedule, and budget. Dr. Robert Oppenheimer led the technical management of this three-year, \$2 billion project in the mid-1940s.

As a discipline, Project Management developed from different fields of application including construction, engineering, and defense. Two forefathers of project management are Henry Gantt, called the father of planning and control techniques, who is famously known for his use of the Gantt chart as a project management tool; and Henri Fayol for his creation of the 5 management functions, which form the basis for the body of knowledge associated with project and program management. Both Gantt and Fayol were known as being students of Frederick Winslow Taylor's theories of scientific management. His work is the forerunner to modern project management tools including work breakdown structure (WBS) and resource allocation.

The 1950's marked the beginning of the modern Project Management era. Project management was formally recognized as a distinct discipline arising from the management discipline. Again, in the United States, prior to the 1950's, projects were managed on an ad hoc basis using mostly Gantt Charts, and informal techniques and tools. At that time, two mathematical project-scheduling models were developed. The "Critical Path Method" (CPM) developed in a joint venture by both DuPont Corporation and Remington Rand Corporation for managing plant maintenance projects. And the "Program Evaluation and Review Technique" or PERT, developed by Booz-Allen & Hamilton as part of the United States Navy's (in conjunction with the Lockheed Corporation) Polaris missile submarine program; These mathematical techniques quickly spread into many private enterprises.

At the same time, technology for project cost estimating, cost management, and engineering economics was evolving, with pioneering work by Hans Lang and others.

In 1969, the Project Management Institute (PMI) was formed to serve the interests of the project management industry. The premise of PMI is that the tools and techniques of project management are common even among the widespread application of projects from the software industry to the construction industry.

In 1981, the PMI Board of Directors authorized the development of what has become A Guide to the Project Management Body of Knowledge (PMBOK Guide), containing the standards and guidelines of practice that are widely used throughout the profession.

1.3 What is a Project?

A project is

A temporary endeavor undertaken to create a unique product, service, or result.

1.3.1 Examples of projects:

Projects can be small or large and involve one person or thousands of people. They can be done in one day or take years to complete. Examples of projects include the following:

- Design and build a new house
- Design a product or services
- To complete a BA course
- Implement a software
- Business or private goals
- Evaluation of a computer or TV purchase
- A business plan
- Introducing policies in a company
- Starting a new design company
- A pharmaceutical company launches a new product

1.3.2 Project Attributes

As you can see, projects come in all shapes and sizes. The following attributes help define a project further:

- Temporary and one-time endeavor: a project has a definite beginning and a definite end
- Unique purpose: every project should have a well-defined objective
- Requires resources from various areas. Resources include people, hardware, software, or other assets
- Brings beneficial change or added value
- Highly complex and risky
- Has a primary customer or sponsor: someone must take the primary role of sponsorship
- Involves uncertainty: it is some-times difficult to define the project's objectives clearly, estimate time, or determine exact cost.

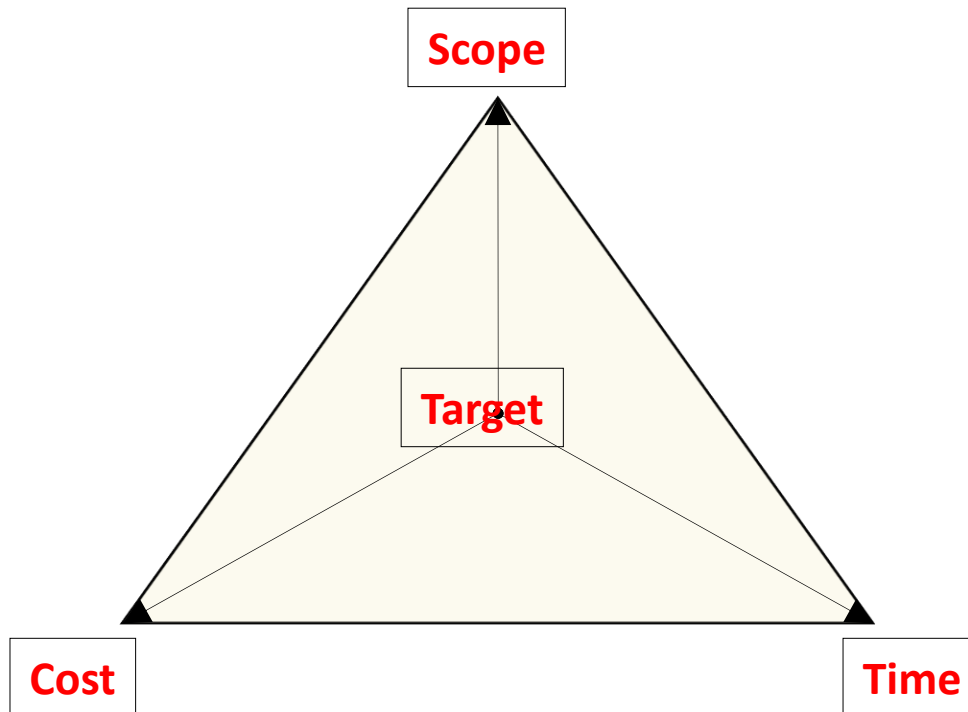
1.3.3 The Triple Constraint

Every project is constrained in different ways by its **scope, time, and cost goals**. These limitations are sometimes referred to in project management as the triple constraint.

To create a successful project, a project manager must consider scope, time, and cost, and balance these three often-competing goals. He or she must consider the following:

- Scope: What work will be done as part of the project? What unique product, service, or result does the sponsor expect from the project?
- Time: How long should it take to complete the project? What is the project's schedule?
- Cost: What should it cost to complete the project? What is the project's budget?

Successful project management means meeting all three goals (scope, time, and cost)—with the required quality and satisfying the project's sponsor!



Experienced project managers know that you must decide which aspect or aspects of the triple constraint are most important. If time is most important, you must often change the initial scope and/ or cost goals to meet the schedule.

Examples:

- If a company wants to get a new product to market, it must focus on scope target and be willing to adjust time and cost as needed. If it is crucial to meet time and cost goals, the scope must be flexible.
- Many people who plan weddings have to adjust scope and cost goals to meet their target wedding date. If scope goals are most important, you might need to adjust time and/ or cost goals.
- If someone wants to move into a new home or apartment by a specific date for a specific cost, he/she must be flexible on scope goals.

In any case, sponsors must provide some type of target goals for a project's scope, time, and cost.

Although the triple constraint describes how the basic elements of a project - scope, time, and cost - interrelate, other elements can also play significant roles. Quality is often a key factor in projects, as is customer or sponsor satisfaction. Some people, in fact, refer to the "quadruple constraint" of project management, including quality along with scope, time, and cost. Others believe that quality considerations, including customer satisfaction, must be inherent in setting the scope, time, and cost goals of a project. A project team may meet

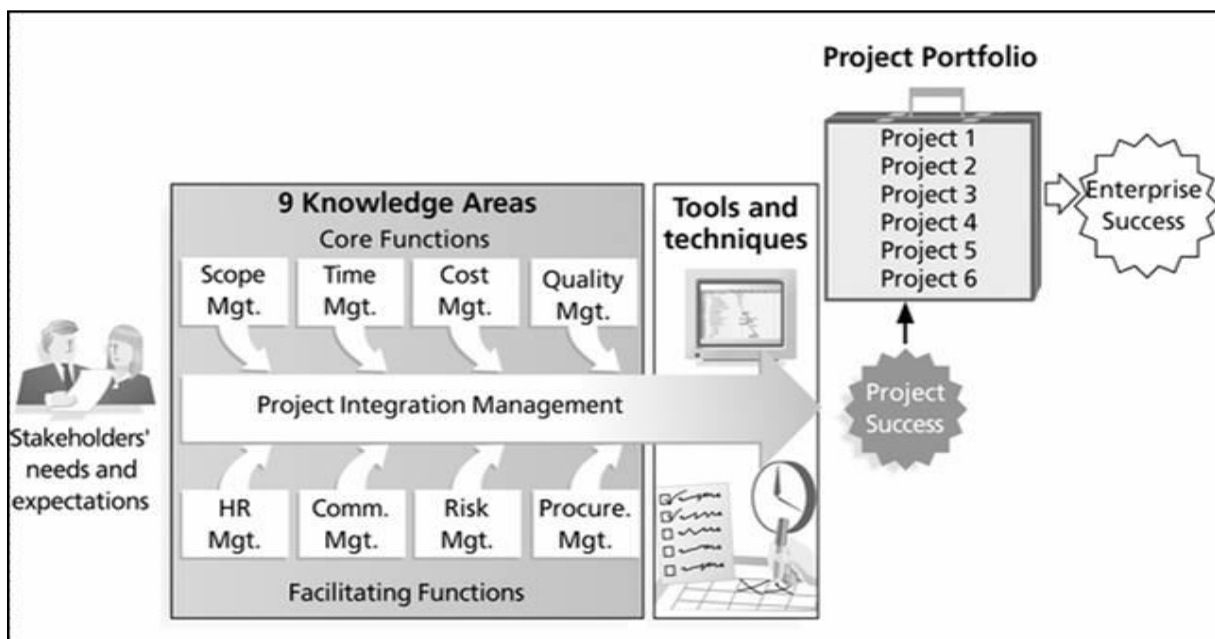
scope, time, and cost goals but fail to meet quality standards or satisfy their sponsor if they have not adequately addressed these concerns. The project manager should be communicating with the sponsor throughout the project to make sure the project meets his or her expectations.

1.4 What is Project Management?

Project management is “the application of knowledge, skills, tools, and techniques to project activities to meet project requirements.”

Project managers must not only strive to meet specific scope, time, cost, and quality goals of projects, but also facilitate the entire process to meet the needs and expectations of the people involved in or affected by project activities.

The figure illustrates a framework to help you understand project management. Key elements of this framework include the project stakeholders, project management knowledge areas, project management tools and techniques, project success, and contribution of a portfolio of projects to the success of the entire enterprise.



1.4.1 Project Stakeholders

Stakeholders are the people involved in or affected by project activities and include the project sponsor, project team, support staff, customers, users, suppliers, and even opponents to the project. These stakeholders often have very different needs and expectations.

Stakeholders' needs and expectations are important in the beginning and throughout the life of a project. Successful project managers develop good relationships with project stakeholders to understand and meet their needs and expectations.

1.4.2 Project Management Knowledge Areas

Project management knowledge areas describe the key competencies that project managers must develop. **The four core knowledge areas** of project management include project scope, time, cost, and quality management. These are core knowledge areas because they lead to specific project objectives. Brief descriptions of each core knowledge area are as follows:

- **Project scope management** involves working with all appropriate stakeholders to define, gain written agreement for, and manage all the work required to complete the project successfully.
- **Project time management** includes estimating how long it will take to complete the work, developing an acceptable project schedule given cost-effective use of available resources, and ensuring timely completion of the project.
- **Project cost management** consists of preparing and managing the budget for the project.
- **Project quality management** ensures that the project will satisfy the stated and implied needs for which it was undertaken.

The four facilitating knowledge areas of project management are human resource, communications, risk, and procurement management. These are called facilitating areas because they are the processes through which the project objectives are achieved. Brief descriptions of each facilitating knowledge area are as follows:

- **Project human resource management** is concerned with making effective use of the people involved with the project.
- **Project communications management** involves generating, collecting, disseminating, and storing project information.
- **Project risk management** includes identifying, analyzing, and responding to risks related to the project.
- **Project procurement management** involves acquiring or procuring goods and services for a project from outside the performing organization.

Project integration management, the ninth knowledge area, is an overarching function that affects and is affected by all of the other knowledge areas. It involves coordinating the other knowledge areas, anticipating and dealing with issues, and making decisions each day about what is in the best interest of the entire project. Project managers must have knowledge and skills in all nine of these areas.

1.4.3 Project Management Tools and Techniques

Project management tools and techniques assist project managers and their teams in carrying out work in all nine knowledge areas.

It is crucial for project managers and their team members to determine which tools will be most useful for their particular projects.

Knowledge area/ category	Tools and techniques
Integration management	Project selection methods, project management methodologies, stakeholder analyses, project charters, project management plans, project management software, change requests, change control boards, project review meetings, lessons-learned reports
Scope management	Scope statements, work breakdown structures, mind maps, statements of work, requirements analyses, scope management plans, scope verification techniques, scope change controls
Time management	Gantt charts, project network diagrams, critical- path analyses, crashing, fast tracking, schedule performance measurements
Cost management	Net present value, return on investment, payback analyses, earned value management, project portfolio management, cost estimates, cost management plans, cost baselines
Quality management	Quality metrics, checklists, quality control charts, Pareto diagrams, fishbone diagrams, maturity models, statistical methods
Human resources management	Motivation techniques, empathic listening, responsibility assignment matrices, project organizational charts, resource histograms, team building exercises
Communications management	Communications management plans, kickoff meetings, conflict management, communications media selection, status and progress reports, virtual communications, templates, project Web sites
Risk management	Risk management plans, risk registers, probability/impact matrices, risk rankings
Procurement management	Make- or- buy analyses, contracts, requests for proposals or quotes, source selections, supplier evaluation matrices

Follow-up studies done by the Standish Group (see the previously quoted “ CHAOS” study in the What Went Wrong? passage) showed some improvement in the statistics for information technology projects in the past decade:

- The number of successful IT projects has more than doubled, from 16% in 1994 to 35% in 2006.
- The number of failed projects decreased from 31% in 1994 to 19% in 2006.
- The United States spent more money on IT projects in 2006 than 1994 (\$346 billion and \$ 250 billion, respectively), but the amount of money wasted on challenged projects (those that did not meet scope, time, or cost goals, but were completed) and failed projects was down to \$ 53 billion in 2006 compared to \$ 140 billion in 1994.²

Despite its advantages, project management is not a silver bullet that guarantees success on all projects. Some projects, such as those involving new technologies, have a higher degree of uncertainty, so it is more difficult to meet their scope, time, and cost goals. Project management is a very broad, often complex discipline. What works on one project might not work on another, so it is essential for project managers to continue to develop their knowledge and skills in managing projects. It is also important to learn from the mistakes and successes of others.

1.4.4 Project Success

There are several ways to define project success. The following list outlines a few common criteria for measuring project success:

- The project met scope, time, and cost goals.
- The project satisfied the sponsor.
- The results of the project met its main objective, such as making or saving a certain amount of money, providing a good return on investment (ROI), or simply making the sponsors happy.

1.5 Program and Project Portfolio Management

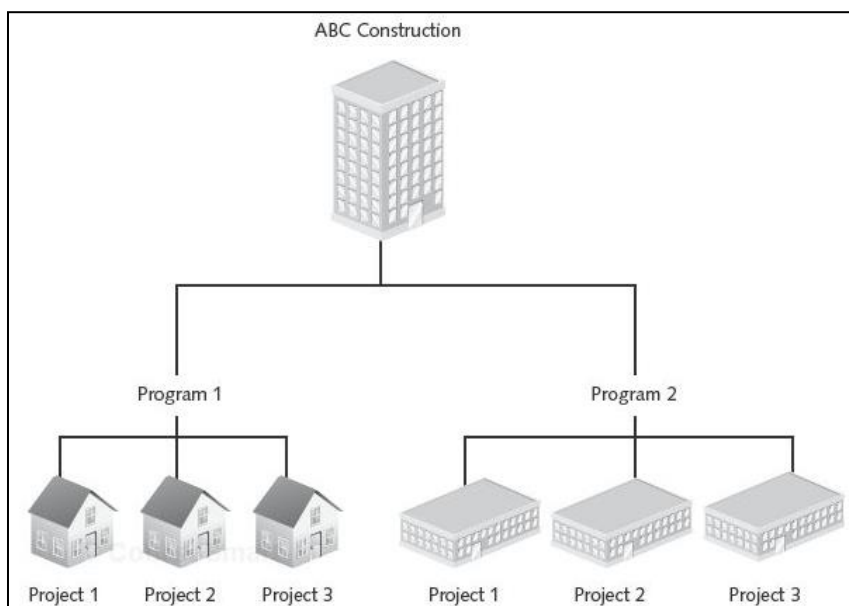
1.5.1 Programs

A program is “a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually.”

As you can imagine, it is often more economical to group projects together to help streamline management, staffing, purchasing, and other work.

Examples:

- A construction firm has a program for building one hundred residential single-family homes in a particular neighborhood. Each home is a separate project for a specific homeowner—the sponsor—but the entire development is a program.
- A clothing firm has a program to analyze customer buying patterns. Projects under this program might include one to send out and analyze electronic surveys, one to conduct several focus groups in different geographic locations with different types of buyers, and one to develop an information system to help collect and analyze current customers' buying patterns.



Program Managers:

- provide leadership and direction for the project manager's heading the projects within the program
- coordinate the efforts of project teams, functional groups, suppliers, and operations staff supporting the projects to ensure that project products and processes are implemented to maximize benefits
- responsible for the success of products and processes produced by those projects
- organize review meetings with all their project managers to share important information and coordinate important aspects of each project.
- Have strong technical and project management skills and also strong business knowledge, leadership capability, and communication skills

1.5.2 Project Portfolio Management

In many organizations, project managers also support an emerging business strategy of project portfolio management, in which organizations group and manage projects and programs as a portfolio of investments that contribute to the entire enterprise's success.

Project portfolio management is:
the continuous process of selecting and managing the optimum set of project initiatives that deliver maximum business value.

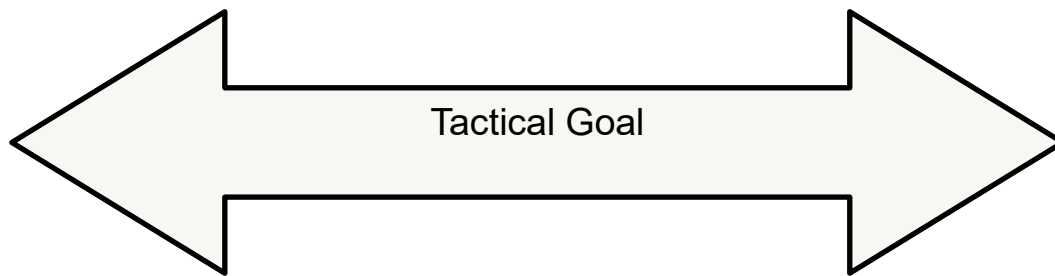
Organizations group projects into portfolios to help them make better investment decisions, such as increasing, decreasing, discontinuing, or changing specific projects or programs based on financial performance, risks, resource utilization, and similar factors that affect business value and strategy.

Portfolio Manager:

- need to understand how projects fit into the bigger picture of the organization, especially in terms of finances and business risks
- create portfolios based on meeting specific organizational goals, such as maximizing the value of the portfolio or making effective use of limited resources
- help their organizations make wise investment decisions by helping to select and analyze projects from a strategic perspective
- might or might not have previous experience as project or program managers
- have strong financial and analytical skills and understand how projects and programs can contribute to meeting strategic goals

Distinction between project management and portfolio management:

- Individual projects often address tactical goals, whereas project portfolio management addresses strategic goals.
- Project management addresses questions related to how well projects are managed in terms of meeting scope, time, and costs goals and stakeholder expectations.
- Project portfolio management addresses questions related to what projects are being done and how well they meet organizational goals, such as making good investments and being competitive.



Project Management

- Are we carrying out projects well?
- Are projects on time and budget?
- Do project stakeholders know what they should be doing?

Project Portfolio Management

- Are we working on the right project?
- Are we investing in the right areas?
- Do we have the right resources to be competitive?

1.6 Project Management Software

The Project Management Center, a Web site for people involved in project management, provides an alphabetical directory of more than 300 project management software solutions (www.infogoal.com/pmc).

This site and others demonstrate the growth in available project management software products, especially Web-based tools. Deciding which project management software to use has become a project in itself.

These project management software tools can be divided into three general categories based on functionality and price.

Low-end tools:

- These tools provide basic project management features and generally cost less than \$200 per user.
- They are often recommended for small projects and single users.
- Most of these tools allow users to create Gantt charts, which cannot be done easily using current productivity software.
- Top Ten Reviews listed MinuteMan (\$ 49) and Project Kickstart (\$ 129.95) in their list of top 10 project management software tools for 2006.
- Several companies provide add-in features to Excel (see www.business-spreadsheets.com) to provide basic project management functions using a familiar software product.

Midrange tools:

- midrange tools are designed to handle larger projects, multiple users, and multiple projects

- All of these tools can produce Gantt charts and network diagrams, and can assist in critical-path analysis, resource allocation, project tracking, status reporting, and so on.
- Prices range from about \$200 to \$600 per user, and several tools require additional server software for using work-group features.
- Microsoft Project is still the most widely used project management software today
- Top Ten Reviews listed Microsoft Project as their number one choice (\$599), along with Milestones (\$219). A product called Copper also made the top 10 list, with a price of \$999 for up to 50 users. Note that students and educators can purchase software like Microsoft Project 2007 at reduced prices from sites like [www. journeyed.com](http://www.journeyed.com).

High-end tools:

- provide robust capabilities to handle very large projects, dispersed work groups, and enterprise functions that summarize and combine individual project information to provide project portfolio management information
- are generally licensed on a per-user basis, integrate with enterprise database management software, and are accessible via the Internet.
- In mid 2002, Microsoft introduced the first version of their Enterprise Project Management software, and in 2003, they introduced the Microsoft Enterprise Project Management solution, which was updated in 2007 to include Microsoft Office Project Server 2007 and Microsoft Office Project Portfolio Server 2007.
- Several inexpensive, Web- based products that provide enterprise and portfolio management capabilities are also on the market. For example, VPMi Express ([www. vcsonline. com](http://www.vcsonline.com)) is available for a low monthly fee per user.
- See the Project Management Center Web site ([www. infogoal.com/ pmc](http://www.infogoal.com/pmc)) or Top Ten Reviews ([http:// project- management- software- review. \(http://project-management-software-review. toptenreviews. com\)](http://project-management-software-review.toptenreviews.com) for links to many companies that provide project management software.

2 Project Lifecycle

The project lifecycle consist of 2 preliminary project phases (Discovery, Evaluation) and 4 major project phases (Initiation, Planning, Execution, Closure).



2.1 Discovery

Firms have to develop a fair, consistent, and logical process for selecting projects, programs, and portfolios. A four-stage planning process for selecting projects includes strategic management, business area analysis, project planning and resource allocation. The portfolio management processes helps to align projects to the strategic objectives of a firm. The program management decides about managing several projects together.

2.2 Evaluation

After the project is approved through a formal project selection process and is given the go-ahead, senior managers have to evaluate the selected projects with various methods. Evaluating projects means taking into consideration the firm's strategy, accomplish financial projections, execute scoring models, considering opportunities and threats, focusing on time constraints and setting project priorities.

2.3 Initiation

The Initiation Phase is the first phase in the project. In this phase a business problem (or opportunity) is identified and a business case which provides various solution options is defined. A feasibility study is then conducted to investigate the likelihood of each solution option addressing the business problem and a final recommended solution is put forward. Once the recommended solution is approved, a project is initiated to deliver the approved solution. A 'Terms of Reference' is completed, which outlines the objectives, scope and structure of the new project, and a Project Manager is appointed. The Project Manager

begins recruiting a project team and establishes a Project Office environment. Approval is then sought to move into the detailed planning phase.

2.4 Planning

Once the scope of the project has been defined in the Project Charter, the project enters the detailed planning phase. This involves the creation of a:

- Project Plan (outlining the activities, tasks, dependencies and timeframes)
- Resource Plan (listing the labor, equipment and materials required)
- Financial Plan (identifying the labor, equipment and materials costs)
- Quality Plan (providing quality targets, assurance and control measures)
- Risk Plan (highlighting potential risks and actions taken to mitigate them)
- Acceptance Plan (listing the criteria to be met to gain customer acceptance)
- Communications Plan (listing the information needed to inform stakeholders)
- Procurement Plan (identifying products to be sourced from external suppliers).

At this point the project has been planned in detail and is ready to be executed.

2.5 Execution

This phase involves the execution of each activity and task listed in the Project Plan. While the activities and tasks are being executed, a series of management processes are undertaken to monitor and control the deliverables being output by the project. This includes the identification of changes, risks and issues, the review of deliverable quality and the measurement of each deliverable being produced against the acceptance criteria. Once all of the deliverables have been produced and the customer has accepted the final solution, the project is ready for closure.

2.6 Closure

Project Closure involves releasing the final deliverables to the customer, handing over project documentation, terminating supplier contracts, releasing project resources and communicating the closure of the project to all stakeholders. The last remaining step is to undertake a Post Implementation Review to quantify the overall success of the project and list any lessons learnt for future projects.

3 Project Discovery

It is important for organizations to develop a fair, consistent, and logical process for selecting projects, programs, and portfolios. Studies show that one of the main reasons people quit their jobs is because they feel they do not make a difference. After employees understand how their work fits into the big picture, they can work more effectively to help themselves and their entire organizations succeed.

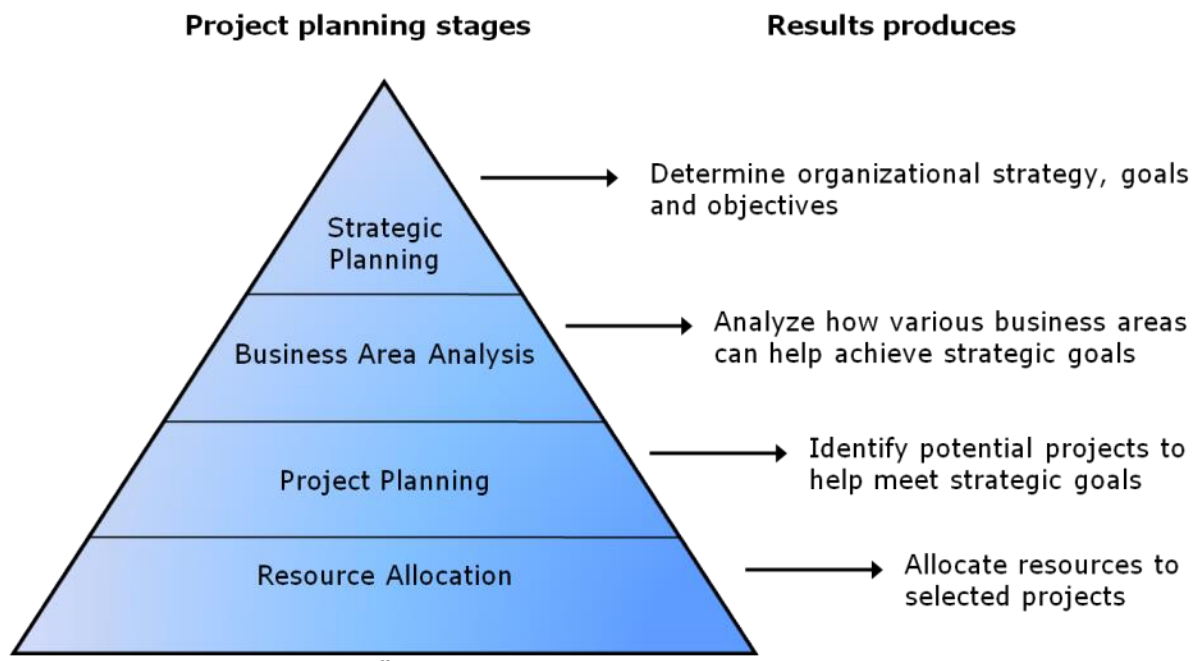
3.1 Four-Stage Discovery Process for Project Selection

One of the most important factors in project success is discovering the best projects to undertake. In addition to using a SWOT analysis, organizations often follow a detailed planning process for project selection.

Figure 1-1 shows a four-stage planning process for selecting projects. Note the hierarchical structure of this model and the results produced from each stage. It is very important to start at the top of the pyramid to select projects that support the organization's business strategy. The four-stages of this process include:

1. **Strategic management:** The first step of the project discovery process is to understand the firm's strategy, goals, and objectives.
2. **Business area analysis:** The second step is to analyze business processes that are central to achieving strategic goals.
3. **Project planning:** The next step is to start defining potential projects that address the strategies and business areas identified. Managers should discuss the potential projects' scope, time, and cost goals; projected benefits; and constraints as part of this process.
4. **Resource allocation:** The last step in the project planning process is choosing which projects to do and assigning resources for working on them. The amount of resources the organization has available or is willing to acquire will affect resource-allocation decisions.

Figure 3-1 Pyramid for the project planning process



3.2 Strategic Management

Successful leaders look at the big picture or strategic plan of the organization to determine what projects will provide the most value. The same can be said for successful individuals. No one person can do everything, so individuals must pick projects to pursue based on their talents, interests, limitations, and so on.

Strategic management involves determining long-term objectives by analyzing the strengths and weaknesses of an organization, studying opportunities and threats in the business environment, predicting future trends, and projecting the need for new products and services. Strategic planning provides important information to help organizations identify and then select potential projects.

For example, if a firm's competitive strategy is cost leadership, it should focus on projects that will help it retain its position as a low-cost producer.

3.3 Business Area Analysis

The internal analysis or assessment focuses on identifying and evaluating a firm's strengths and weaknesses in the functional areas of business, including management, marketing, finance/accounting, production/operations, research and development, and management information systems.

Representative managers from throughout the firm need to be involved in determining a firm's strengths and weaknesses. Key factors should be prioritized so that the firm's most important strengths and weaknesses can be determined collectively. Based on the internal analysis and the firm's strategic planning, projects have to be launched to support a firm's strengths or eliminate a firm's weakness.

For example, could the organization make improvements in sales, manufacturing, engineering, information technology (IT), or other business areas to support the firm's strategy?

3.3.1 SWOT Analysis

The SWOT analysis is an extremely useful tool for understanding and decision-making for all sorts of situations in business and organizations. SWOT is an acronym for Strengths, Weaknesses, Opportunities and Threats.

The SWOT analysis headings provide a good framework for reviewing strategy, position and direction of a company or business proposition, or any other idea.



3.4 Project Planning

3.4.1 Project Portfolio Selection

The goal of project portfolio management is to help maximize business value to ensure enterprise success.

Project portfolio managers and other senior managers must focus on how all of an organization's projects fit together to help the entire enterprise achieve success.

That might mean

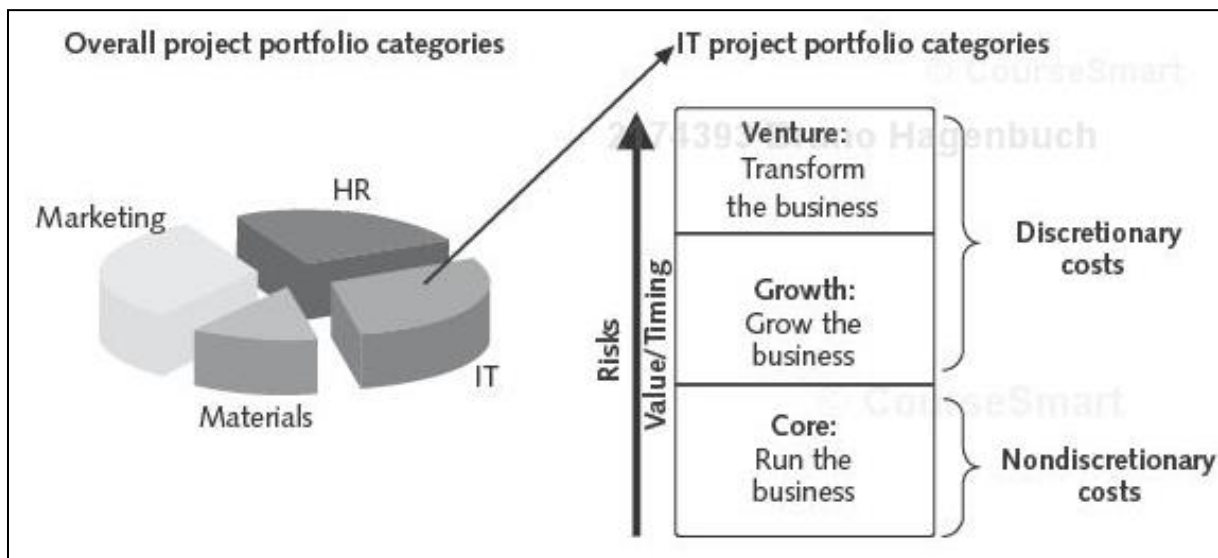
- canceling or putting several projects on hold
- reassigning resources from one project to another

- suggesting changes in project leadership
- taking other actions that might negatively affect individual projects or programs to help the organization as a whole

Portfolios should be formed and continuously updated to help the organization as a whole make better strategic decisions. Organizations normally put all projects into one portfolio, but then often break it down into more detailed sub-portfolios, often set up by major departments or other categories.

Several companies create a separate portfolio for IT projects. It is often difficult to measure the financial value of many IT projects, yet these projects are often a large investment and have a strong effect on other business areas.

The right part of this figure shows how the IT projects could be categorized in more detail to assist in their management. For example, there are three basic IT project portfolio categories: venture, growth and core.



Note that the core category of IT projects is labeled as nondiscretionary costs. This means that the company has no choice in whether to fund these projects; it must fund them to stay in business.

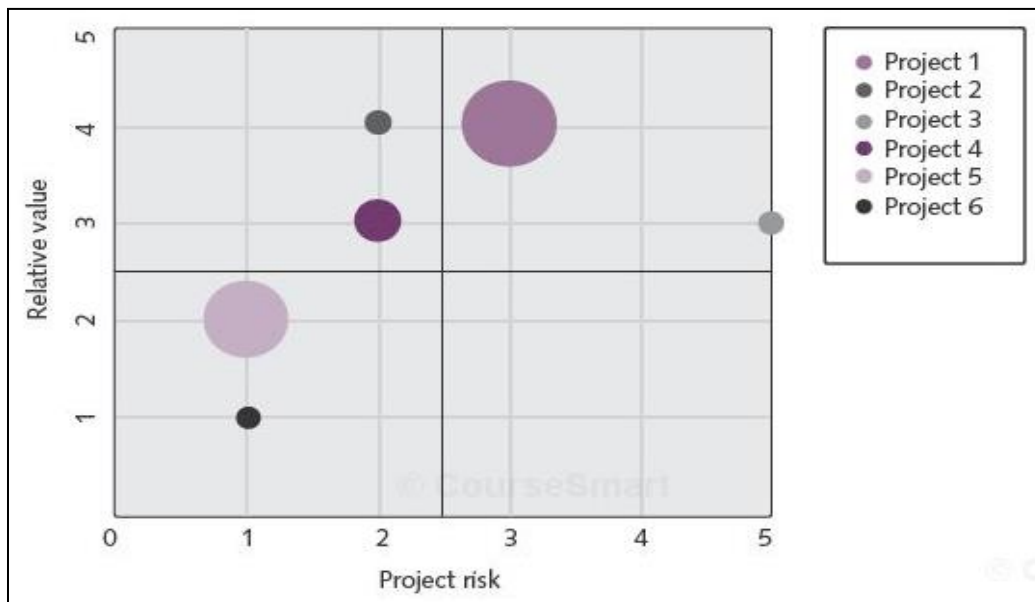
Projects that fall under the venture or growth category would be discretionary costs because the company can use its own discretion in deciding whether to fund them. Also note the arrow in the center of Figure. This arrow indicates that the risks, value, and timing of projects normally increase as you go from core to growth to venture projects. However, some core projects can also be high risk, have high value, and require good timing.

3.4.2 Five Levels of Project Portfolio Management

An organization can view project portfolio management as having five levels, from simplest to most complex, as follows:

1. Put all of your projects in one list. Many organizations find duplicate or unneeded projects after they identify all the projects on which they are working.

2. Prioritize the projects in your list. It's important to know which projects are most important to an organization so that resources can be applied accordingly.
3. Divide your projects into several categories based on types of investment. Categorizing projects helps you see the big picture, such as how many projects are supporting a growth strategy, how many are helping to increase profit margins, how many relate to marketing, and how many relate to IT. Organizations can create as many categories as they need to help understand and analyze how projects affect business needs and goals.
4. Automate the list. Managers can view project data in many different ways by putting key information into a computerized system. You can enter the project information in spreadsheet software such as Excel. You might have headings for the project name, project manager, project sponsor, business needs addressed, start date, end date, budget, risk, priority, key deliverables, and so on. You can also use more sophisticated tools to help perform project portfolio management, such as enterprise project management software.
5. Apply modern portfolio theory, including risk-return tools that map project risks.



The figure provides a sample map to assist in evaluating project risk versus return, or business value. Each bubble represents a project, and the size of the bubble relates to its approved budget. Notice that there are not and should not be projects in the lower-right quadrant, which is the location of projects that have low relative value and high risk.

3.4.3 Program Management

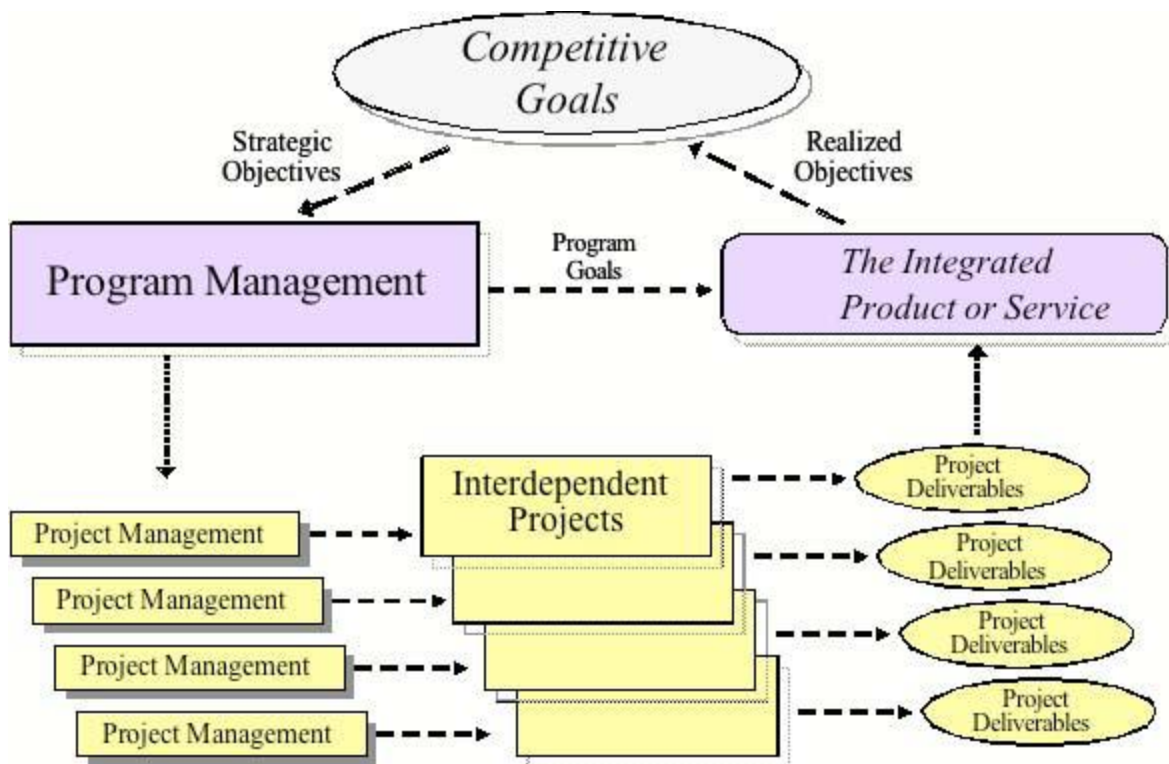
After deciding which projects to pursue, organizations need to decide if it is advantageous to manage several projects together as part of a program. There might already be a program that a new project would logically fall under, or the organization might initiate a program and then approve projects for it. A program is a group of projects managed in a coordinated way to obtain benefits and control not available from managing them individually.

“Good program management goes right to the bottom line; it improves a company’s

P&L (profit and loss). A company that delivers more products, better products, and does so faster wins the competitive race. Program management makes better, faster and cheaper a reality”

1.1.1.1 Aligning Project Execution to Business Strategy

By introducing a program management development model to deliver a portfolio of high-value products or services, the consistent focus on business success by a program manager results in a tight alignment between strategic objectives and project outputs. When implemented properly, the program management development model creates a closed-loop management system that creates competitive advantage by effectively delivering products and services that align to the firm’s strategy and competitive goals.



1.1.1.2 Improving Time-to-Market

By using an integrated development approach such as the program management development model, time-to-market goals are optimized. The program management model is built on the development, management and delivery of interdependencies between the functional elements of the program throughout the development life cycle. By incorporating and managing the cross-project deliverables through an iterative and integrated development process, a limited rework scenario exists. This translates to faster time-to-market possibilities, an advantage that brings an extended sales cycle, premium prices, higher profits, and faster learning over companies that do not use program management practices.

The project hand-off or waterfall approach where project management ownership is transferred (or sometimes thrown over the wall) from one functional project team to the next is too slow to gain time-to-market competitive advantage.

1.1.1.3 Program Management Benefits

Organizations must decide when it makes sense to group projects together. When too many projects are part of one program, it might be wise to create a new program to improve their management. The main goal of programs is to obtain benefits and control not available from managing projects separately.

Grouping related projects into programs provide the following benefits:

- Aligned with business strategy
- Improved coordination
- Better planning
- Faster throughput time
- Reduced cost
- Increased authority
- Increasing control
- Higher efficiency

4 Project Evaluation

Most organizations face hundreds of problems and opportunities for improvement and consider potential projects to address them. These organizations— both large and small— cannot undertake most of the potential projects identified because of resource limitations and other constraints. Therefore, an organization's overall business strategy should guide the project selection process and management of those projects.

4.1 Methods for Selecting Projects

Although people in organizations identify many potential projects as part of their strategic planning process, they also identify projects by working on day- to-day operations. A marketing analyst might notice that competitors are using new forms of advertising and suggest a project to respond to this competition. It is important for organizations to encourage workers at all levels to submit project ideas because they know firsthand what problems they are encountering and what opportunities might be available.

How do senior managers decide which of the many potential projects their organization should pursue? Some projects directly support competitive strategy and are easy choices, but other project ideas require additional thought and analysis. However, organizations need to narrow down the list of potential projects to those projects that will be most beneficial. Most large organizations go through a preliminary project prioritization process annually. For example, early each fall Exxon Corporation's Information Technology (IT) organizations work with all of their internal client organizations worldwide to identify potential IT projects and resource requirements for the following year. This process takes about three weeks, followed by meetings to discuss and prioritize potential projects and agree to cut- off lines based on the availability of funds and other resources. The prioritized list of potential projects are then reviewed by senior management as part of the corporation's fall company planning and budgeting process.

Selecting projects is not an exact science, but it is a critical part of project, program, and project portfolio management. Many methods exist for selecting from among possible projects. Common techniques are listed here and explained in the following sections:

1. **Company strategy:** focusing on the firm's strategy and broad organizational needs
2. **Financial projections:** net present value analysis, return on investment, payback analysis or other financial projections
3. **Weighted scoring model:** provides a systematic process for selecting projects based on many criteria.
4. **Balanced scorecard**
5. **Problems, opportunities, and directives:** selection based on the response to a problem, an opportunity, or a directive
6. **Time frame:** the time it will take to complete a project or the date by which it must be done

7. **Project priority:** overall priority of the project

In practice, organizations usually use a combination of these approaches to select projects. Each approach has advantages and disadvantages, and it is up to management to decide the best approach for selecting projects based on their particular organization. In any case, projects should first and foremost address business needs.

4.2 **Company Strategy**

When deciding what projects to undertake, when to undertake them, and to what level, managers must focus on meeting their organization's many needs. Projects that address the firm's strategy are much more likely to be successful because they will be important to the organization's competitive position.

For example, a company might have a competitive strategy of cost leadership, meaning that it attracts customers primarily because its products or services are inexpensive. Wal-Mart and Cub Foods fit into this category; a project to help reduce inventories and, thereby, costs would fit their competitive strategies.

4.3 **Financial Projections**

Financial considerations are often an important aspect of the project selection process, especially during tough economic times. Three primary methods for determining the projected financial value of projects include net present value analysis, return on investment, and payback analysis.

4.3.1 **Net Present Value Analysis**

Net present value (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time.

An organization should consider only projects with a positive NPV if financial value is a key criterion for project selection. This is because a positive NPV means the return from a project exceeds the **opportunity cost of capital**— the return available by investing the capital elsewhere.

For example, is it best to put money into Project A or Project B? Projects with higher NPVs are preferred to projects with lower NPVs if all other factors are equal.

The figure below illustrates the NPV concept for two different projects. Note that this example starts discounting right away in Year 1 and uses a 10% discount rate for both projects. You can use the NPV function in Microsoft Excel to calculate the NPV quickly.

Note that figure lists the projected benefits first, followed by the costs, and then the calculated cash flow amount. Notice that the sum of the cash flow— benefits minus costs, or income minus expenses— is the same for both projects at \$ 5,000. The net present values are different, however, because they account for the time value of money. Money earned today is worth more than money earned in the future, primarily due to inflation. Project 1 had a negative cash flow of \$ 5,000 in the first year, whereas Project 2 had a negative cash flow of only \$ 1,000 in the first year.

Although both projects had the same total cash flows without discounting, these cash flows are not of comparable financial value. NPV analysis, therefore, is a method for making equal comparisons between cash flow for multiyear projects. Although this example shows both projects having the same length, NPV also works for projects of different lengths.

	A	B	C	D	E	F	G
1	Discount rate	10%					
2							
3	PROJECT 1	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
4	Benefits	\$0	\$2,000	\$3,000	\$4,000	\$5,000	\$14,000
5	Costs	\$5,000	\$1,000	\$1,000	\$1,000	\$1,000	\$9,000
6	Cash flow	(\$5,000)	\$1,000	\$2,000	\$3,000	\$4,000	\$5,000
7	NPV	\$2,316					
8		Formula =npv(b1,b6:f6)					
9							
10	PROJECT 2	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
11	Benefits	\$1,000	\$2,000	\$4,000	\$4,000	\$4,000	\$15,000
12	Costs	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$10,000
13	Cash flow	(\$1,000)	\$0	\$2,000	\$2,000	\$2,000	\$5,000
14	NPV	\$3,201					
15		Formula =npv(b1,b13:f13)					
16							
17							

Note that totals are equal, but NPVs are not because of the time value of money

There are some items to consider when calculating NPV. Some organizations refer to the investment year(s) for project costs as Year 0 instead of Year 1 and do not discount costs in Year 0. Other organizations start discounting immediately based on their financial procedures; it is simply a matter of preference for the organization. The discount rate can also vary, based on the prime rate and other economic considerations.

4.3.2 Return on Investment

Another important financial consideration is return on investment. Return on investment (ROI) is the result of subtracting the project costs from the benefits and then dividing by the costs.

For example, if you invest \$100 today and next year your investment is worth \$110, your investment is worth \$110, your ROI is $(\$110 - 100)/100$, or 0.10 (10%).

Note that the ROI is always a percentage. It can be positive or negative. It is best to consider discounted costs and benefits for multiyear projects when calculating ROI.

You calculate the ROI as follows:

$$\text{ROI} = (\text{total discounted benefits} - \text{total discounted costs}) / \text{discounted costs}$$

The higher the ROI, the better. Many organizations have a required rate of return for projects. The required rate of return is the minimum acceptable rate of return on an investment. For example, an organization might have a required rate of return of at least 10% for projects. The organization bases the required rate of return on what it could expect to receive elsewhere for an investment of comparable risk.

4.3.3 Payback Analysis

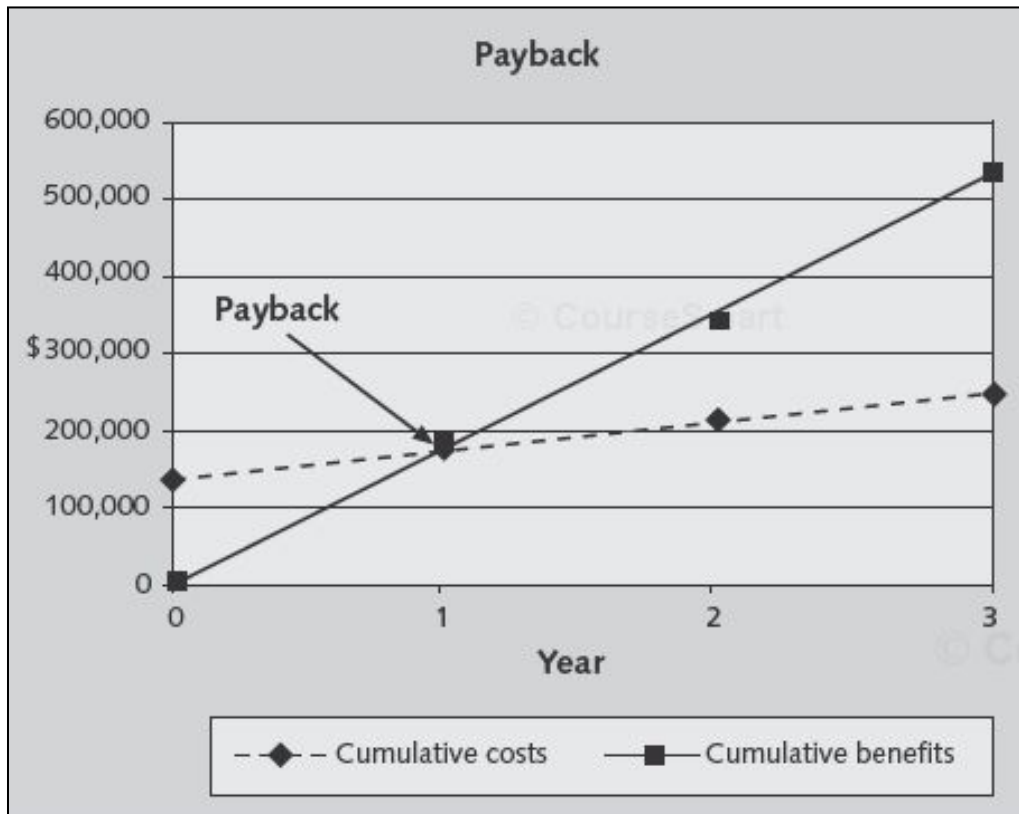
Payback analysis determines how much time will lapse before accrued benefits overtake accrued and continuing costs. Payback occurs in the year when the cumulative benefits minus costs reach zero.

Payback analysis is another important financial tool to use when selecting projects. Payback period is the amount of time it will take to recoup - in the form of net cash inflows - the total dollars invested in a project. In other words, payback analysis determines how much time will lapse before accrued benefits overtake accrued and continuing costs. Payback occurs in the year when the cumulative benefits minus costs reach zero.

Discount rate	8%					
Assume the project is completed in Year 0			Year			
	0	1	2	3	Total	
Costs	140,000	40,000	40,000	40,000		
Discount factor	1	0.93	0.86	0.79		
Discounted costs	140,000	37,200	34,400	31,600	243,200	
Benefits	0	200,000	200,000	200,000		
Discount factor	1	0.93	0.86	0.79		
Discounted benefits	0	186,000	172,000	158,000	516,000	
Discounted benefits - costs	(140,000)	148,800	137,600	126,400	272,800	← NPV
Cumulative benefits - costs	(140,000)	8,800	146,400	272,800		
ROI	112%					
	Payback in Year 1					

The figure above shows how to find the payback period. The cumulative benefits minus costs for Year 0 are (\$ 140,000). Adding that number to the discounted benefits minus costs for Year 1 results in \$ 8,800. Because that number is positive, the payback occurs in Year 1. Note that the year the project was undertaken in this example was called Year 0.

Creating a chart helps illustrate more precisely when the payback period occurs. The figure below charts the cumulative discounted costs and cumulative discounted benefits each year using the numbers from the above figure. Note that the lines cross a little after Year 1 starts (assuming the project was done in Year 0). The cumulative discounted benefits and costs are equal to zero where the lines cross.



4.4 Weighted Scoring Model

A weighted scoring model is a tool that provides a systematic process for selecting projects based on many criteria. These criteria include such factors as meeting strategic goals or broad organizational needs; addressing specific problems or opportunities; the amount of time it will take to complete the project; the overall priority of the project; and the projected financial performance of the project.

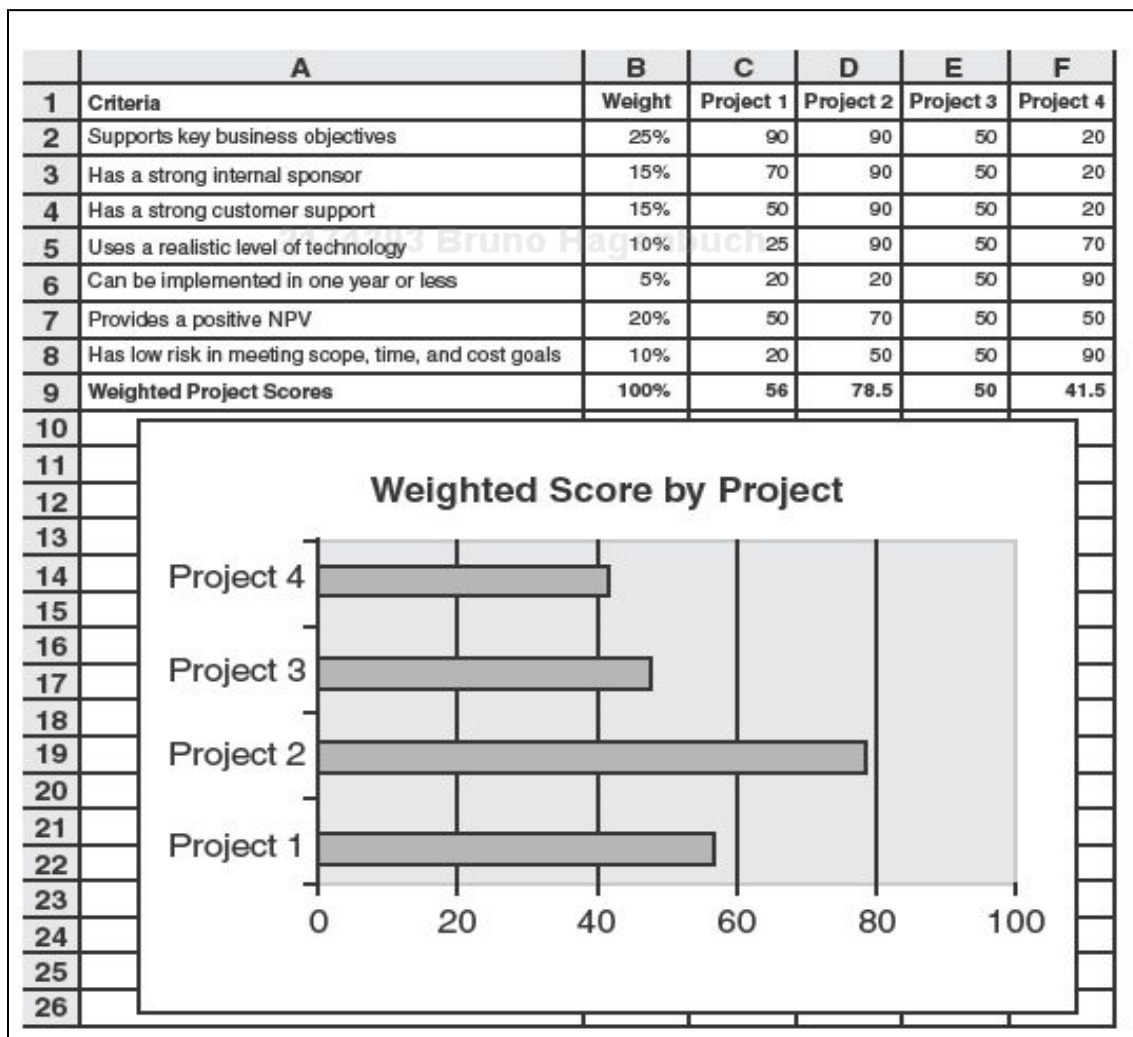
The first step in creating a weighted scoring model is to identify criteria important to the project selection process. It often takes time to develop and reach agreement on these criteria. Some possible criteria for projects include the following:

- Supports key business objectives
- Has a strong internal sponsor
- Has strong customer support
- Uses a realistic level of technology
- Can be implemented in one year or less

- Provides a positive NPV
- Has low risk in meeting scope, time, and cost goals

Next, you assign a weight to each criterion. Once again, determining weights requires consultation and final agreement. These weights indicate how much you value each criterion or how important each criterion is. You can assign weights based on percentage, and the sum of all the criteria's weights must total 100%. You then assign numerical scores to each criterion (for example, 0 to 100) for each project. The scores indicate how much each

Sample weighted scoring model for project selection:



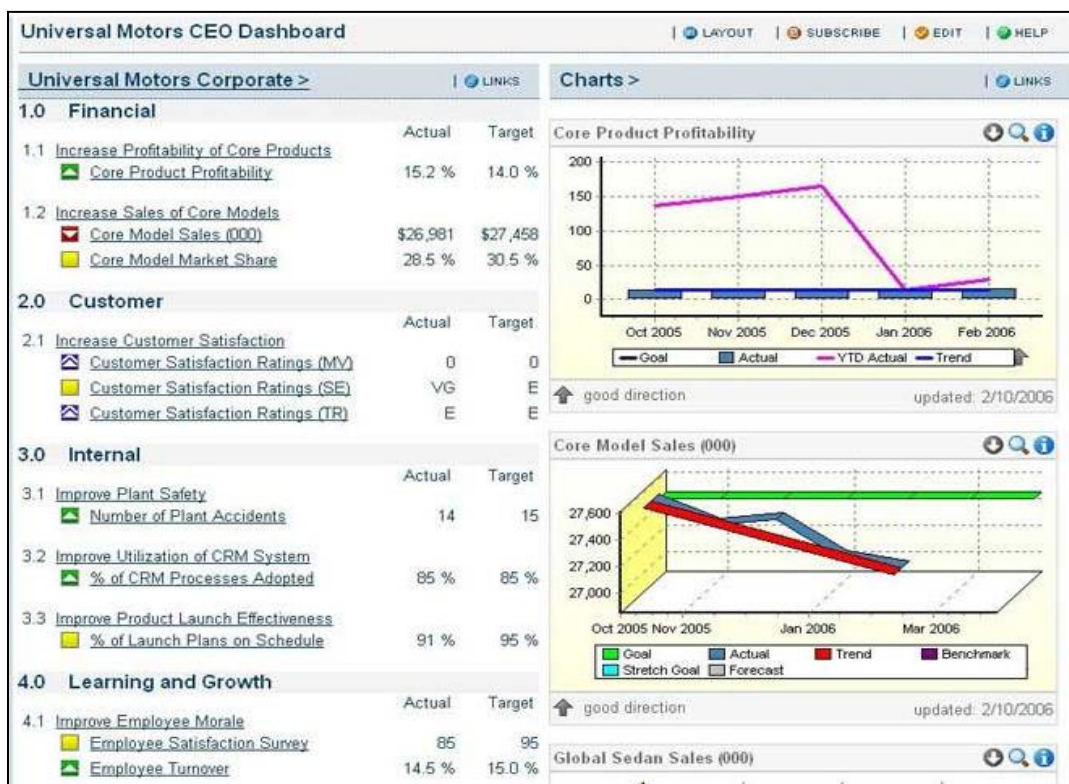
4.5 Balanced Scorecard

A balanced scorecard is a methodology that converts an organization's value drivers— such as customer service, innovation, operational efficiency, and financial performance—to a

series of defined metrics. Organizations record and analyze these metrics to determine how well projects help them achieve strategic goals.

The Balanced Scorecard Institute, which provides training and guidance to organizations using this methodology, quotes Kaplan and Norton's description of the balanced score-card as follows:

The balanced scorecard retains traditional financial measures. But financial measures tell the story of past events, an adequate story for industrial age companies for which investments in long-term capabilities and customer relationships were not critical for success. These financial measures are inadequate, however, for guiding and evaluating the journey that information age companies must make to create future value through investment in customers, suppliers, employees, processes, technology, and innovation. Visit www.balancedscorecard.org for more information on using this approach to project selection.



An example from Defense Finance and Accounting Service, "DFAS Strategic Plan," Nov 2001:



4.6 Problems, Opportunities, and Directives

Another method for selecting projects is based on their response to a problem, an opportunity, or a directive, as described in the following list:

- **Problems** are undesirable situations that prevent an organization from achieving its goals. These problems can be current or anticipated. For example, users of an information system might be having trouble logging on to the system or getting information in a timely manner because the system has reached its capacity. In response, the company could initiate a project to enhance the current system by adding more access lines or upgrading the hardware with a faster processor, more memory, or more storage space.
- **Opportunities** are chances to improve the organization. For example, an organization could implement a project to train workers on important skills that will make the organization more competitive.
- **Directives** are new requirements imposed by management, government, or some external influence. For example, a college or university may have to meet a requirement to not collect or use a student's social security number.

Organizations select projects for any of these reasons. It is often easier to get approval and funding for projects that address problems or directives because the organization must respond to these categories of projects to avoid hurting the business.

For example, several years ago Exxon Corporation realized that it was losing \$200,000 each minute its motor fuel store point-of-sale system was down. Getting approval for a \$7 million project to re-engineer this critical system was approved and given high priority. Many projects resulting from natural disasters, such as hurricanes and earthquakes, get quick approvals due to their serious nature. Many problems and directives must be resolved quickly, but managers must also consider projects that seek opportunities for improving the organization.

4.7 Project Time Frame

Another approach to project selection is based on the time it will take to complete a project or the date by which it must be done. For example, some potential projects must be finished within a specific time period, such as projects that were done to meet Year 2000 issues. If they cannot be finished by this set date, they can cause serious problems. Like-wise, if there is a potential project that is only valid if it can be done by a certain time and there is no way your organization can meet the deadline, it should not be considered. Some projects can be completed very quickly— within a few weeks, days, or even minutes. However, even though many projects can be completed quickly, it is still important to prioritize them.

4.8 Project Priority

Another method for project selection is the overall priority of the project. Many organizations prioritize projects as being high, medium, or low priority based on the current business environment. For example, if it were crucial to cut operating costs quickly, projects that have the most potential to do so would be given a high priority. The organization should always complete high-priority projects first, even if a low- or medium-priority project could be finished in less time. Usually, there are many more potential projects than an organization can undertake at any one time, so it is very important to work on the most important ones first. As you can see, organizations of all types and sizes can use many approaches to select projects. Many project managers have some say in which projects their organizations select for implementation. Even if they do not, they need to understand the motive and over-all business strategy for the projects they are managing. Project managers and team members are often asked to justify their projects, and understanding many of these project selection methods can help them to do so.

4.9 Project Approval

After a formal project selection process, the senior management has to approve the projects and give the go-ahead.

After a project is approved, senior managers should meet to accomplish the following tasks to lay the groundwork for a project before it officially starts:

- **Background:** explain the business situation and challenges, assumptions and constraints
- **Objectives:** outline scope, time, and cost constraints for the project
- **Organization:** identify the project sponsor and project manager
- **Deliverables:** reviews the process and sets expectations for the project
- **Approval:** by project sponsor and senior management

4.10 Top Management Commitment

Without top management commitment, many projects will fail. Some projects have a senior manager called a champion who acts as a key proponent for a project. Projects are part of the larger organizational environment, and many factors that might affect a project are out of the project manager's control. Top management commitment is crucial for the following reasons:

- **Resources:** Project managers need adequate resources. The best way to kill a project is to withhold the required money, human resources, and/ or visibility for the project. If project managers have top management commitment, they will also have adequate resources and be able to focus on completing their specific projects.
- **Unique Project Needs:** Project managers often require approval for unique project needs in a timely manner. For example, a project team might have unexpected problems and need additional resources halfway through the project, or the project manager might need to offer special pay and benefits to attract and retain key project personnel. With top management commitment, project managers can meet these specific needs in a timely manner.
- **Politics:** Project managers must have cooperation from people in other parts of the organization. Because most projects cut across functional areas, top management must help project managers deal with the political issues that often arise in these types of situations. If certain functional managers are not responding to project managers' requests for necessary information, top management must step in to encourage functional managers to cooperate.
- **Coach and Mentor:** Project managers often need someone to mentor and coach them on leader-ship issues. Many project managers come from technical positions and are inexperienced as managers. Senior managers should take the time to pass on advice on how to be good leaders. They should encourage new project man-agers to take classes to develop leadership skills and allocate the time and funds for them to do so.

4.11 Organizational Standards

Another problem in most organizations is not having standards or guidelines to follow that could help in performing project management functions. These standards or guidelines might be as simple as providing standard forms or templates for common project documents,

examples of good project documentation, or guidelines on how the project manager should perform certain tasks, such as holding a kick-off meeting or providing status information.

Top management must support the development of these standards and guidelines and encourage or even enforce their use.

Some organizations invest heavily in project management by creating a project management office or center of excellence. A project management office (PMO) is an organizational entity created to assist project managers in achieving project goals. Some organizations develop career paths for project managers. Some require that all project managers have some type of project management certification and that all employees have some type of project management training. The implementation of all of these standards demonstrates an organization's commitment to project management and helps them ensure project success.

5 Project Initiation

The Initiation Phase is the first major phase in the project. In this phase a business problem (or opportunity) is identified and a business case which provides various solution options is defined. A feasibility study is then conducted to investigate the likelihood of each solution option addressing the business problem and a final recommended solution is put forward. Once the recommended solution is approved, a project is initiated to deliver the approved solution. A Project Charter is completed, which outlines the objectives, scope and structure of the new project..

The Initiation Phase is the first phase in the project.

1. **Stakeholder Analysis:** provides information on key stakeholders to help manage relationships with them.
2. **Business Case:** a business problem (or opportunity) is identified and a business case providing various solution options is defined.
3. **Feasibility study:** is conducted to investigate the likelihood of each solution option addressing the business problem and a final recommended solution is put forward.
4. **Project Charter** is completed, which outlines the objectives, scope and structure of the new project.
5. **Preliminary Scope Statement** is a document used to develop and confirm a common understanding of the project scope.

5.1 Stakeholder Analysis

A stakeholder analysis provides information on key stakeholders to help manage relationships with them. The type of information included in a stakeholder analysis includes the following:

- Names and organizations of key stakeholders
- Their roles on the project
- Perceived attitudes and/or risks, unique facts about each stakeholder
- Their level of interest in the project
- Potential impact on project, their influence on the project
- Stakeholder Management Strategy (Suggestions for managing relationships)
- Responsibility

It is helpful to start preparing a stakeholder analysis during initiation and adding information to it during the planning process.

How does a project manager identify key project stakeholders and find out more about them? The best way is by asking around. There might be formal organizational charts or biographies that can provide some information, but the main goal of the stakeholder analysis is to help project managers manage relationships with key stakeholders.

Because a stakeholder analysis often includes sensitive information, it should not be part of the official project plans, which are normally available for all stakeholders to review. In many cases, only project managers and a few other team members should be involved in preparing the stakeholder analysis.

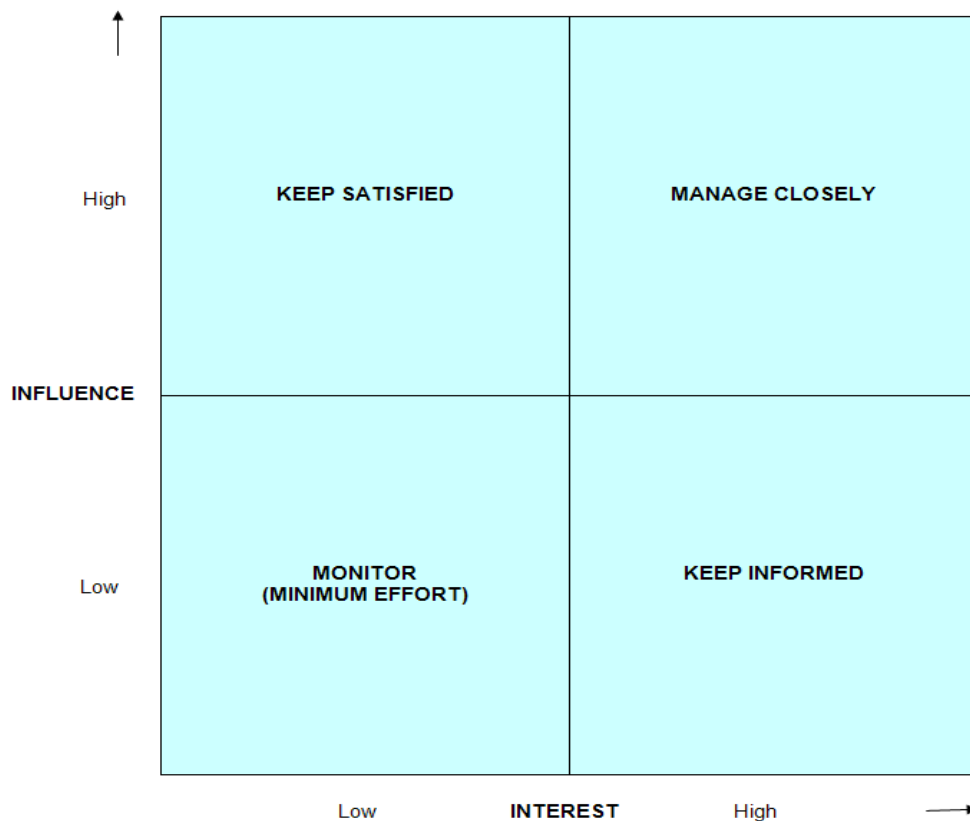
The figure below provides an example of a stakeholder analysis. It is important for project managers to take the time to perform a stakeholder analysis of some sort to identify and try to meet stakeholder needs and expectations. In addition, as new stakeholders are added to the project and more information is provided, the analysis should be updated.

Stakeholder Analysis July 3, 2009					
Project Name: Just-In-Time Training Project					
KEY STAKEHOLDERS					
	Mike Sundby	Lucy Camarena	Ron Ryan	Mohamed Abdul	Julia Portman
Organization	VP of HR	Training director	Senior HR staff member	Senior programmer/analyst	VP of IT
Role on project	Project champion	Project sponsor	Led the Phase I project	Project team member	Project steering committee member
Unique facts	Outgoing, demanding, focuses on the big picture; MBA with emphasis on organizational design	Very professional, easy to work with but can stretch out discussions; Ph.D. in education	Old-timer; jealous that he wasn't asked to lead Phase II project	Excellent technical skills, English his second language, weak people skills, not excited about a training project	Thinks the company is way behind in applying IT, especially for training; wary of many suppliers
Level of interest	Very high	Very high	High	Medium	High
Level of influence	Very high; can call the shots	Very high; subject matter expert	Medium; he could sabotage the project	High; needs strong IT support for project to succeed	High; people listen to her at steering committee meetings
Suggestions on managing relationship	Keep informed, ask for advice as often as needed	Make sure she reviews work before showing to managers	Ask Lucy to talk to him to avoid problems, ask him to be available for advice	Help him see the project's importance, encourage his creativity	Compliment her a lot, ask for additional IT support as needed

Influence / Interest Grid

Once the key stakeholders are identified, plot their position on the grid below using the following guidelines:

- **High influence, interested people:** these are the people you must fully engage and make the greatest efforts with e.g. A head of department, who represents the users/customers
- **High influence, less interested people:** provide sufficient information to these people to ensure that they are up to date but not overwhelmed with data e.g. the Accountable Body (Management Board or Operations Committee)
- **Low influence, interested people:** keep these people adequately informed, talk to them to ensure that no major issues arise. These people can help with the detail of the project e.g. End Users, other Project Managers, Business Community
- **Low influence, less interested people:** provide these people with minimal communication to prevent boredom e.g. other departmental members, teams unaffected by the change.



5.2 Business Case

A business case is a document that provides justification for investing in a project. Once a business problem or opportunity has been identified, a Business Case is prepared.

Typical information included in a business case includes the following:

- Introduction/Background
- Business Objective
- Current Situation and Problem/ Opportunity Statement
- Critical Assumptions and Constraints
- Analysis of Options and Recommendation
- Preliminary Project Requirements
- Budget Estimate and Financial Analysis
- Schedule Estimate
- Potential Risks
- Exhibits

5.3 Feasibility Study

At any stage during (or after) the development of a Business Case, a formal Feasibility Study may be commissioned.

The purpose is to assess the likelihood of a particular solution option's achieving the benefits outlined in the Business Case. The Feasibility Study will also investigate whether

- the forecast costs are reasonable
- the solution is achievable
- the risks are acceptable and/or
- any likely issues are avoidable.

In the example provided below, the likelihood of new technology delivering the required result is very high, as it has been rated 9 out of 10. To come to this conclusion, a technology prototype was created.

Solution Component	Feasibility Rating	Method used to determine feasibility
New Technology	9	A technology prototype was created to assess the solution
New People	8	A survey was completed to identify skill-set availability
New Processes	3	Processes within similar organizations were reviewed
New Assets	9	Physical assets were inspected

5.4 Project Charter

A project charter is a document that formally recognizes the existence of a project and provides a summary of the project's objectives and management. It authorizes the project manager to use organizational resources to complete the project.

Contents of a project charter will also vary to meet individual project needs. Typical information included in a project charter includes the following:

- **Project Title** and Date of Authorization
- **Project Manager:** name and contact information
- **Start date/Finish Date** of the project
- **Background:** chart the current situation/problem, explain the necessity of the project
- **Objectives:** briefly describe the main project objectives, the expected results at the end of the project (quality/time/costs) and the requirements
- **Scope:** outline clearly the boundaries of the project, define what is included and what is not included
- **Budget/Cost:** explain the cost calculation and estimates, and resources and funding required to undertake the project
- **Approach:** describe how the project objectives will be met, list important assumptions, constraints to be considered, interdependencies to other projects or company activities, reference to related documents
- **Approval:** Have the project charter signed by the project sponsor, project manager and related business managers
- **Comments:** allow stakeholders to document important information they want to add

Because many projects fail because of unclear requirements and expectations, starting with a project charter makes sense. If project managers are having difficulty obtaining support from project stakeholders, for example, they can refer to what everyone agreed to in the project charter. After the charter is completed, it is good practice to hold an official kick-off meeting for the project.

Example of project charter:

PROJECT NAME

Project Owner	<i>Name</i>	<i>phone</i>	<i>e-mail</i>
----------------------	-------------	--------------	---------------

Project Manager	<i>Name</i>	<i>phone</i>	<i>e-mail</i>
------------------------	-------------	--------------	---------------

General Information

Start Date		End Date	
Estimated Costs	CHF	Cost Center	
Within Budget	yes/no	Cost Collector	

Background

Chart the current situation/problem, explain the necessity of the project

Objectives

Briefly describe the main project objectives, the expected results at the end of the project (quality/time/costs) and the requirements

Scope

Outline clearly the boundaries of the project, define what is included and what is not included

Costs

Explain the cost calculation and estimates, indicate resources and funding required to undertake the project

Approach

Describe how the project objectives will be met, list important assumptions, constraints to be considered, interdependencies to other projects or company activities, reference to related documents

Approval

Name	Role	Position	Date	Signature
				I

Comments

Allow stakeholders to document important information they want to add

5.5 Preliminary Scope Statement

A scope statement is a document used to develop and confirm a common understanding of the project scope. It describes in detail the work to be accomplished on the project and is an important tool for preventing scope creep—the tendency for project scope to continually increase. It is helpful to create a preliminary, or initial, scope statement during project initiation so that the entire project team can start important discussions and work related to the project scope.

Scope statements, like project charters, also vary by project type. As a minimum, a preliminary scope statement should include:

- the product or service requirements and characteristic
- a summary of all major deliverables
- the project success criteria

The preliminary and subsequent scope statements should expand on information provided in the business case and project charter. Many scope statements also refer to other documents, such as specifications for particular products or relevant policies, procedures, or standards. Project managers must decide what aspects of scope are most important to define early in the project and document them in the preliminary scope statement. They should also establish a process for ensuring that everyone agrees on project scope throughout the project and a process for handling scope changes.

Sample section of preliminary scope statement:

Preliminary Scope Statement

Project Name: Just-In-Time Training Project

Product Characteristics and Requirements

1. Supplier management training: The supplier management director estimates the need to train at least 100 employees each year in supplier management. There should be three levels of courses: an executive course, an introductory course, and an advanced course. Course materials should be developed as a joint effort among internal experts, outside training firms, and key suppliers. A partnership should be developed to maximize the effectiveness of the training and minimize development costs. Different delivery methods should be explored, including instructor-led, CD-ROM, and Web-based.
2. Negotiating skills training: Employees from supplier management and other departments would benefit from this training. There should be several courses offered, including a basic course, a course tailored to negotiating contracts, and a course tailored to international negotiations.

Deliverables:

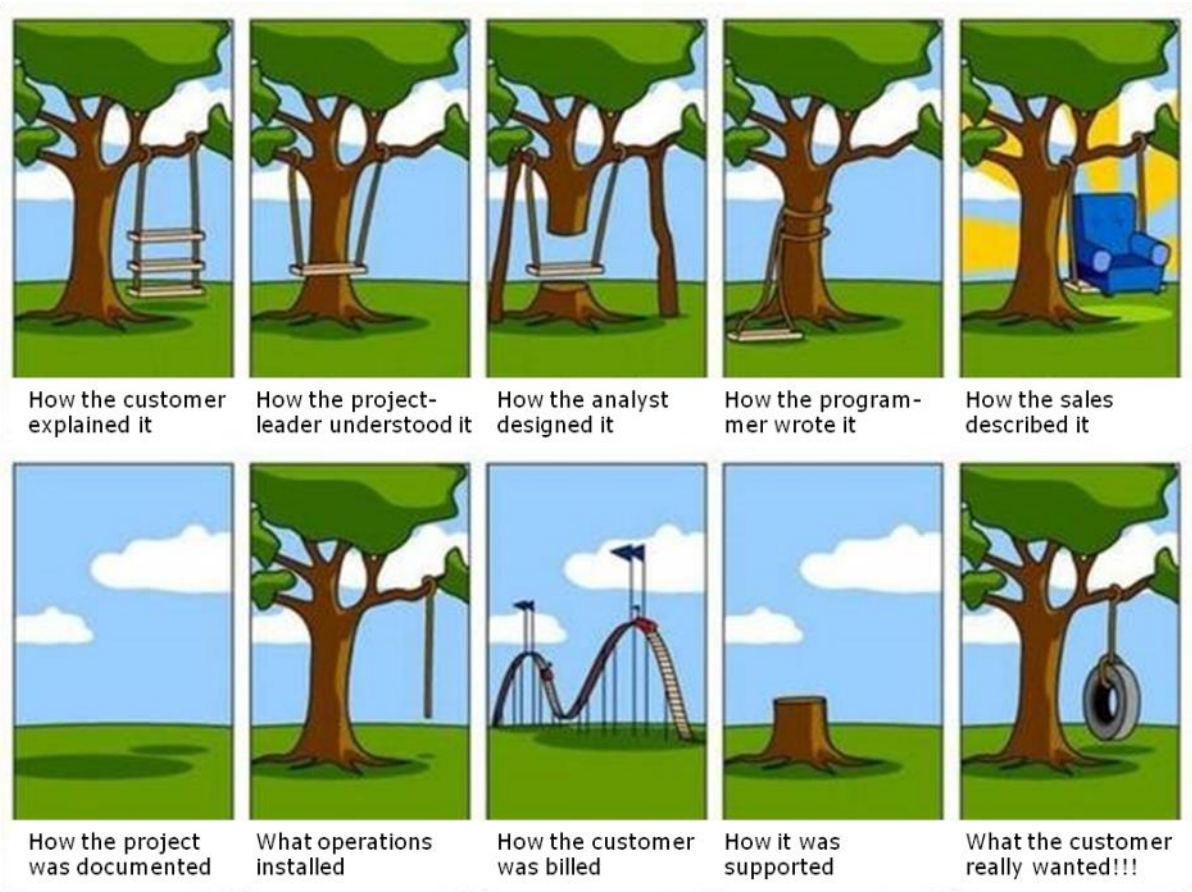
Supplier management training:

1. Needs assessment: A study will be conducted to determine the learning objectives for the executive, introductory, and advanced courses. Study results will be documented in a report about 20-30 pages long.
2. Research of existing training: A short study will identify current training courses and materials available. Study results will be documented in a report about 10—20 pages long, plus attachments and references.

3. Partnerships: Partnership agreements will be made to get outside training organizations and suppliers to work on developing and providing training. The legal department will assist in developing these partnerships.
4. Course design and development.
5. Pilot course.
Etc.

Project Success Criteria:

Our sponsor has stated that the project will be a success if the new training courses are all available within one year, if the average course evaluations are at least 3.0 on a 1-5 scale, and if the company reduces its training costs per employee by 10 percent each year.



5.6 Lessons Learned

Obtain formal and written approval for project order:

- Management needs to be made aware that also the planning phase needs time to have a good reliable scope, budget, timeline at the end of the planning phase.

- Things that are clarified during the initiation phase are mainly high level business requirements and high level efforts.

Define simple, clear and measurable objectives:

- At the end of the initiation phase, business case and project order should be understood by all stakeholders, so the project team can work on potential solutions and in the planning Phase.

Calculate savings for each objective:

- This should be done wherever possible because it proves the cost-effectiveness of the project.
- The calculation can be done as a ROI calculation and should be driven by the business if it is a business project.

Make the line-manager responsible for the objectives:

- It is the line-managers' task to set up the objectives for the projects concerning their department since they need to assume ownership of the project and usually have the highest level of expertise in their departments.

6 Planning

6.1 Introduction

Many people have heard the following sayings:

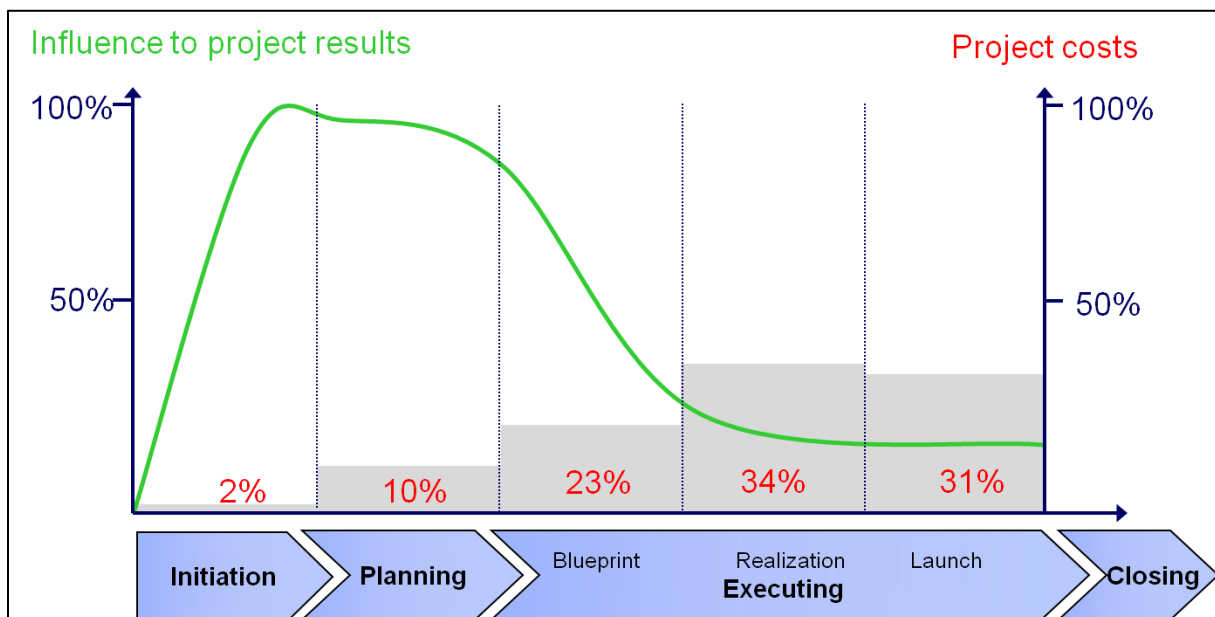
- If you fail to plan, you plan to fail
- If you don't know where you're going, any road will take you there
- What gets measured gets managed.

All of these sayings emphasize the fact that planning is crucial to achieving goals. Successful project managers know how important it is to develop, refine, and follow plans to meet project goals, and they know how easy it is to become sidetracked if they do not have good plans to follow. They also know that people are more likely to perform well if they know what they are supposed to do and when.

6.1.1 Project Planning Should Guide Project Execution

Planning is often the most difficult and unappreciated process in project management. Often, people do not want to take the time to plan well, but theory and practice show that good planning is crucial to good execution. The main purpose of project planning is to guide project execution. To guide execution, plans must be realistic and useful, so a fair amount of time and effort must go into the project planning process.

The table below shows an example of projects results versus project cost:



6.1.2 Summary of Planning Tasks and Outputs

You can consider many of these planning tasks as following a chronological order, especially for the scope, time, and cost tasks. You need to plan the project scope and determine what activities need to be done before you can develop a detailed project schedule. Likewise, you need a detailed project schedule before you can develop a cost baseline. Of course, human resource planning and appointment to the project team must also be accomplished at the start of a project as part of project human resource management.

Planning outputs for project integration, scope, time, and cost management:

Integration management	<ul style="list-style-type: none"> ▪ Team contract ▪ Project management plan
Scope management	<ul style="list-style-type: none"> ▪ Scope management plan ▪ Scope statement ▪ Work breakdown structure (WBS) ▪ WBS dictionary
Time management	<ul style="list-style-type: none"> ▪ Activity list and attributes ▪ Milestone list ▪ Network diagram (showing activity dependencies) ▪ Activity resource requirements ▪ Activity duration estimates ▪ Project schedule (in Gantt chart format)
Cost management	<ul style="list-style-type: none"> ▪ Cost estimate ▪ Cost baseline
Quality management outputs	<ul style="list-style-type: none"> ▪ Quality management plan ▪ Project dashboard ▪ Quality metrics descriptions ▪ Quality checklist
Human resources output	<ul style="list-style-type: none"> ▪ Project organizational chart ▪ Responsibility assignment matrix ▪ Resource histogram ▪ Staffing management plan
Communications management output	<ul style="list-style-type: none"> ▪ Communications management plan ▪ Project Web site
Risk management output	<ul style="list-style-type: none"> ▪ Risk management plan ▪ Probability/ impact matrix ▪ Risk register ▪ Risk-related contractual agreements
Procurement management output	<ul style="list-style-type: none"> ▪ Make-or-buy analysis ▪ Procurement management plan ▪ Requests for proposal/quote ▪ Contract statement of work ▪ Supplier evaluation matrix

6.2 Integration Management

Project integration management involves coordinating all the project management knowledge areas throughout a project's life span. The main planning tasks performed as part of project integration management include creating a team contract and developing the project management plan.

6.2.1 Team Contracts

Team contracts help to promote teamwork and clarify team communications. After core project team members have been selected, they meet to prepare a team contract.

The process normally includes reviewing a template and then working in small groups of three to four people to prepare inputs for the team contract. Creating smaller groups makes it easier for everyone to contribute ideas. Each group then shares their ideas on what the contract should contain, and then they work together to form one project team contract.

The project manager should attend the meeting and act as a coach or facilitator, observing the different personalities of team members and seeing how well they work together. It is crucial to emphasize the importance of the project team throughout the project's life cycle. The team contract should provide the groundwork for how the project team will function.

A team contract may include following points:

- Code of conduct
- Participation
- Communication
- Problem solving
- Meeting guidelines

Everyone involved in creating the team contract should sign it. As new project team members are added, the project manager should review ground rules with them and have them read and sign the contract as well.

Team Contract

October 4, 2009

Project Name: De Sign

Project Team Members' Names and Sign-Off:

- Peter Miller
- Patrick Kostner
- Ann McGliver
- Kian Chandler

Code of Conduct: As a project team, we will:

- Work proactively anticipating potential problems and preventing their occurrence.
- Keep other team members informed of information related to the project.
- Focus on what is best for the entire project team.

Participation: We will:

- Be honest and open during all project activities.

- Provide the opportunity for equal participation.
- Be open to new approaches and consider new ideas.
- Let the project manager know well in advance if a team member has to miss a meeting or may have trouble meeting a deadline for a given task.

Communication: We will:

- Keep discussions on track and have one discussion at a time.
- Use the telephone, e-mail, a project Web site, instant messaging, and other technology to assist in communicating.
- Have the project manager or designated person facilitate all meetings and arrange for phone and videoconferences, as needed.
- Work together to create the project schedule and related information and enter actuals, issues, risks, and other information into our enterprise project management system by 4 p.m. every Friday.

Problem Solving: We will:

- Only use constructive criticism and focus on solving problems, not blaming people.
- Strive to build on each other's ideas.
- Bring in outside experts when necessary.

Meeting Guidelines: We will:

- Plan to have a face-to-face meeting of the entire project team every Tuesday morning.
- Arrange for telephone or videoconferencing for participants as needed.
- Hold other meetings as needed.
- Develop and follow an agenda for all meetings.
- Record meeting minutes and send them out via e-mail within 24 hours of all project meetings, focusing on decisions made and action items and issues from each meeting.

6.2.2 Project Plan

A project management plan is a document used to coordinate all project planning documents and to help guide a project's execution and control. Plans created in the other knowledge areas are subsidiary parts of the overall project management plan. Project management plans facilitate communication among stakeholders and provide a baseline for progress measurement and project control.

A baseline is a starting point, a measurement, or an observation that is documented so that it can be used for future comparison. The project management plan briefly describes the overall scope, time, and cost baselines for the project. Specific plans in each of those knowledge areas provide more detailed baseline information. For example, the project management plan might provide a high-level budget baseline for the entire project, whereas the cost baseline prepared as part of the project cost management knowledge area provides detailed cost projections by WBS by month.

Project management plans should be dynamic, flexible, and receptive to change when the environment or project changes. These plans should greatly assist the project manager in leading the project team and assessing project status. Just as projects are unique, so are project plans. For a small project involving a few people over a couple of months, a project charter, team contract, scope statement, and Gantt chart might be the only project planning documents needed; there would not be a need for a separate project management plan. A large project involving 100 people over three years would benefit from having a detailed

project management plan and separate plans for each knowledge area. It is important to tailor all planning documentation to fit the needs of specific projects. Because all project plans should help guide the completion of the particular project, they should be only as detailed as needed for each project.

There are common elements to most project management plans, as follows:

- Project Title and Date of Authorization
- **Background:** chart the current situation/problem, explain the necessity of the project
- **Objectives:** briefly describe the main project objectives, the expected results at the end of the project (quality/time/costs) and the requirements
- **Scope:** outline clearly the boundaries of the project, define what is included and what is not included
- **Timeline:** indicate the project start/end date, sketch the project phases, milestones and deliverables per milestone.
- **Cost:** explain the cost calculation and estimates, and resources and funding required to undertake the project
- **Project Organization:** Define the project structure, roles and responsibilities, time commitment of the team members
- **Approach:** description of how the project objectives will be met, list of important assumptions, constraints to be considered, interdependencies to other projects or company activities, references to related documents
- **Benefit:** What is the improvement potential and the benefit to cost relation of the project?
- **Quality management:** name meeting frequency, reporting structure, project reviews, verification, validation, etc
- **Risks management:** list critical success factors of the project; reflect on issues, assumptions and constraints
- **Approval:** Have the project charter signed by the project sponsor, project manager and related business managers
- **Comments:** allows stakeholders to document important information they want to add

6.3 Scope Management

Project scope management involves defining and controlling what work is or is not included in a project. The main planning tasks performed as part of project scope management include:

- scope planning
- scope definition
- creating the WBS

The main documents produced are a

- scope management plan
- scope statement
- WBS
- WBS dictionary

6.3.1 Scope Planning and the Scope Management Plan

A project's size, complexity, importance, as well as other factors affects how much effort is spent on scope planning. The main output of scope planning is a scope management plan, which is a document that includes:

- descriptions of how the team will prepare the scope statement
- create the WBS
- verify completion of the project deliverables
- control requests for changes to the project scope

Key inputs to the scope management plan include:

- project charter
- preliminary scope statement
- current project management plan
- policies and procedures related to scope management
- historical information about previous projects
- environmental factors, such as marketplace conditions

6.3.2 Scope Definition and the Scope Statement

Good scope definition is crucial to project success because it helps

- improve the accuracy of time, cost, and resource estimates
- defines a baseline for performance measurement and project control
- aids in communicating clear work responsibilities

Work that is not included in the scope statement should not be done. The main techniques used in scope definition include analyzing products, identifying alternative approaches to doing the work, understanding and analyzing stakeholder needs, and using expert judgment. The main out-put of scope definition is the scope statement.

As described in the initiation phase, the project team develops a preliminary scope statement. The preliminary project scope statement should provide basic scope information, and subsequent scope statements should clarify and provide information that is more specific. Although contents vary, scope statements should include, at a minimum:

- description of the project, including its overall objectives and justification
- detailed descriptions of all project deliverables
- characteristics and requirements of products and services produced as part of the project
- project success criteria
- referencing supporting documents, such as product specifications and corporate policies, which often affect how products or services are produced

As more information becomes available and decisions are made related to project scope - such as specific products that will be purchased or changes that have been approved - the project team should update the project scope statement.

An up-to-date project scope statement is an important document for developing and confirming a common understanding of the project scope. It describes in detail the work to be accomplished on the project and is an important tool for ensuring customer satisfaction and preventing scope creep.

Scope Statement

Project Title: Training Project

Project Justification

Strategic planning initiatives identified the opportunity to improve productivity and reduce costs by changing Global Construction's approach to internal training. The project team will develop a new training program that provides just-in-time training to employees on key topics, including supplier management, negotiating skills, project management, and software applications.

Product Characteristics and Requirements

1. Supplier management training: The supplier management director estimates the need to train at least 100 employees each year in supplier management. There should be three levels of courses: an executive course, an introductory course, and an advanced course. Course materials should be developed as a joint effort among internal experts, outside training experts, if needed, and key suppliers. This training must be tailored to meet business needs. A partnership might be developed to maximize the effectiveness of the training and minimize development costs. Different delivery methods should be explored, including instructor-led, CD-ROM, and Web-based. About half of employees would prefer an instructor-led approach, and about half would prefer a self-paced course they could take at their convenience.
2. Negotiating skills training: Employees from supplier management and other departments would benefit from this training. There should be several courses offered, including a basic course, a course tailored to negotiating contracts, and a course tailored to international negotiations. Different delivery methods should be explored, including instructor-led, CD-ROM, and Web-based.

Deliverables

Project Management-Related Deliverables: Team contract, project management plan, scope management plan, scope statement, WBS, etc.

Product-Related Deliverables:

1. Supplier management training:
 - 1.1. Needs assessment: A study will be conducted to determine the learning objectives for the executive, introductory, and advanced courses. A detailed survey will be included as part of the study. One survey will be done to assess all training needs (i.e. supplier

- management, negotiating skills, etc.). Results will be documented in a report about 20-30 pages long and provided in hard copy and presentation format to all project steering committee members. Results will also be stored on the project Web site.
- 1.2. Research of existing training: A study will be done to identify current training courses and materials available. Study results will be documented in a report about 10-20 pages long, plus attachments and references. This report will be provided in hard copy format to all project steering committee members and stored on the project Web site.
 - 1.3. Partnerships: Partnership agreements will be explored to get outside training organizations and suppliers to work on developing and providing training. Product descriptions or descriptions of current courses provided that could meet our training needs will be documented. The legal department will assist in delivering these partnerships.
 - 1.4. Course development: Appropriate materials will be developed for each course. Materials could take various formats, including written, video, CD-ROM, and Web-based. Materials should include interactivity to keep learners engaged. Stakeholders from related departments will be actively involved in reviewing the new course materials.
 - 1.5. Pilot course: A pilot course will be provided for the introductory supplier management course. Feedback from the pilot course will be incorporated into future courses. Instructor-led classes will initially be designed for 20 participants. Changes to this number might be made as needed.
2. Negotiating skills training:
 - 2.1. Needs assessment: A study will be conducted to determine the learning objectives for the basic negotiations, contract negotiations, and international negotiations courses.
 - 2.2. Research of existing training: A study will be done to identify current training courses and materials available.

Project Success Criteria

Our sponsor has stated that the project will be a success if the new training courses are all available within one year, if the average course evaluations are at least 3.0 on a 1-5 scale, and if the company recoups the cost of the project in reduced training costs within two years after project completion.

6.3.3 Creating the Work Breakdown Structure

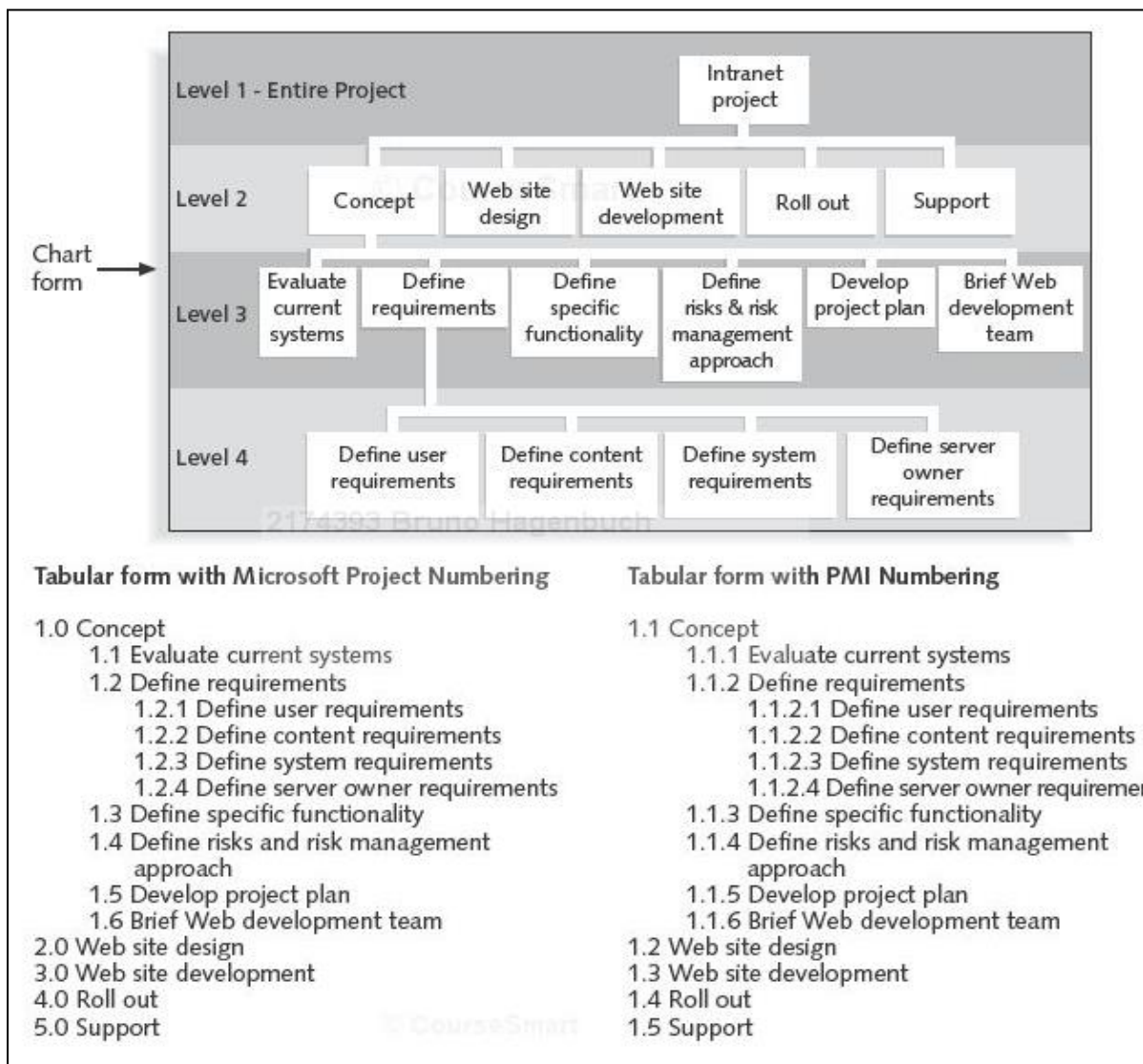
A work breakdown structure (WBS) is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project. In other words, the WBS is a document that breaks all the work required for the project into discrete tasks, and groups those tasks into a logical hierarchy.

Because most projects involve many people and many different deliverables, it is important to organize and divide the work into logical parts based on how the work will be performed. The WBS is a foundation document in project management because it provides the basis for planning and managing project schedules, costs, resources, and changes. Because the WBS defines the total scope of the project, some project management experts believe that work should not be done on a project if it is not included in the WBS. Therefore, it is crucial to develop a good WBS.

A WBS is often depicted in a graphical format, similar to an organizational chart. The name of the entire project is the top box, called level 1, and the main groupings for the work are listed in the second tier of boxes, called level 2. This level numbering is based on PMI's Practice Standard for Work Breakdown Structure, Second Edition (2006). Each of those boxes can be broken down into subsequent tiers of boxes to show the hierarchy of the work.

Project teams often organize the WBS around project products, project phases, or other logical groupings. People often like to create a WBS in a graphical format first to help them visualize the whole project and all of its main parts. You can also show a WBS in tabular form as an indented list of tasks showing the groupings of the work. Note that the term “task” is used to describe each level of work in the WBS.

For example, in the figure below, the following items can be referred to as tasks: the level 2 item called Concept, the level 3 item below that called Define Requirements, and the level 4 item below that called Define User Requirements. Tasks that are decomposed into smaller tasks are called summary tasks.



The lowest level of the WBS is level 4. A **work package** is a task at the lowest level of the WBS. In above figure, tasks 1.2.1, 1.2.2, 1.2.3, and 1.2.4 based on numbering on the left are work packages. The other tasks would probably be broken down further. However, some tasks can remain at a level 3 in the WBS. Some might be broken down to level 5 or 6, depending on the complexity of the work.

It also represents the level of work that the project manager monitors and controls. You can think of work packages in terms of accountability and reporting. If a project has a relatively

short time frame and requires weekly progress reports, a work package might represent work completed in one week or less. On the other hand, if a project has a very long time frame and requires quarterly progress reports, a work package might represent work completed in one month or more. A work package might also be the procurement of a specific product or products, such as an item or items purchased from an outside source.

Nevertheless, it is very difficult to create a good WBS. To create a good WBS, you must understand both the project and its scope, and incorporate the needs and knowledge of the stakeholders.

Many people confuse tasks on a WBS with specifications. Tasks on a WBS represent work that needs to be done to complete the project.

6.3.4 Approaches to Developing Work Breakdown Structures

Because it is difficult to create a good WBS, this section describes several approaches you can use to develop them. These approaches include:

- **Using guidelines:** follow firms guidelines for developing a WBS
- **Analogy approach:** use a similar project's WBS as a starting point
- **Top-down approach:** start with the largest items of the project and break them into their subordinate items.
- **Bottom-up approach:** aggregate specific tasks and organize them into summary activities, or higher levels in the WBS
- **Mind-mapping approach:** use mind mapping to help develop WBSs

Work Breakdown Structure (WBS) for a Training Project

1. Initiating

- 1.1. Prepare stakeholder analysis
- 1.2. Prepare business case
- 1.3. Create project charter
- 1.4. Hold project kick-off meeting
- 1.5. Develop preliminary scope statement

2. Planning

- 2.1. Project integration management
 - 2.1.1. Create team contract
 - 2.1.2. Develop project management plan
- 2.2. Project scope management
 - 2.2.1. Develop scope statement
 - 2.2.2. Create WBS and WBS dictionary
- 2.3. Project time management
- 2.4. Project cost management
- 2.5. Project quality management
- 2.6. Project human resources management
- 2.7. Project communications management
- 2.8. Project risk management
- 2.9. Project procurement management

3. Executing

- 3.1. Course design and development
 - 3.1.1. Supplier management training
 - 3.1.1.1. Needs assessment

3.1.1.1.1. Develop survey	
3.1.1.1.2. Administer survey	
3.1.1.1.3. Analyze survey results	
3.1.1.2. Research of existing training	
3.1.1.3. Partnerships	
3.1.1.3.1. Research potential partners for providing training	
3.1.1.3.2. Meet with potential partners	
3.1.1.3.3. Develop partnership agreements	
3.1.1.4. Course development	
3.1.1.4.1. Develop executive course	
3.1.1.4.2. Develop introductory course	
3.1.1.4.3. Develop advanced course	
3.1.1.5. Pilot course	
3.1.1.5.1. Plan pilot course	
3.1.1.5.2. Hold pilot course	
3.1.1.5.3. Prepare report on pilot course	
3.1.1.5.4. Review results of pilot course	
3.1.2. Negotiating skills training	
3.1.3. Project management training	
3.1.4. Software applications training	
3.2. Course administration	
3.3. Course evaluation	
3.4. Stakeholder communications	
3.4.1. Communications regarding project and changes to training	
3.4.1.1. Prepare e-mails, posters, memos, and other information	
3.4.1.2. Plan and hold meetings	
3.4.1.3. Prepare information for the corporate intranet	
3.4.2. Communications regarding productivity improvements	
4. Monitoring and controlling	
5. Closing	

6.3.5 Creating the WBS Dictionary

A WBS dictionary is a document that describes WBS tasks in detail. The format of the WBS dictionary can vary based on project needs. It might be appropriate to have just a short paragraph describing each work package. For a more complex project, an entire page or more might be needed for the work- package descriptions. Some projects might require that each WBS item describe the responsible person or organization, resource requirements, estimated costs, and other information. Other projects might not require a WBS entry for every single WBS task.

6.4 Time Management

Project time management involves the processes required to ensure timely completion of a project. The main planning tasks performed as part of project time management are:

1. Activity definition
2. Activity sequencing
3. Activity resource estimating
4. Activity duration estimating
5. Project schedule

The main documents produced are:

- activity list and attributes
- milestone list
- network diagram
- activity resource requirements
- activity duration estimates
- project schedule

6.4.1 Activity Definition

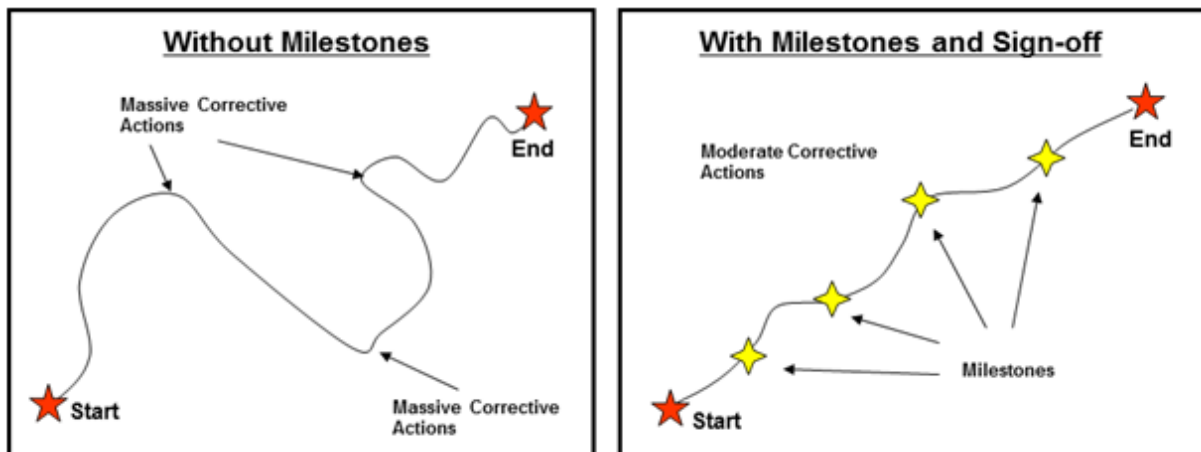
Activity definition consists of clearly defining all the activities needed to perform a project. The goal of the activity definition process is to ensure that project team members have a complete understanding of all the work they must do as part of the project scope so that they can start scheduling the work.

The **activity list** is a tabulation of activities to be included on a project schedule. The list should include the activity name, an activity identifier or number, and a brief description of the activity.

The **activity attributes** provide schedule-related information about each activity, such as predecessors, successors, logical relationships, leads and lags, resource requirements, constraints, imposed dates, and assumptions related to the activity. The activity list and activity attributes should be in agreement with the WBS.

A **milestone** is a significant event on a project. It often takes several activities and a lot of work to complete a milestone, but the milestone itself is like a marker to help in identifying necessary activities. There is usually no cost or duration associated with a milestone.

Milestones and the following project phase sign-off enforce project control checks in scope, processes, time, cost and quality.



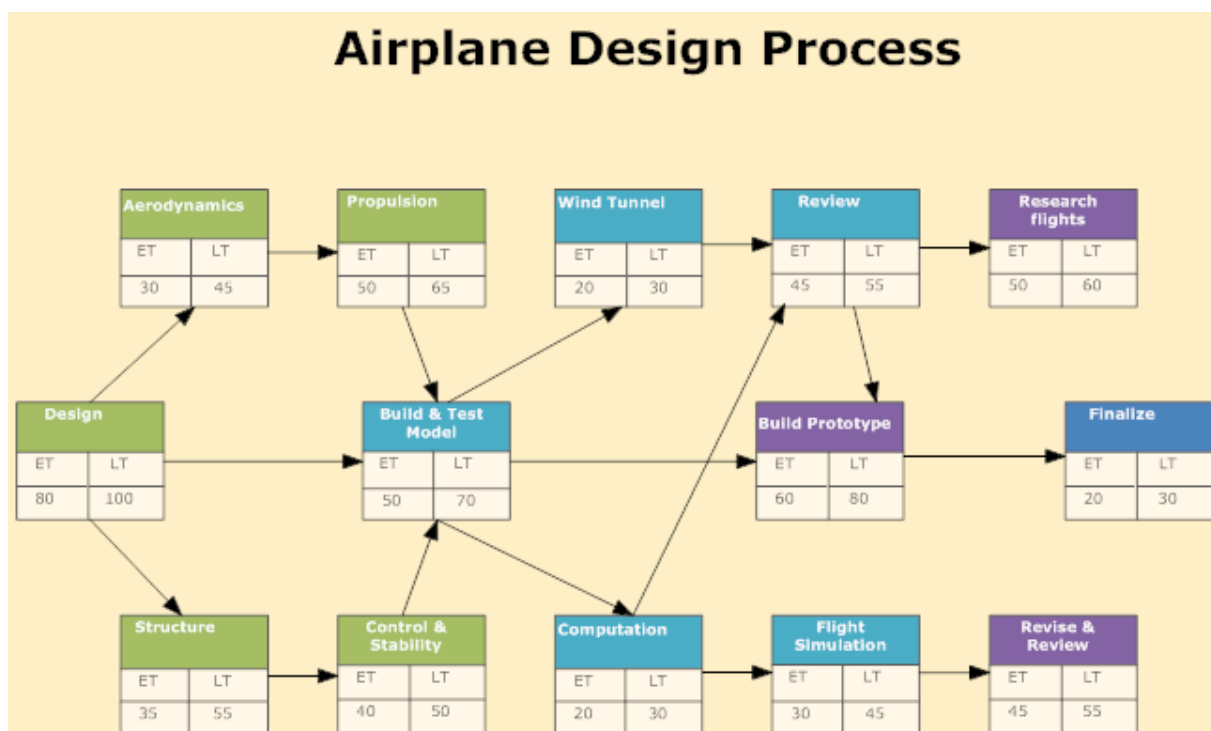
6.4.2 Activity Sequencing

After defining project activities, the next step in project time management is activity sequencing. A dependency or relationship relates to the sequencing of project activities or tasks. For example, does a certain activity have to be finished before another one can start? Can the project team do several activities in parallel? Can some overlap?

Determining these relationships or dependencies between activities has a significant impact on developing and managing a project schedule.

Network Diagrams

Network diagrams are the preferred technique for showing activity sequencing. A network diagram is a schematic display of the logical relationships among, or sequencing of, project activities. Some people refer to network diagrams as PERT charts.



Example of a PERT chart (ET = estimated time, LT = latest time):

Program Evaluation and Review Technique (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. By using the PERT weighted average for each activity duration estimate, the total project duration estimate accounts for the risk or uncertainty in the individual activity estimates. To use PERT, you calculate a weighted average for the duration estimate of each project activity using the following formula:

PERT weighted average = (optimistic time + 4xmost likely time + pessimistic time) /6

6.4.3 Activity Resource Estimating

Before you can estimate the duration for each activity, you must have a good idea of the quantity and type of resources (people, equipment, and materials) that will be assigned to each activity. Important questions to answer in activity resource estimating include the following:

- Does the organization have appropriate people, equipment, and materials available for performing the work?
- Are there any organizational policies that might affect the availability of resources?
- Does the organization need to acquire more resources to accomplish the work?
- Would it make sense to outsource some of the work?
- Will outsourcing increase or decrease the amount of resources needed and when they will be available?

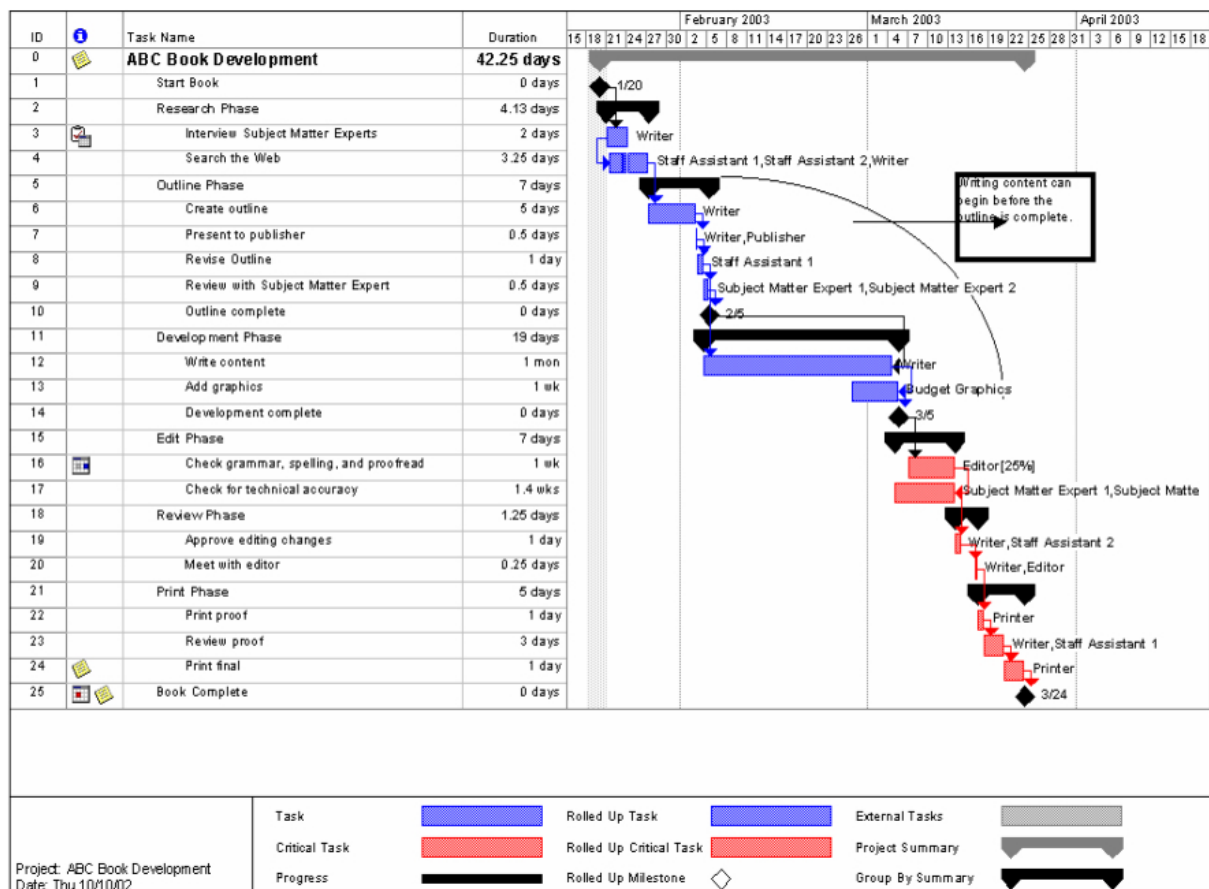
6.4.4 Activity Duration Estimating

After working with key stakeholders to define activities, determine their dependencies, and estimate their resources, the next process in project time management is to estimate the duration of activities. It is important to note that duration includes the actual amount of time spent working on an activity plus elapsed time. For example, even though it might take one workweek or five workdays to do the actual work, the duration estimate might be two weeks to allow extra time needed to obtain outside information or to allow for resource availability.

6.4.5 Project Schedule

The ultimate goal of schedule development is to create a realistic project schedule that provides a basis for monitoring project progress for the time dimension of the project. Project managers must lead their teams in creating realistic schedules and then following them during project execution.

The main project schedule is often displayed in the form of a Gantt chart. 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.



Lessons Learned on Project Schedule:

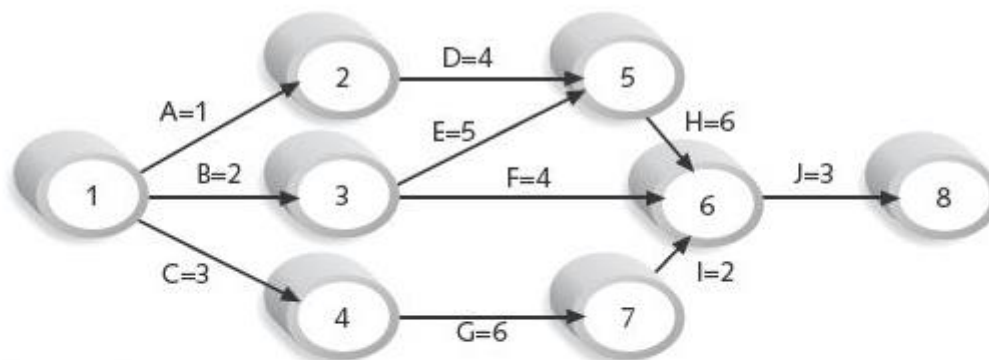
- The project schedule is one of the most significant progress-controlling tools for the project team as well as for the project manager. It is the script for the whole project.
- The project schedule must be comprehensive, with no tasks omitted. If important tasks are overlooked, even the best progress control becomes worthless.
- The implementation schedule has to be updated regularly to provide a good project progress overview.

6.4.6 Critical Path Analysis

Many projects fail to meet schedule expectations. Critical path method (CPM) - also called critical path analysis - is a network diagramming technique used to predict total project duration. This important tool will help you combat project schedule overruns.

A critical path for a project is the series of activities that determine the earliest time by which the project can be completed. It is the longest path through the network diagram and has the least amount of slack or float. **Slack or float** is the amount of time an activity may be delayed without delaying a succeeding activity or the project finish date.

The longest path or the path containing the critical tasks is what is driving the completion date for the project.



Note: Assume all durations are in days.

Path 1: A-D-H-J Length = 1+4+6+3 = 14 days

Path 2: B-E-H-J Length = 2+5+6+3 = 16 days

Path 3: B-F-J Length = 2+4+3 = 9 days

Path 4: C-G-I-J Length = 3+6+2+3 = 14 days

Because the critical path is the longest path through the network diagram, Path 2, B-E-H-J, is the critical path for Project X.

6.4.7 Lessons Learned

Make sure the project schedule covers all necessary tasks:

- The project schedule is the progress monitoring tool and the script for the project.
- Missing tasks may impact negatively on the project.

Use expert knowhow when creating the schedule:

- An experienced expert is probably the best source of knowledge necessary when estimating the duration of activities on the schedule. Use consultants when creating the schedule:

Plan sufficient contingency into the schedule:

- Flexibility is required to cover unforeseeable events which commonly occur.
- A shortage of time weakens and ultimately endangers the project.

Plan democratic, execute directive:

- Setting targets is a collaborative process between the project manager and the project team.
- Thereafter, performance can be judged against the team's own criteria.

Take holidays and absences into account when planning:

- Holidays, whether personal, public or religious, along with issues such as plant closure, are often overlooked in the planning process, but have potentially serious implications for deadlines.

Keep the planning simple and non-bureaucratic:

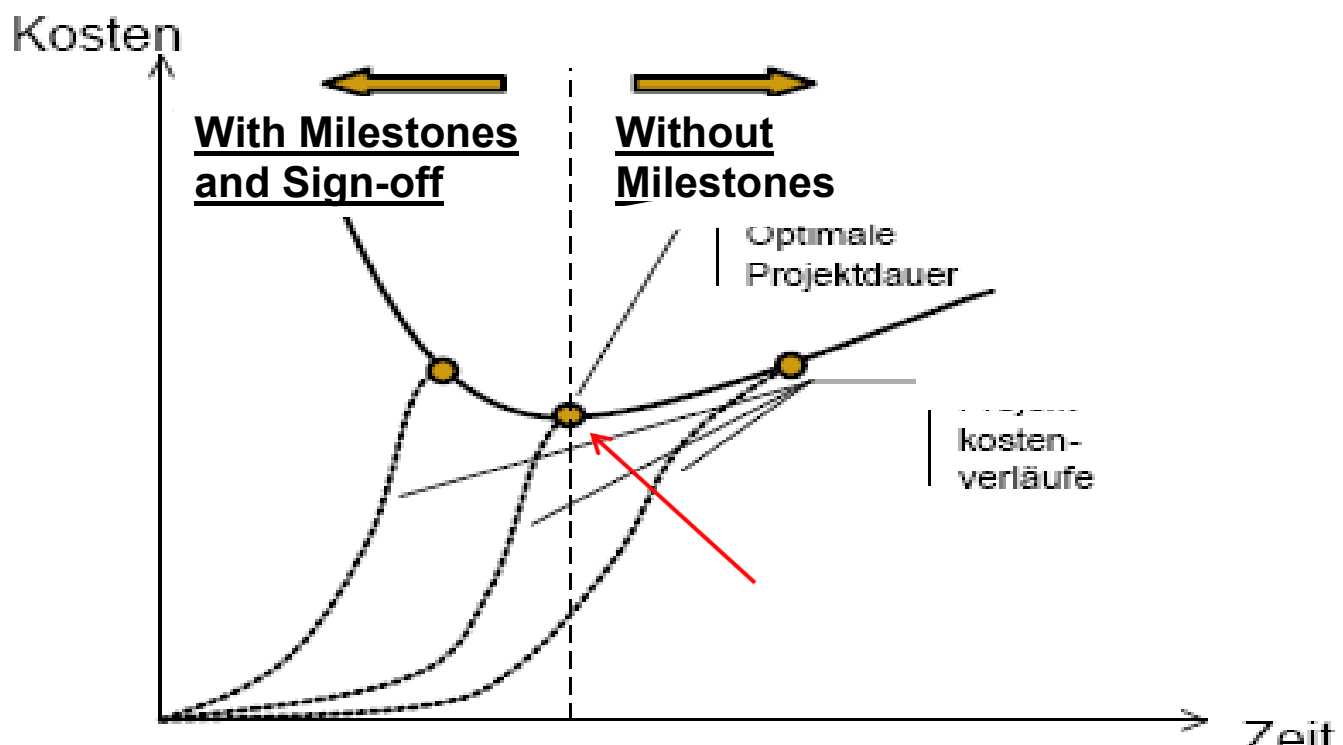
- The planning tools must serve their purpose without being unnecessarily complex.
- If they are over-bureaucratic they may hinder the project progress and stifle creativity.

6.5 Cost Management

Project cost management includes the processes required to ensure that a project team completes a project within an approved budget. The main planning tasks performed as part of project cost management:

- **cost estimating:** involves developing an approximation or estimate of the costs of the resources needed to complete a project
- **cost budgeting:** involves allocating the overall cost estimate to individual tasks over time to establish a baseline for measuring performance.

A large percentage of total project costs are often labor costs. Many organizations estimate the number of people or hours they need for major parts of a project over the life cycle of the project. They also determine the labor rate to apply based on the category of labor.



6.5.1 Cost Estimation Tools and Techniques

As you can imagine, developing a good cost estimate is difficult. Fortunately, several tools and techniques are available to assist in creating them. Three commonly used techniques for creating estimates include the following:

1. **Analogous estimates**, also called **top-down estimates**, use the actual cost of a previous, similar project as the basis for estimating the cost of the current project. This technique requires a good deal of expert judgment and is generally less costly than others are, but it can also be less accurate. Analogous estimates are most reliable when the previous projects are similar in fact, not just in appearance.
2. **Bottom-up estimates** involve estimating individual activities and summing them to get a project total. The size of the individual activities and the experience of the estimators drive the accuracy of the estimates. If a detailed WBS is available for a project, the project manager could have each person responsible for a work package develop his own cost estimate for that particular work package. The project manager would then add all of the cost estimates to create cost estimates for each higher-level WBS item and finally for the entire project. This approach can increase the accuracy of the cost estimate, but it can also be time intensive and, therefore, expensive to develop.
3. **Parametric modeling** uses project characteristics (parameters) in a mathematical model to estimate project costs. A parametric model might provide an estimate of \$5 per square foot for flooring, for example, based on the type of flooring, total square feet required, and location of the job. Parametric models are most reliable when the historical information used to create the model is accurate, the parameters are readily quantifiable, and the model is flexible in terms of the size of the project.

Sample cost estimate:

Assumptions:

- Internal labor rates include benefits and overhead.
- Average hourly rates are based on skill levels and departments of stakeholders.
- External labor rates are based on historical averages; may change as contracts are awarded.
- Non-labor costs include purchasing licenses for using training materials, books, CD/ROMs, travel expenses, etc.
- Non-labor costs may change as contracts are awarded. Reserves are calculated by taking 10% of the total estimate.

WBS Categories	Internal Labor	\$/hour	Internal \$ Total	External Labor	\$/hour	External \$ Total	Total Labor	Non-labor \$	Total Cost
1. Initiating	200	\$ 65	\$ 13,000			\$ -	\$ 13,000		\$ 13,000
2. Planning	600	\$ 60	\$ 36,000			\$ -	\$ 36,000		\$ 36,000
3. Executing			\$ -			\$ -	\$ -		\$ -
3.1 Course design and development			\$ -			\$ -	\$ -		\$ -
3.1.1 Supplier management training	600	\$ 60	\$ 36,000	600	\$ 150	\$ 90,000	\$ 126,000	\$ 100,000	\$ 226,000
3.1.2 Negotiating skills training	300	\$ 55	\$ 16,500	300	\$ 150	\$ 45,000	\$ 61,500	\$ 50,000	\$ 111,500
3.1.3 Project management training	400	\$ 60	\$ 24,000	400	\$ 150	\$ 60,000	\$ 84,000	\$ 50,000	\$ 134,000
3.1.4 Software applications training	400	\$ 60	\$ 24,000	400	\$ 150	\$ 60,000	\$ 84,000	\$ 50,000	\$ 134,000
3.2 Course administration	400	\$ 55	\$ 22,000	300	\$ 250	\$ 75,000	\$ 97,000	\$ 80,000	\$ 177,000
3.3 Course evaluation	300	\$ 55	\$ 16,500			\$ -	\$ 16,500		\$ 16,500
3.4 Stakeholder communications	300	\$ 55	\$ 16,500			\$ -	\$ 16,500		\$ 16,500
4. Monitoring and Controlling	500	\$ 55	\$ 27,500			\$ -	\$ 27,500		\$ 27,500
5. Closing	200	\$ 55	\$ 11,000			\$ -	\$ 11,000		\$ 11,000
Subtotal									\$ 903,000
Reserves			\$ -			\$ -	\$ -		\$ 90,300.0
Total	4,200		243,000	2,000		330,000	573,000	330,000	\$ 993,300

6.5.2 Cost Budgeting

Project cost budgeting involves allocating the project cost estimate to tasks over time.

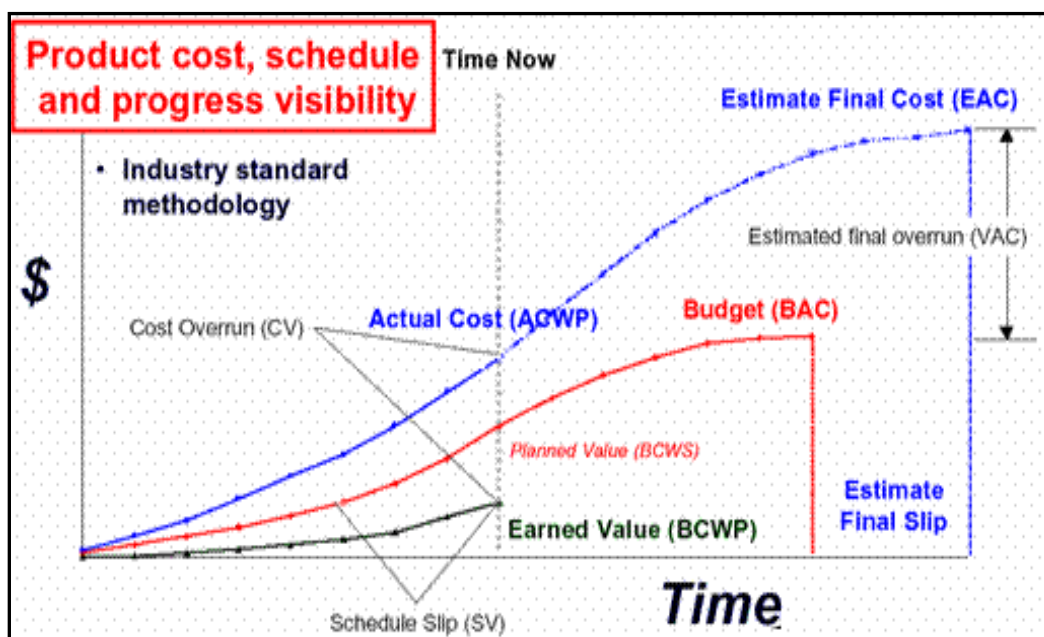
The main goal is to produce a cost baseline. A cost baseline is a time-phased budget that project managers use to measure and monitor cost performance. Estimating costs for each major project activity over time provides project managers and top management with a foundation for project cost control using earned value management.

Sample cost baseline:

	Month												Total Cost
WBS Categories	1	2	3	4	5	6	7	8	9	10	11	12	
1. Initiating	13,000												\$ 13,000
2. Planning	6,000	16,000	8,000	1,000	1,000	1,000	1,000	1,000	1,000				\$ 36,000
3. Executing			-			-	-						\$ -
3.1 Course design and development			-			-	-						\$ -
3.1.1 Supplier management training			5,000	73,667	73,667	73,667							\$ 226,000
3.1.2 Negotiating skills training			5,000	35,500	35,500	35,500							\$ 111,500
3.1.3 Project management training			5,000	43,000	43,000	43,000							\$ 134,000
3.1.4 Software applications training			5,000	43,000	43,000	43,000							\$ 134,000
3.2 Course administration						17,000	53,333	53,333	53,333				\$ 177,000
3.3 Course evaluation							3,000	3,000	3,000	7,500			\$ 16,500
3.4 Stakeholder communications		1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	\$ 16,500
4. Monitoring and Controlling	1,000	2,000	2,000	2,000	3,000	3,500	3,000	3,000	2,000	3,000	2,000	1,000	\$ 27,500
5. Closing											8,000	3,000	\$ 11,000
Subtotal													\$ 903,000
Reserves*			-			-	-					90,300	\$ 90,300
Total	20,000	19,500	31,500	199,667	200,667	218,167	61,833	61,833	60,833	12,000	11,500	95,800	993,300

*Reserves are all entered in month 12

6.5.3 Earned Value Management



- **EV:** Earned Value. A means of evaluating budgetary performance by relating actual expenditures to technical achievement as measured by a milestone accomplishment scheme. EV may be used interchangeably with BCWP
- **ACWP:** Actual Cost of Work Performed. The actual cost incurred on the project to date, irrespective of what was budgeted.
- **BAC:** Budget at Completion. The total original budget for the project, representing the total value of work to be performed, synonymous with performance baseline.

- **BCWP:** Budgeted Cost of Work Performed. Interchangeable with cumulative earned value; a metric representing the planned value for the amount of work completed on the project to date.
- **BCWS:** Budgeted Cost of Work Scheduled. The total value of work that was originally scheduled for completion by the end of a reporting period.
- **EAC:** Estimate at Completion. The current best estimate for the total cost of the project. This value may differ from the BAC over time because better estimates can be made as the project progresses.

6.5.4 Lessons Learned on Cost Management

Avoid budget shortfalls:

- It is advisable to set up a project budget with enough reserves to cover unforeseeable costs.
- The external consulting input is especially difficult to quantify as it strongly depends on the capabilities of the project members.
- A budget shortfall may delay the project considerably as financial resources are not easy to obtain during a project period.

Keep the through-put time as short as possible:

- Every project is an additional load for the line organization and the members working in the project.
- With a short through-put time cost are kept low and the motivation of the project members high.

6.6 Quality Management

Many projects fail because the project team focuses only on meeting the written requirements for the main products being produced and ignores other stakeholder needs and expectations for the project.

Quality, therefore, must be considered on an equal level of importance with project scope, time, and cost.

Quality management is executed in 3 major steps:

- **Quality Planning:** define and measure project quality
- **Quality Assurance:** analyze and improve project quality
- **Quality Control:**

The quality management plan describes how the project management team will implement quality policies. Like other project plans, its format and contents vary based on the particular project and organizational needs.

Possible content of a project management plan:

Project Quality Management Plan

1. Introduction
 - Purpose of The Project Quality Management Plan
2. Project Quality Management Overview
 - Organization, Responsibilities, and Interfaces
 - Tools, Environment, and Interfaces
3. Project Quality Management
 - Quality Planning: Define Project Quality, Measure Project Quality
 - Quality Assurance: Analyze Project Quality, Improve Project Quality
 - Quality Control

Appendix A: Project Quality Management Plan Approval

Appendix B: References

Appendix C: Key Terms

6.6.1 Quality Planning

Quality planning includes identifying which quality standards are relevant to the project and how best to satisfy those standards. It is important to describe important factors that directly contribute to meeting customer requirements. Organizational policies related to quality, the scope statement, product descriptions, and related standards and regulations are all important inputs to the quality planning process.

For each project requirement and deliverable, identify the quality targets that, once met, will ensure that the deliverable meets the requirements of the customer.

Quality Metrics

Metrics allow organizations to measure their performance in certain areas and to compare them over time or with other organizations. Examples of common metrics used by organizations include failure rates of products produced, availability of goods and services, and customer satisfaction ratings.

Before deciding on the metrics to use for a particular project, it is important to clarify the project goals, business case for the project, and success criteria.

Many organizations use charts to keep track of metrics, such as a project dashboard - a graphical screen summarizing key project metrics.



6.6.2 Quality Assurance

Quality assurance techniques are the preventative steps taken to eliminate any variances in the quality of the deliverable produced from the quality targets set.

Quality assurance is often undertaken at a summarized level of the project by an external project resource.

Examples of techniques used to assure the quality of deliverables include:

- **Reviewing historical data:** understanding other related projects (either currently under way or recently completed) and the quality issues encountered with those projects will enable the quality manager to identify potential quality issues within this project.
- **Defining requirements:** by documenting a comprehensive set of customer requirements, you will gain a greater understanding of the level of deliverable quality required to achieve total customer satisfaction.

- **Defining standards:** by defining a specific set of quality criteria and standards, the project team will clearly understand the level of quality to be achieved.
- **Recruiting skilled staff:** using skilled staff will directly affect the quality of the deliverables produced. Appropriately skilled staff should have the knowledge, skills and experience required to undertake the tasks allocated in the project plan with minimal training, to achieve the level of quality desired.
- **Undertaking quality reviews:** independent reviews to assess the overall quality of each deliverable can provide the customer with confidence that the project is on track and likely to produce a deliverable that meets the requirements.
- **Implementing change control:** changes to scope often have an effect on the level of quality delivered. Through the identification of a clear change control process, only changes which are absolutely necessary will be adopted by the project for implementation.

6.6.3 Quality Control

In addition to undertaking quality assurance to improve deliverable quality, a series of quality control (QC) techniques may be implemented. QC is defined as the curative steps taken to eliminate any variances in the quality of the deliverable produced from the quality targets set. QC techniques are often undertaken at a detailed level of the project by an internal project resource.

The types of techniques used to 'control' deliverable quality are:

- **Peer reviews:** the process of requiring project team members to review each other's work is known to increase the level of quality of deliverables.
Deliverables reviews: internal project staff may undertake formal planned reviews of deliverables to ensure that they will meet the requirements of the customer.
- **Documentation reviews:** similar to deliverable reviews, this process involves the review of all project documentation at regular planned intervals in the project.
- **Phase reviews:** these are formal reviews at the end of each major project milestone to assess the activities and deliverables completed to date and gain approval from the project sponsor to continue to the next project phase.

Dragan Milosevic, author of the Project Management Toolbox, has done several studies to investigate what companies that excel in project delivery capability do differently from others. After analyzing data from hundreds of companies, he found four key practices these best-performing companies follow:

1. **Templates:** they build an integrated project management toolbox. In other words, they use several standard and advanced project management tools. They tailor these tools to their organizations and provide employees with lots of templates.
2. **Project leaders:** they grow competent project leaders, emphasizing business and soft skills. These organizations identify good project leaders and provide training, mentoring, and a career path for them.
3. **Delivery processes:** they develop streamlined, consistent project delivery processes. Project management methodologies are well defined and followed.

4. **Metrics:** probably the hardest of all, they install a sound but comprehensive set of project performance metrics. It is difficult defining, measuring, and tracking metrics across an organization, but in order to improve project delivery capability, these metrics are crucial.

Dragan Milosevic, Portland State University, “ Delivering Projects: What the Winners Do,”
PMI Conference Proceedings (November 2001).

6.7 Human Resources Management

People determine the success and failure of organizations and projects. Project human resource management is concerned with making effective use of the people involved with a project.

The quality of the project members determines the success of the project. Project work is very demanding and complex and therefore requires people with a high learning potential. The project management team members have to be highly capable. Qualified project members ensure a fast and proper implementation. Especially the members in the project management team have to be clever and capable as they are the driving force of the project. The project organization is as good as its individuals.

If one of the members is weak the project can be endangered depending on the importance of that person to the project. The first corrective action should be to educate this person properly in project management and to provide the necessary support for his tasks. This will almost certainly involve a lot of support from other project team members especially from the project leader and the project manager. Another option is to replace the project member but this is not always possible as he may be a specialist in a particular area.

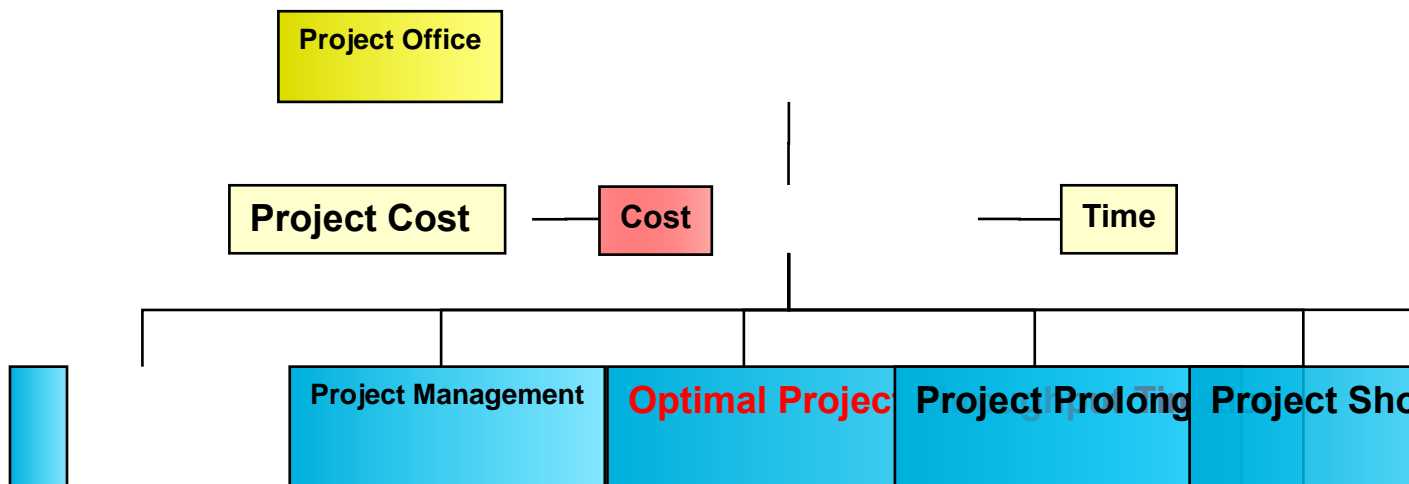
The worst case is the failure of the project leader. In that case the project is likely to disintegrate. It is advisable to replace the project leader immediately to guarantee the success of the project. We also experienced that one of the project members was able to take over the leadership and bring the project to a successful conclusion.

6.7.1 Project Organizational Charts

Similar to a company's organizational chart, a project organizational chart is a graphic representation of how authority and responsibility is distributed within the project.

A project organization usually covers all departments. A good project organization ensures creativity, innovation and short decision-lines.

Example of an effective project organization:



Lessons Learned for Project Organization:

- **Build up trust among the project members:** trust among the project members including the Steering Committee is essential for a successful project, because the project organization has hardly any hierarchical authority but has to be based on natural authority, that is, trust.
- **Establish management ownership:** the top management must play an active role on the Steering Committee and assume ownership. Having ownership means feeling responsible for the project, supporting it and providing it with the appropriate authority and resources.
- **Appoint a strong and effective project manager:** the stronger the project manager, the better the chances for a successful project implementation. If the project manager is below par in its tasks and responsibilities, the project is likely to fail.
- **Empower the project manager sufficiently:** The project manager must have wide-ranging authority and control over all aspects of the project. He must be able to act independently, quickly and effectively, regardless of any potential obstacles within the organization.
- **Recruit capable project members:** project work is very demanding and complex and therefore requires people with a high learning potential.
- **Define task and responsibilities clearly:** clearly-defined tasks and responsibilities at all levels of the project organization contribute to the efficiency of the project and help to reduce conflicts of authority and jurisdiction.
- **Engage full-time project members:** Part-time project members always tend to work for the line organization because line matters have higher priority to them and are less complex than project work.
- **Learn from qualified external:** good consultants with intimate knowledge of the software have a major impact on the throughput time and the quality of a project.

- **Establish a flat project hierarchy with short communication-lines:**

A flat project hierarchy works very efficiently and effectively because of its shorter decision-lines, faster communication and easier leadership. Short communication lines in the project organization enable a fast reaction to problems. Above all a fast, direct link to the Steering Committee chairman is essential for matters beyond the competence of the project management.

6.7.2 Steering Committee

The Steering Committee (SC) is the top authority for a project. A capable and powerful Steering Committee is as absolutely crucial for a project as it has to fulfill very important tasks and responsibilities, namely:

- To assume ownership;
- To monitor project targets;
- To manage the implementation of project policy;
- To control on project planning and progress;
- To enable fast decisions;
- To decide on organizational issues;
- To make resources available;
- To support the project manager;
- To motivate the management;
- To approve proposals from the project team;

To be a Steering Committee member is very demanding. It is not enough just to attend meetings. A Steering Committee member is expected to assume ownership and lead the projects under his responsibility.

6.7.3 Project sponsor

The project sponsor has a key position in the whole project. This individual's participation can influence the success of the project considerably.

Below are a few characteristics we found helpful in a chairman:

- They assume ownership and lead the Steering Committee. The CEO often makes the best chairman.
- They are a respected and accepted authority among the SC members.
- They identify with the project and demonstrate their full support.
- They cooperate closely with the project manager.
- They hold regular meetings with the project manager to discuss the project progress, the problems and to prepare the SC meeting.
- Their door is always open to discuss relevant problems.

6.7.4 Project manager

The project manager is the overall leader of the project. Their main task is managing, leading and coaching. They have to make the implementation as easy as possible and create a pleasant atmosphere and environment for the project members to work in.

The project manager should have broad authority over all elements of the project. Their authority should be sufficient to permit them to engage in all necessary managerial and technical actions required to complete the project successfully regardless of organizational barriers.

The tasks and responsibilities are described below:

- Leading the project;
- Managing the project (planning, organizing, coordinating, controlling);
- Coaching of project members;
- Detecting and solving problems and conflicts;
- Marketing and Public Relations;
- Educating and training project leaders and SC;
- Reporting to the SC;
- Conducting quality control;

Strength in the following areas is an asset for successful project management:

- **Leadership:**
The project manager must be assertive within the project and toward the line organization, must be goal-oriented, have a sense of vision, take decisions and motivate the project members.
- **Business management know-how:**
Understanding the business processes and procedures in finance, sales and production is essential for following discussions in the various projects.
- **Organization:**
Organizational topics like planning, coordinating and controlling are daily business for a project manager.
- **Coaching:**
The project manager has a big crew to take care of in personnel matters. The project members must be coached and educated in their manager's special field.
- **Communication:**
Communicative abilities help the project manager to discuss and market the project internally and externally.
- **Risk-taking:**
The outcome of a project is never 100% sure. That is why a good amount of risk-taking is needed.
- **Flexibility:**
Circumstances in a project change quite often as new knowledge is gained and problems occur. It is normal for a project manager to deal with new situations and react accordingly.
- **Acceptance:**
The project manager has to be accepted by the project members, especially by the Steering Committee and the project management team.
- **Analytical abilities:**
Project management also involves a constant search for bottlenecks and problems within the projects.
- **Stress-resistant:**
Project management is a high-pressure job.

Helpful hints for the Project Manager

- **Broad project overview:**
The project manager has to keep an overview of the project. A broad, but not necessarily very detailed knowledge about the project is required. Involvement in the detail of the

project is only required of the manager in the event of problems but in that case it should be rapid.

- **Good emotional stability:**
Project management is a high-pressure job. Emotional stability is a vital factor in this job. A good balance between project involvement and private interests is desirable. The project manager should not feel guilty about taking holidays. Recreation is necessary to bring the manager's full potential and to avoid the risk of getting bogged down in project detail, becoming too emotionally involved and losing objectivity.
- **Play fair:**
Management is tough, but can still be fair and human as long as both sides play fair giving people a second chance.
- **Acceptance and trust:**
Acceptance and trust throughout the organization helps the project manager to be able to market or defend the project successfully at all levels of the organization.
- **Flexible working environment:**
The project manager has to travel a lot to keep track of the progress of all projects. The ability to work while on the move (whether in the airport, train, car etc.) is a distinct advantage. A notebook and a mobile phone help to achieve this goal.
- **Regular traveling schedule:**
To avoid family problems, it is helpful to have a regular schedule of being away from home. The time away from home should be used for working in order to have the time back home fully available for the family.
- **Understand the mechanics of power and politics:**
Influencing the organization requires an understanding of both the formal and informal structures of the organization and the mechanics of power and politics.
- **Sparring partner:**
The project manager is a solitary figure. A good sparring partner (external consultant or coach) is essential.
- **Difference between project manager and coordinator:**
There are some differences between a project manager and a project coordinator. The coordinator advises and gathers the business requirements; the manager is authorized to give directives.
- **Personal contacts:**
The project manager should not delegate tasks where personal contact is important (congratulations for a specific success, birthday, birth of a child, etc.).
- **Informal contacts are helpful:**
It helps to take the occasional stroll through the offices or the plant and chat with the future system users to get an idea about their concerns regarding the project implementation.
- **Understand the project's environment:**
It is useful for the project manager to experience the working environment where they plan to implement the software. They learn to understand departmental processes and procedures and the employees' problems and concerns. It is enough to be there for a day or a shift, but important is to be there.
- **Pain in the neck:**
Sometimes the project manager has to be a pain in the neck, especially if projects are not working the way they should. Nevertheless, project team members find it very reassuring to know that the project manager cares about their work and is also willing to take over responsibility.
- **No cheers for the project manager:**
The project manager should expect no thanks if the project goes live without any hitch. People take it for granted.

- Good communication
Good communication with the Steering Committee chairman is important to ensure an optimal information flow and a fast reaction in case of problems.
- Draw attention to problems in the line:
The project manager has to draw the Steering Committee's attention to problems in the line organization; but it is not his job to solve line problems insofar as they do not affect the project implementation itself.

6.7.5 Project members

Project members must be fast learners as they must absorb and apply knowledge within a short time. They must have the mental capacity to cope with the complex implementation of integrated standard software.

During the life cycle of the project, the project members must be able to concentrate on project matters rather than conflicts within the line organization yet another reason to keep the throughput time as short as possible.

Tasks and responsibilities:

- To configure and customize the system;
- To work out the as-is and to-be concept;
- To support the project management team;
- To train and support the users;
- To test the system;
- To discuss functional issues with members of the project management;
- To evaluate proposals of the project management team;
- To report to the project management team;

6.7.6 Responsibility Assignment Matrix

A responsibility assignment matrix (RAM) is a matrix that maps the work of the project as described in the work breakdown structure (WBS) to the people responsible for performing the work. A RAM allocates work to responsible and performing organizations, teams, or individuals, depending on the desired level of detail. For smaller projects, it is best to assign WBS activities to individuals.

Sample responsibility assignment matrix:

Tasks	PM	Member A	Member B	Consultant
Needs assessment	A	R	C	I
Research of existing training	I	A. R	C	I
Partnerships	A, R	I	I	C
Course development	A	C	C	R
Pilot course	A	c	I	R
Course administration	I	A	R	I
Course evaluation	I	A	R	I
Stakeholder communications	A, R	R	C	C

Legend: R: Responsible, A: Accountable, C: Consulted, I: Informed

6.7.7 Resource Planning

A resource plan describes the physical resource required to complete a project. This includes a list of the types of resource required, such as labor, equipment and materials, as well as a schedule identifying when each resource will be utilized. A resource plan is created after the project plan has been defined. A detailed resource plan cannot be created until every activity and task in the project plan has been identified. Following the completion of the resource plan, it will be possible to finalize the financial plan, as the fixed cost portion of the project will have been identified.

To create a resource plan, the following steps are undertaken:

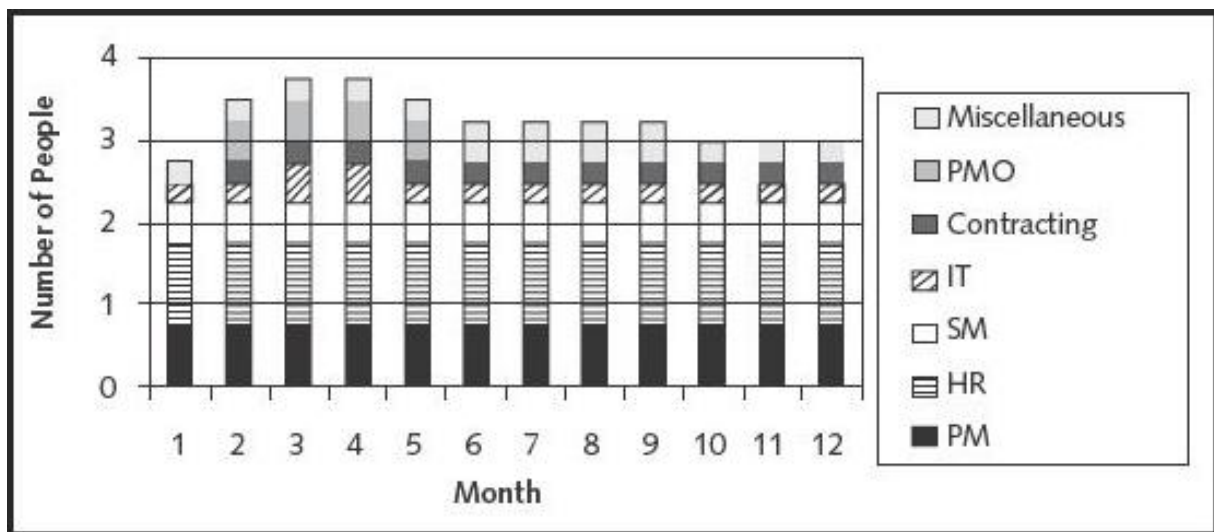
- **Skills:** List the general types of resources to be utilized on the project.
- **Amount:** Identify the number and purpose of each type of resource required.
- **Time:** identify when each resource will be utilized, duration of assignment, start/end time
- **Place:** identify where/in which site or location is the capacity needed
- Assign the resources to a resource schedule

Resource Histograms:

A resource histogram is a column chart that shows the number of resources required for or assigned to a project over time. Project managers often create a resource histogram in which columns represent the number of people (or person hours, if preferred) needed in each skill category, such as managers, IT specialists, and HR specialists. By stacking the columns, you can see the total number of people needed each month. After resources are assigned to a project, you can view a resource histogram for each person to see how his or her time has been allocated.

Sample resource histogram:

Type of Resource	Meaning	1	2	3	4	5	6	7	8	9	10	11	12
PM	Project Manager	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
HR	Human Resources	1	1	1	1	1	1	1	1	1	1	1	1
SM	Supplier Management	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
IT	Information Technology	0.25	0.5	0.5	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Contracting	Contracting	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
PMO	Project Management Office	0	0.5	0.5	0.5	0.5	0	0	0	0	0	0	0
Miscellaneous	Miscellaneous	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.25



6.8 Communications Management

Good information is a critical success factor in project implementation. Open and honest information and communication is of paramount importance to satisfy the users' information requirements and to prevent rumors. The users need this information because any project brings changes to their working environment and is basically something that threatens their job. The open information and communication policy helps the user to become acquainted with the new situation, builds up trust in the project and among its members and promotes acceptance of the project.

Project communications management involves generating, collecting, disseminating, and storing project information.

6.8.1 Communications Management Plan

A communications management plan is a document that guides project communications.

The communications management plan should address the following items:

- Information requirements of each project stakeholder
- A schedule of the communication events, including its purpose, method and frequency
- A matrix highlighting the resource involved in each communication event
- A clear process for undertaking each communication event within the project

Sample communications plan:

Communication Type	Objective of Communication	Medium	Frequency	Audience	Owner	Deliverable
Kickoff Meeting	Introduce the project team and the project. Review project objectives and management approach.	<ul style="list-style-type: none"> ▪ Face to Face 	Once	<ul style="list-style-type: none"> ▪ Project Sponsor ▪ Project Team ▪ Stakeholders 	PM	<ul style="list-style-type: none"> ▪ Agenda ▪ Meeting Minutes
Project Team Meetings	Review status of the project with the team.	<ul style="list-style-type: none"> ▪ Face to Face ▪ Conf Call 	Weekly	<ul style="list-style-type: none"> ▪ Project Team 	PM	<ul style="list-style-type: none"> ▪ Agenda ▪ Meeting Minutes
Technical Design Meetings	Discuss and develop technical design solutions for the project.	<ul style="list-style-type: none"> ▪ Face to Face 	As Needed	<ul style="list-style-type: none"> ▪ Project Technical Staff 	TL	<ul style="list-style-type: none"> ▪ Agenda ▪ Meeting Minutes
Monthly Project Status Meetings	Report on the status of the project to management.	<ul style="list-style-type: none"> ▪ Face to Face ▪ Conf Call 	Monthly	<ul style="list-style-type: none"> ▪ PMO 	PM	<ul style="list-style-type: none"> ▪ Status Report
Project Status Reports	Report the status of the project including activities, progress, costs and issues.	<ul style="list-style-type: none"> ▪ Email 	Monthly	<ul style="list-style-type: none"> ▪ Project Sponsor ▪ Project Team ▪ Stakeholders ▪ PMO 	PM	<ul style="list-style-type: none"> ▪ Project Status Report

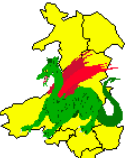
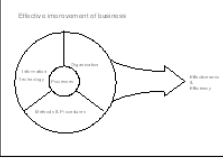

6.8.2 Project Marketing

It is primarily the project manager's task to market the project and to keep the company informed about the project activities. The project members must also play their part in selling the project by helping to convince people of its benefits.

The following marketing opportunities should be taken:

- Publishing of a project bulletin;
- Publishing articles in company magazines or newspapers;
- Making project presentations in other, not directly project-related meetings (sales, plant, year-end meetings, etc.);
- Standard presentation training for project leaders;
- Personal chats with interested parties, line managers and users;
- Special publicity for the live date of a module;
- Availability of all project information to the whole company on the Intranet.

Example of a project bulletin:

FUTURA BULLETIN	
Issue 3/1998	
<p>MERTHYR ON BOARD</p>  <p>This year, Sekiuk will be fully involved in our SAP projects. Until the end of the year, the</p> <p>modules Production Planning, Controlling and Plant Maintenance will be introduced. For all areas we have a representative in the Project Team. George Williams (KOW) is responsible for the production and logistics modules and Andrew Purchase (ADP) for the finance modules. Elton Bridges (EOB) represents the SAP projects in the Steering Committee.</p> <p>All project members are highly motivated and looking forward to the implementation of SAP at their plant.</p> <p>We wish them all the best for their projects.</p> <p><i>Norbert Weitz</i></p>	
<p>DO WE NEED A SYSTEM LIKE SAP? Interview with Prof. Dr. Arno de Schepper</p> <p>What is your role with the implementation of Futura?</p> <p>I see three aspects:</p> <p>First my relation with top management. As independent advisor, with lots of experience in implementing complex systems, I can counsel top management on what they have to do for the project, and eventually also on what must change in their own functioning, and that is of course easier for an outsider than for an ALVED employee. Second, my assistance to the project manager on aspects of project management and project control.</p> <p>Third, where needed, input on the ways of working in logistics and the relations with marketing/sales and production.</p> <p>Why needs ALVED an independent advisor?</p> <p>To start with: the Futura project is big, complicated and costly. The value of an independent advisor is, if you select a good one, that he has gathered experience in other companies. He can transfer part of the learning curve from other situations to ALVED.</p> <p>What is important on Futura for the management of the business?</p> <p>It is important to understand what Futura is. The following picture can help us.</p>  <p>To improve effectiveness and efficiency of business management you have to improve and to bring in proper balance with each other four basic elements: the processes (simple, straight forward, reliable), the organisation (distribution of tasks and responsibilities and adequate people) methods and procedures (adapted to the product/market combinations) and the information (the system and the measurements). Futura is not only a SAP information system, it also has repercussions on the ways of working and the organisation.</p> <p>Futura improves the co-ordination between all company levels and functions. The most important quality of Futura is that the experience of commercial, technical and accounting departments is brought together to function as one coherent team.</p> <p><i>Continued on page 2</i></p>	
<p>FUTURA NEWS</p> <ul style="list-style-type: none"> • We congratulate Xavier in de Baek (XB) to the birth of his son Kye. • As from 1.3.98 onwards, David Zeraschi (DAZ) is 100 % available for the IT department in Sekiuk. • Marjon Schreurs (MSX) is supporting the CO-PC and FI projects in Sekiuk for 50 %. • A successful ABAP training was carried out by Ctac for the IT people. • The Release change to 2.2E took place on the test machine. This new Release will be installed on the productive machine on 23/24.3.98. • Certain people, especially the young ones, have problems recovering from carnival. They get sick or have very "erotic" voices... • By moonshine and snow the PT members enjoyed a relaxing atmosphere in the Swiss mountains. While having an excellent dinner top secrets were revealed. It came out that a Dutch man attended a boys' school when he was young. The relation with his friends must have been unbelievably close. They even chase him to Switzerland and mention strange room numbers on the phone. Who knows what these numbers mean and what happened in these rooms? • We all know that the Dutch are the best, greatest and most famous people in the world. They discovered America and Siberia, have the biggest balloon, the greatest soccer team etc. etc. etc. 	<p>PROFILES</p> <p>Prof. Dr. Arno de Schepper is professor in Logistics at the university of Brabant in the Netherlands. He is also independent advisor in Logistics and Business Management. He is a long time relation of ALVED management. Already twelve years ago he executed his first support job for ALVED in the Roermond factory. That was in the period that he was starting up the consultancy practice for Coopers & Lybrand in the Netherlands. He was a speaker for ALVED in Luxor.</p>  <p>Arno de Schepper is married, he has five children and is also a dedicated gardener on his farm.</p>
<p>DO WE NEED A SYSTEM LIKE SAP? Interview with Prof. Dr. Arno de Schepper (from page 1)</p> <p>This can be observed best in the goods flow in the company as all departments have great interest in this. The results among others normally include: Shorter delivery times, better customer service, reduction of stocks and better operational performance. These elements should be quantified so that their realisations can be followed and checked.</p> <p>What means Futura for the functioning of the people that will work with it?</p> <p>People normally are afraid that they will loose the ownership of data and also will have less social contacts than before the introduction of the system.</p> <p>It is true that data are not any longer owned only by a certain individual or small group. But the wider use of data in the company and the access to data of other individuals and</p> <p>departments enriches the insight in the total company process and brings it closer to the individual.</p> <p>About social contacts the following observations are valid. Social contacts depend, above all, from the individual itself. We all know that individuals in the same function and at the same level have very different social behaviours and related contacts. The change to an advanced system make contacts more efficient but also facilitates contacts with other colleagues better than before.</p> <p>More advanced systems give individuals possibilities to grow in their functions. I wholeheartedly hope that many of the ALVED group will use the enlarged possibilities provided by Futura.</p> <p><i>Arno de Schepper</i></p>	
<p>Editors: Futura Project Management Editorial Address: ALVED AG, Bahnhofstrasse 7, 6002 Luzern</p> <p>Coordinator: Petra (PBL)</p>	

6.8.3 Project Meetings

Meetings are an essential part of the project work and are certainly not a waste of time. They are justified on the following grounds:

- **Communication:** With every meeting the project members improve their communication and mutual understanding.
- **Progress control:** Regular meetings help to monitor progress and provide feedback on all issues.
- **Throughput time:** Efficient and effective meetings have a considerable impact on the project throughput time because decision-making is better and problem-solving faster.
- **Teamwork:** In meetings the project members start to understand each other better, learn to accept and respect individual strengths and weaknesses, resolve conflicts and problems which have already been raised and discussed.
- **Project quality:** Frequent meetings improve quality because the project members form a team and more pleasant atmosphere evolves. Discussions are more focused and hence better decisions are taken.

The frequency of the meetings has a direct impact on the throughput time. The more frequent meetings are held, the more efficient and effective they are.

Tips for the preparation of a meeting:

- Meetings should only be held when necessary otherwise the participants' attention will wander and the meeting lose momentum.
- Short but frequent meetings are more efficient than long but less regular ones.
- Good preparation improves the quality of a meeting tremendously.
- People tend to prepare poorly for meetings. Encourage better preparation by stating speakers' names on the agenda. This will also strengthen their sense of ownership.
- A copy of the Steering Committee agenda should be sent to the project management team members, since they must help prepare the Steering Committee meeting.
- The chairman's name should feature as little as possible on the agenda since the chairman needs to lead the meeting.
- The goal of a meeting is to reach conclusions and decisions and not to get lost in endless discussions. To pre-empt this, every participant should be well briefed in advance and thorny problems raised and discussed beforehand.
- Topics that could be dealt with bilaterally, should not be put on the meeting agenda.
- The project manager should brief the Steering Committee chairman before the meeting on the decisions he wants to push through. "
- Slides should be produced in a readable font size and not be too dense, summarizing only the main points.
- Schedule or expenditure graphs should indicate deviations with an arrow or special color to highlight the issues. Digressions will bore the listeners and waste precious meeting time.
- Specific issues should be presented by the appropriate specialists. In case they are not official member of the meeting, they have to be invited for the particular presentation.
- Guest presentations should be checked beforehand to ensure they are appropriate.
- The meeting room has to be checked and arranged well in advance. It is advisable to be there before the meeting starts to avoid any surprises.

Essential etiquettes for meetings:

- The atmosphere is crucial in a meeting. Conducting meetings in a pleasant atmosphere is more productive and leads to better decisions being taken.
- Seek consensus on controversial decisions and avoid leaving unresolved issues or contention between participants.

- It is never good to take people by surprise with totally new proposals since they have had no time to absorb the implications and may become tense as a result
- Sometimes it pays to ask for wisdom rather than convince with good arguments.
- Don't become emotional. Over-heated arguments are always counter-productive because objectivity is lost.
- Take care that you don't get too tense defending a topic Sometimes a smile is more convincing than any amount of rational argument. Tension undermines confidence
- Give the impression of a smiling, relaxed and not stressed meeting chairman. A relaxed, smiling chairman can calm things down.
- Try to neutralize people's natural aggression when defending "their territory" before other participants.
- The quality of a meeting depends on the contribution of the participants. The better they are prepared, the better the meeting.
- "Hit and Run": Once an idea has been accepted it is unwise to continue justifying it since this would be to invite further objections and risk opening the issue once again; this time you may lose the argument.
- When you got things completely your own way you are well advised not to labour the point. Try to hide it and continue with the next agenda point.
- When guest speakers are present they should be allowed to participate in non-controversial decisions arising from their particular contribution.
- Presentations are best limited to key aspects, particularly threats. Key information should be clearly distinguished from interesting observations so as not to over-complicate things and drag the meeting out.
- It is useful to conclude with a short debriefing so as to get some feedback on your performance and assess reactions.

Personal contact outside meetings is still very important. Often problems are not mentioned in an official meeting because they are too embarrassing for the person involved. Furthermore you will get the best insight into the project by talking to the project members personally.

6.9 Risk Management

A project risk is an uncertainty that can have a negative or positive effect on meeting project objectives. Key outputs of project risk management planning include a risk management plan, a probability/ impact matrix, a risk register, and risk- related contractual agreements.

A potential risk which is identified too late may become a real problem with the following consequences:

- longer throughput time
- additional resources needed (cost and human resources)
- poor quality
- reduced functionality
- project failure in the worst case

6.9.1 Risk Management Plan

A risk management plan summarizes how risk management will be performed on a particular project. Like other specific knowledge area plans, it becomes a subset of the project management plan.

The general topics that a risk management plan should address include

- The methodology for risk management
- Roles and responsibilities
- Budget and schedule estimates for risk-related activities
- Risk categories
- Probability and impact matrices
- Risk documentation

In addition to a risk management plan, many projects also include contingency plans, fallback plans, and contingency reserves.

- **Contingency plans** are predefined actions that the project team will take if an identified risk event occurs.
- **Fallback plans** are developed for risks that have a high impact on meeting project objectives, and are put into effect if attempts to reduce the risk are not effective. Sometimes the terms contingency plan and fallback plan are used interchangeably, and some people view fallback plans as contingency plans of last resort.
- **Contingency reserves** or **contingency allowances** are funds held by the project sponsor that can be used to mitigate cost or schedule overruns if unknown risks occur.

Sample risk management plan:

Risk Management Plan

Project Name: Training Project

1. Methodology

The project team will review data available from the Phase 1 project and past training programs to assist in risk management planning. They will also review information related

to external projects similar to this one. The team will use several tools and techniques, including brainstorming, surveys, and risk-related checklists to assist in risk management.

2. Roles and Responsibilities

The project manager will be responsible for leading the team and other stakeholders in performing risk-related activities. As detailed tasks and deliverables are determined, the project manager will delegate those tasks as appropriate.

3. Budget and Schedule Estimates

As specific risk-related tasks and deliverables are determined, budget and schedule information will be provided.

4. Risk Categories

General categories and subcategories for risk on this project include business risks (suppliers and cash flow), technical risks (course content, hardware, software, and network), organizational risks (executive support, user/employee support, supplier support, and team support), and project management risks (estimates, communications, and resources).

5. Risk Communications and Impact

Risk probability and impact will initially be estimated as high, medium, or low based on expert advice. If more advanced scoring is needed, the project team will determine an appropriate approach.

6. Risk Documentation

All risk-related information will be summarized in a risk register. Detailed documentation will be available in a secure area on the project Web site.

6.9.2 Probability/ Impact Matrix (PIM)

It is important to evaluate risks to determine which ones need the most attention. Risk events refer to specific, uncertain events that may occur to the detriment or enhancement of the project.

For example, negative risk events might include the performance failure of a product produced as part of a project, delays in completing work as scheduled, increases in estimated costs, supply shortages, litigation against the company, and strikes. Examples of positive risk events include completing work sooner than planned or at an unexpectedly reduced cost, collaborating with suppliers to produce better products, and obtaining good publicity from the project.

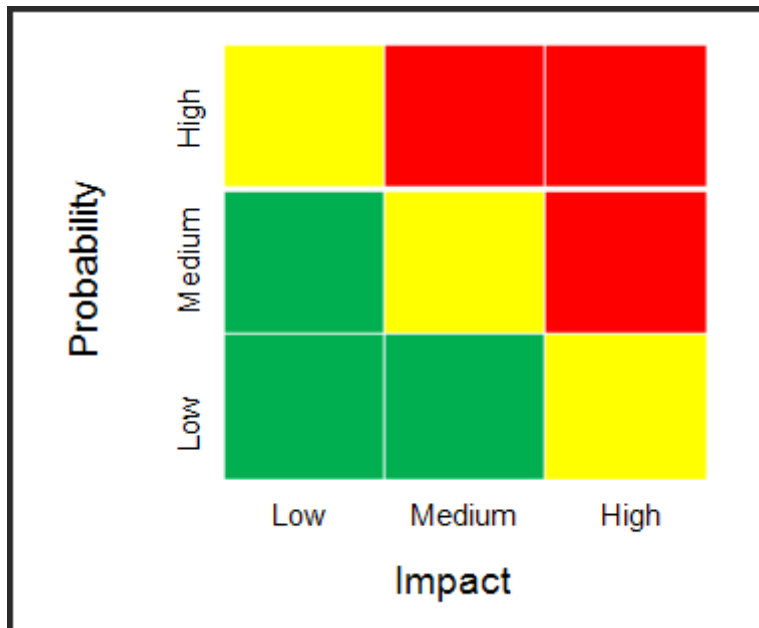
There are two important dimensions of risk events:

- probability of the risk event occurring
- impact or consequence if the risk does occur

A project manager can chart the probability and impact of risk events on a probability/impact matrix or chart. The y-axis of a probability/impact matrix lists the relative probability of a risk event occurring, and the x-axis of the chart shows the relative impact of the risk event occurring.

To use this approach, project stakeholders identify and list the risk events related to their projects. They then label each risk event as being high, medium, or low in terms of its probability of occurrence and level of impact. The project manager then summarizes the results in a probability/ impact matrix. Project teams should initially focus on risk events that fall in the high sections of the probability/ impact matrix and develop strategies for minimizing negative risk events and maximizing positive ones.

Sample probability – impact matrix:



The corners of the chart have these characteristics:

- **Low impact/Low probability** - Risks in the bottom left corner are low level, and you can often ignore them.
- **Low impact/High probability** - Risks in the top left corner are of moderate importance - if these things happen, you can cope with them and move on. However, you should try to reduce the likelihood that they'll occur.
- **High impact/Low probability** - Risks in the bottom right corner are of high importance if they do occur, but they're very unlikely to happen. For these, however, you should do what you can to reduce the impact they'll have if they do occur, and you should have contingency plans in place just in case they do.
- **High impact/High probability** - Risks towards the top right corner are of critical importance. These are your top priorities, and are risks that you must pay close attention to.

6.9.3 Risk Register

A risk register is a document that contains results of various risk management processes, displayed in a table or spreadsheet format. It is a tool for documenting potential risk events and related information.

The risk register often includes the following main headings:

- **Identification number** for each risk event

- **Rank** for each risk event: The rank can be indicated as high, medium, or low, or it can be a number, with 1 being the highest-ranked risk.
- **Name** of the risk event
- **Description** of the risk event
- **Risk Category** under which the risk event falls
- **Root cause:** It is important to find the root cause of a problem— the real or underlying reason a problem occurs. By finding the root cause, you can deal with it directly rather than dealing with the symptoms of the problem. You can help identify the root cause of problems by creating a cause-and-effect or fishbone diagram or continually asking why until you find a root cause.
- **Triggers** for each risk event: Triggers are indicators or symptoms of actual risk events. Documenting potential risk triggers also helps the project team identify more potential risk events.
- **Risk responses** to each risk event: There can be one or more potential responses to each risk event. .
- **Risk owner** or person who will own or take responsibility for the risk event: One person should be responsible for monitoring each risk event. .
- **Probability** of the risk event occurring: The chance of the risk event becoming a reality is rated as high, medium, or low. .
- **Impact** to the project if the risk event occurs: The impact to project success if the risk event actually occurs can be rated as high, medium, or low. .
- **Status** of the risk event: Did the risk event occur? Was the response strategy completed? Is the risk event no longer relevant to the project?

Sample risk register:

Risk Register

September 3,2009

Project Name: Project Meteor

ID No.	Rank	Risk	Description	Cate- gory	Root Cause	Triggers	Potential Responses	Risk Owner	Proba- bility	Impact	Status
R15	1										
R21	2										
R7	3										

To understand the risk register more fully, imagine that the following data is entered for the first risk in the register.

- IDNo.:R15
- Rank: 1
- Risk: Poor survey response.
- Description: Many people dislike surveys and avoid filling them out, or if they do, they don't offer good or honest feedback.
- Category: Organizational/user support risk
- Root cause: People don't want to take the time and think their inputs aren't important.
- Triggers: Low survey response rate the first few days; incomplete surveys.
- Potential Responses: Make sure senior management emphasizes the importance of this project and the survey for designing good courses. Have the functional managers personally mention the survey to their people and stress its importance. Offer a reward

to the department with the most responses. Ensure that the survey instructions say it will take 10 minutes or less to complete. Extend the deadline for survey responses.

- Risk owner: Mike Wilson, project champion
- Probability: Medium
- Impact: High
- Status: PM will set up a meeting within a week with a project steering committee to decide which response strategies to implement if the survey response is low.

6.9.4 Risk-Related Contractual Agreements

Many projects involve outside suppliers. Work done by outside suppliers or sellers should be well documented in contracts, which are mutually binding agreements that obligate the seller to provide the specified products or services, and obligate the buyer to pay for them. Project managers should include clauses in contracts to help manage project risks. For example, sellers can agree to be responsible for certain negative risks and incur the costs themselves if they occur. Or there can be incentive or penalty clauses in contracts based on seller performance to encourage positive risks and discourage negative risks. Project teams can also use certain types of contracts, such as fixed-price contracts, to reduce their risk of incurring higher costs than expected.

6.10 Project Procurement Management

Project procurement management includes acquiring or procuring goods and services for a project from outside the organization. Good procurement management often provides a win-win situation for both buyers and sellers.

Key outputs produced by project procurement management planning include make-or-buy analyses, procurement management plans, requests for proposal, contract statements of work, and supplier evaluation matrices.

6.10.1 Make-or-Buy Analyses

With a make- or- buy decision, an organization decides if it would benefit more by making a product or performing a service itself, or by buying the product or service from a supplier. If there is no need to buy products or services from outside the organization, the organization can avoid the costs involved in managing procurement management processes.

Make-or-buy analysis involves estimating the internal costs of providing a product or service, and comparing that estimate to the cost of outsourcing.

6.10.2 Procurement Management Plan

A procurement management plan is a document that describes how the procurement processes will be managed, from developing documentation for making outside purchases or acquisitions to contract closure.

Topics that can be included in a procurement management plan are as follows:

- Guidelines on types of contracts to be used in different situations
- Standard procurement documents or templates to be used, if applicable
- Guidelines for creating contract work breakdown structures, statements of work, and other procurement documents
- Roles and responsibilities of the project team and related departments, such as the purchasing or legal department
- Guidelines on using independent estimates for evaluating sellers' cost proposals
- Suggestions on managing multiple providers
- Processes for coordinating procurement decisions, such as make-or-buy decisions, with other project areas
- Constraints and assumptions related to purchases and acquisitions
- Lead times for purchases and acquisitions
- Risk-mitigation strategies for purchases and acquisitions, such as insurance contracts and bonds
- Guidelines for identifying prequalified sellers and organizational lists of preferred sellers
- Procurement metrics to assist in evaluating sellers and managing contracts

6.10.3 Types of Contracts

Fixed-price or lump-sum contracts:

- Fixed-price or lump-sum contracts involve a fixed total price for a well-defined product or service.
- The buyer incurs little risk or uncertainty in this situation because the price is predetermined.
- Sellers often pad their estimates somewhat to reduce their risk, while keeping in mind that their price must still be competitive.
- Fixed-price contracts generally have well-defined deliverables and deadlines, and may include incentives for meeting or exceeding selected project objectives.

Cost-reimbursable contracts:

- Cost-reimbursable contracts involve payment to the seller for direct and indirect actual costs.
- Cost-reimbursable contracts often include fees such as a profit percentage, and they can also include incentives for meeting or exceeding selected project objectives.
- Buyers absorb more of the risk with cost-reimbursable contracts than they do with fixed-price contracts. For example, if the cost of wood doubles, the buyer would have to absorb the additional cost.

Time- and- material contracts:

- Time- and- material contracts are a hybrid of both fixed-price and cost-reimbursable contracts.
- This type of contract is often used for services that are needed when the work cannot be clearly specified and total costs cannot be estimated in a contract. Many consultants prefer time-and-material contracts.

6.10.4 Request for Proposal or Quote

When organizations decide to procure goods or services, they often create documents to describe what they plan to procure and how potential sellers should respond. Two common examples of procurement documents include a Request for Proposal (RFP) and a Request for Quote (RFQ).

Request for Proposal (RFP)

A Request for Proposal (RFP) is a document used to solicit proposals from prospective suppliers. A proposal is a document in which sellers describe what they will do to meet the requirements of a buyer. It can be expensive and time-consuming to prepare a good RFP or proposal for a large contract, such as building a new bridge or designing a complex information system. For smaller contracts, it would take less time and money.

Request for Quote (RFQ)

A Request for Quote (RFQ) is a document used to solicit quotes or bids from prospective suppliers. A bid (also called a quote) is a document prepared by sellers providing pricing for standard items that have been clearly defined by the buyer. Creating and responding to RFQs is usually much quicker than the same process for RFPs. Selections are often made based on the lowest bid.

RFPs and RFQs can be issued in several ways.

- The organization might contact one or several preferred sellers directly and send the RFP or RFQ only to them.

- To reach more sellers, the organization might post the information on its Web site, or advertise on other sites or in newspapers.

Project managers must carefully consider which approaches are most appropriate in various situations.

Topics addressed in an RFP usually include the following:

- Purpose of the RFP
- Background information, describing the organization issuing the RFP and the project itself
- Basic requirements for the products and/ or services being proposed
- Hardware and software environment (for technology-related proposals)
- RFP process, describing how sellers should prepare and submit their proposals
- Statement of work and schedule information
- Appendices providing more detailed information, as appropriate

Sample RFP:

Request for Proposal

August 1, 2009

Project Name: Just-In-Time Training Project

RFP Name: Qualified-Sellers List for Just-In-Time Training Project

Purpose of RFP

Global Construction wants to improve training in supplier management, negotiating skills, project management, and software for its employees. In the fast-paced, ever-changing construction market, effectively training employees across a globally dispersed company with different populations is a challenge. By redesigning our current training, Global Construction can reduce training costs and improve productivity. In addition to providing traditional instructor-led courses on-site, we want to allow our employees to learn about specific topics on a just-in-time basis by having quick access to materials and expert advice. The purpose of this RFP is to hire experts to help us find qualified sellers to develop and deliver these new training courses.

Background Information

Global Construction employs 10,000 full-time employees in 10 different countries and 15 U.S. states. We want to increase the productivity of our employees, especially in the sales, purchasing, engineering, and information technology departments. The Just-In-Time Training project, a one-year project, began on July 2, 2009. A key part of this project is working with outside firms to develop and provide just-in-time training in supplier management, negotiating skills, project management, and software applications. See Appendix A for detailed information on the project and specific training needs.

Basic Requirements

The basic requirements for this work include the following:

1. Develop a list of qualified sellers to develop and provide the training as described in Appendix A.
2. Provide a summary description and detailed evaluation of each seller. Provide company brochures, Web sites, annual reports, and other appropriate information.
3. Work with Global Construction to develop an evaluation system to assess each seller.
4. Provide an objective assessment of each seller using this evaluation system.

5. Develop a list of the top five sellers for each course.
6. Provide recommendations for developing partnerships/relationships with each of the top five sellers.
7. Complete the above work no later than September 9, 2009.

RFP Process

Prospective sellers will send written proposals to Global Construction no later than August 10, 2009. To prepare your proposal, use the outline in Appendix B and examine Appendix C for our evaluation criteria. We expect to award the contract no later than August 20, 2009.

Statement of Work and Schedule Information

See Appendix C for a statement of work. The work must be completed no later than September 9, 2009.

Appendices

Appendix A: Just-In-Time Training Project Documents

Appendix B: Proposal Outline

Appendix C: Evaluation Criteria

Appendix D: Statement of Work

6.10.5 Contract Statements of Work

A contract statement of work (SOW) is a description of the work that is to be purchased. The SOW should be included with the RFP to clarify the work that needs to be performed. The contract SOW is a type of scope statement that describes the work in sufficient detail to allow prospective suppliers to both determine if they are capable of providing the goods and services required and to determine an appropriate price for the work.

A contract SOW should be clear, concise, and as complete as possible. It should describe all services required and include performance information, such as the location and timing of the work. It is important to use appropriate words in a contract SOW - for example, must instead of may. Must implies that something has to be done; may implies that there is a choice involved. The contract SOW should specify the products and services required for the project, use industry terms, and refer to industry standards.

The figure below shows the contract statement of work for the qualified-sellers list described in the RFP.

Contract Statement of Work

August 1, 2009

Project Name: Just-in-Time Training Project

Contract Name: Qualified-Sellers List

Scope of Work:

1. Develop a list of qualified sellers to develop and provide the training as described in Appendix A.
2. Provide a summary description and detailed evaluation of each seller Provide company brochures. Web sites, annual reports, and other appropriate information.

3. Work with Global Construction to develop an evaluation system to assess each seller.
4. Provide an objective assessment of each seller using this evaluation system
5. Develop a list of the top five sellers of each course.
6. Provide recommendations for developing partnerships/relationships with each of the top five sellers.
7. Complete the above work no later than September 9.2009.

Location of Work:

The seller can perform the work at any location. The seller must physically meet with representatives from Global Construction in our corporate office at least twice during the term of the contract.

Period of Performance:

Work is expected to start on or around August 20. 2009 and end no later than September 9. 2009 The seller will prepare a detailed schedule for all work required, including dates for deliverables and meetings. After meeting with representatives from Global Construction to review and update the schedule, the seller will agree to the schedule for this work.

Deliverables Schedule:

The seller will prepare a detailed schedule for all of the work required, including dates for all deliverables and meetings. After meeting with representatives from Global Construction to review and update the schedule, the seller will agree to the schedule for this work.

Applicable Standards:

The seller will use standard software to produce the required documentation for this project. Draft and final documents will be sent via e-mail

Acceptance Criteria:

The seller will work closely with the project manager. Kristin Maur. to clarify expectations and avoid problems in providing acceptable work. Kristin will provide written acceptance/non-acceptance of all deliverables.

Special Requirements:

The seller's staff assigned to work on this contract must have appropriate education and experience Resumes of proposed staff will be provided as part of the proposal. The seller will work with Global Construction to make all travel arrangements and minimize travel costs.

6.10.6 Supplier Evaluation Matrices

It is highly recommended that buyers use formal supplier evaluation procedures to help select sellers. In addition to reviewing their proposals or quotes, buyers should also review;

- sellers' past performance
- talk to recent customers
- interview their management team
- request sample products or demos

After doing a thorough evaluation, many organizations summarize evaluations using a supplier evaluation matrix - a type of weighted scoring model. A weighted scoring model provides a systematic process for selection based on numerous criteria. For example, suppliers are often evaluated on criteria related to

- cost
- quality
- technology
- past performance
- management
- skills

Sample Supplier Evaluation Matrix:

Criteria	Weight	Proposal 1	Proposal 2	Proposal 3
Past performance	30%	70	90	70
Cost	25%	80	75	70
Educational background	25%	70	75	70
Management approach	20%	85	80	70
Weighted Project Scores	100%	75.5	80.5	70

7 Executing

The Execution phase is typically the longest phase of the project (in terms of duration). It is the phase within which the deliverables are physically constructed and presented to the customer for acceptance. To ensure that the customer's requirements are met, the Project Manager monitors and controls the activities, resources and expenditure required to build each deliverable throughout the execution phase. A number of management processes are also undertaken to ensure that the project proceeds as planned.

Many of the tasks and outputs created in the other process phases are fairly similar from project to project, but no two projects are ever executed in the exact same way. Why? Because projects involve uncertainty. No one can ever predict the challenges that project teams will face in trying to meet project goals.

7.1 Communications Management

7.1.1 Project Kick-Off Meeting

A kick-off meeting is a meeting held at the beginning of a project so that stakeholders can meet each other, review the goals of the project, and discuss future plans.

Project kick-off meetings are often used to get support for a project and clarify roles and responsibilities. If there is a project champion, as there is for this project, he or she should speak first at the kick-off meeting and introduce the project sponsor and project manager. If anyone seems opposed to the project or unwilling to support it, the project champion— an experienced senior manager— should be able to handle the situation.

At a minimum, the project manager and sponsor should have met several times, and other key stakeholders should have been involved in developing the project charter. The project manager should make sure the right people are invited to the kick-off meeting and send out an agenda in advance. For a small project, a kick-off meeting might be an informal meeting of the project team held in a social environment. The main idea is to get the project off to a good start.

All project meetings with major stakeholders should include an agenda. Notice the main topics in an agenda:

1. Introduction of attendees
2. Project background
3. Project objectives and policies
4. Project organization, roles and responsibilities
5. Project scope, time and cost
6. Project integration (holiday rules, meeting schedule, reporting, issue management, training, documentation)
7. Quality assurance
8. Project tools and techniques
9. Appendix

7.1.2 Project Steering Committee Meeting

Stakeholders often review project performance information at project steering committee. Steering committee meetings or status review meetings are a good way to highlight important information, empower people to be accountable for their work, and have face-to-face discussions about key project issues.

Good meetings are well prepared in advance. The better the preparation is, the more efficient and satisfying for the participants. The first preparatory step for a meeting is to set up the agenda. Consider the type of information required by the participants, especially the steering committee members. To ensure the inclusion of all items it is helpful to keep an open file between meetings.

The agenda for a steering committee meeting may consist of the items mentioned below. Strict time limits should be set for the discussion of each agenda item. The time allocation is decided before the meeting and closely monitored during it, otherwise you will always run out of time.

1. Status Reporting
2. Time and Costs
3. Critical Issues
4. Change Requests
5. Risk Management
6. Miscellaneous
7. Date of next meeting

7.1.3 Reporting

Performance reporting keeps stakeholders informed about how resources are being used to achieve project objectives. Work performance information and measurements, fore-casted completion dates, quality-control measurements, the project management plan, approved change requests, and deliverables are all important inputs to performance reporting.

- **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.
- **Forecasts** predict future project status and progress based on past information and trends. How long will it take to finish the project based on how things are going? How much more money will be needed to complete the project? Project managers can also use earned value management, as described earlier in this chapter, to answer these questions by estimating the budget at completion and the projected completion date based on how the project is progressing.

7.1.4 Status Reporting

Status reports address where the project stands in terms of meeting scope, time, and cost goals. Is work being accomplished as planned? How long did it take to do certain tasks? How much money has been spent to date? Status reports can take various formats depending on the stakeholders' needs.

Sample status report:

Progress Report PROJECT NAME

Project Owner: Name, Position, Functional Area

Project Manager: Name, Position, Functional Area

Project Team Members: Name, Position, Functional Area

Summary		
Scope	😊 / 😞	Comment:
Time	😊 / 😞	Comment:
Costs	😊 / 😞	Comment:
Quality	😊 / 😞	Comment:
Status quo in Gant Chart		
Main Tasks completed since last Report		
Comments on Main Tasks that are not on Target (if any)		
Critical Points		
Changes / Change Requests (if any)		
Project Risks (probability, impact, actions)		
Decisions needed		
Main Tasks to be completed until next Report		

7.1.5 Progress Reporting

Progress reporting measures progress against time. In many projects, each team member prepares a weekly or monthly progress report. Team leaders often create consolidated progress reports based on the information received from team members.

Sample progress reporting form:

Project Name		PROJECT REPORT WEEK: 43				Date: 25/10/200902				8004			
Module/Location: UK		Sub-project: Production Planning				In time: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>							
Outstanding issues: <ul style="list-style-type: none"> Integration meeting has to organized next week AL on holiday week 44 						Initials KB				01 Travelling costs			
						Costs in CHF 300				02 Training costs			
						Expenses code 03				03 Other expenses			
ID	Performed Activities:	KG	AL	SW	IW								
	Preparation for conversion	24		10									
	Making user manual	8											
	PP/PI Discussion	2	2	2									
	Miscellaneous	3											
	Total Time												
ID	Activities Next Week:	KG	AL	SW	IW								
	Continuing with conversion preparations	20		12									
	User Manual	8											

7.1.6 Lessons Learned on Reporting

Reporting is a very important tool for all project members and serves the following functions:

- **Progress control:**
For the project manager and the project leader it is a tool to monitor progress closely. They should study the weekly reporting carefully to detect any bottlenecks. Based on the reported information, corrective actions may be needed.
- **Risk identification:**
The outstanding issues mentioned on the report form are a good indication of potential risk for the project. Risks need to be investigated and discussed within the project organization, starting bottom up, until a solution is found.
- **Organization:**
The project members often find weekly reporting annoying and unnecessary. In fact it is an invaluable organizational aid. Itemizing all the activities done over the past week can reinforce the sense of achievement. Planning the next week's work helps them to anticipate potential problems or bottlenecks.
- **Project information:**
Weekly reporting provides progress information to all project members and indicates whether the project is on schedule or not. The information is especially valuable for the Steering Committee to get an idea about progress.
- **Feedback on working time:**
The reports also show the time spent on the project. This is a good indicator of the project members' workload. If actual time spent is more or if it less than scheduled, the appropriate measures should be taken.

7.2 Time Management

As time is a scarce resource on projects, it is important to record the time spent by each member of the team on a Timesheet to enable the Project Manager to control the level of resource allocated to a particular activity.

7.2.1 Timesheet Document

Time management is undertaken through the completion of timesheets. A timesheet is a document which records all allocation of time against a set of project activities listed on the project plan. Timesheets are typically completed weekly by all members of the project. This includes project staff, contractors and often suppliers.

If timesheets are not recorded, then it may be difficult to accurately assess the amount of time spent undertaking project activities, and therefore become impossible to manage the projects constraints of time, cost and quality.

Sample timesheet:

PROJECT REPORT WEEK: 35		Date: 30.08.2009	
Module: IT	Sub-project: EL	In time: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

1. Performed Activities (planning)	<u>Mo</u>	<u>Tu</u>	<u>We</u>	<u>Th</u>	<u>Fr</u>
BC administration (tape-drive problem, evaluation)	1	3	2	3	2
SD ZSBIC009 Batch-Input (change for BE)			2		
SD ABAP ZSORC009 (claim handling) change for HA	2	1			
SD language problem customer master sales text					
SD New ABAP for text determination ZSZZC001				2	4
FI problem for MEP (OSS-inquiry)				1	
SD problems (OSS: wrong language, not possible to post goods issue for delivery)	2			2	
Total Time	5	4	4	8	6

Costs in CHF			
Expenses code			

Codes for expenses:

01 Travelling costs

02 Training costs

03 Other expenses

2. Activities next period	<u>Mo</u>	<u>Tu</u>	<u>We</u>	<u>Th</u>	<u>Fr</u>
<u>Merthyr</u> visit	X	X			
Total Time					

3. Outstanding issues

- SD problems (OSS: wrong language, not possible to post goods issue for delivery)
- FI problem for MEP (OSS-inquiry)

7.2.2 Timesheet Register

A Timesheet Register provides a summary of the time currently spent on the project and enables the Project Plan to be kept fully up to date

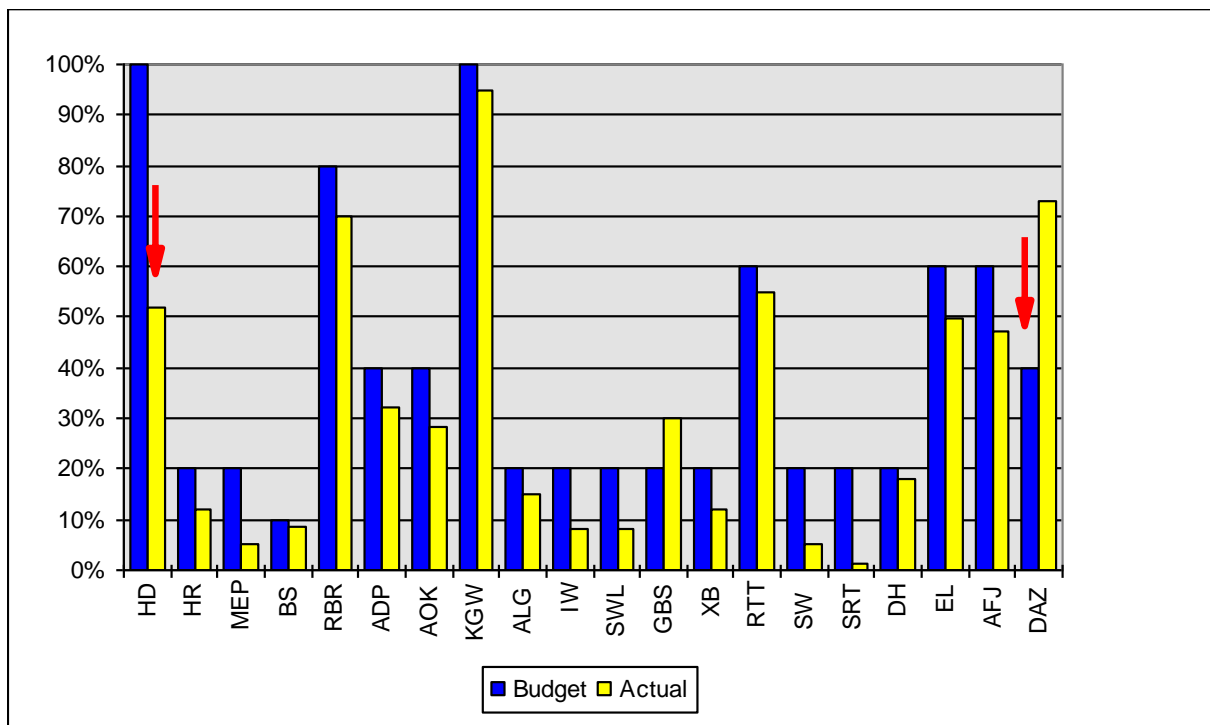
The details of all timesheets are formally recorded in a timesheet register enabling:

- The project plan to be updated with a summary of the time recorded against each task
- The cost of each staff member to be calculated and monitored throughout the project
- The identification of overtime for the projects

Sample project register:

Module	Project member	Budget in % /mth	Actual in % / mth	Budget in hrs/mth	Actual in hrs/mth	wk 40	wk 41	wk 42	wk 43	wk 44	wk 45	wk 46	wk 47	wk 48
FI SKL	HD	100%	52%	152	79	36	11	10	22	20				
	HR	40%	13%	60.8	19	10	4	0	5	4				
	MEP	20%	3%	32	4	0	4	0	0	8				
PM SKL	BS	10%	18%	15.2	28	7	8	5	8	8				
	RBR	80%	68%	122	103	30	28	19	26	24				
FI SUK	ADP	60%	40%	90	60	24	14	6	16	30				
	AOK	60%	33%	90	50	24	10	8	8	24				
PP SUK	KGW	100%	97%	150	145	37	41	36	31	40				
	ALG	40%	13%	60	20	2	13	3	2	2				
	IW	40%	7%	60	11	2	6	2	1	0				
	SWL	20%	13%	30	19	2	7	7	3	2				
	GBS	20%	29%	30	44		16	20	8	22				
	XB	20%	12%	30	18		16	2	0	16				
	RTT	80%	59%	120	88	23	23	23	19	23				
PUR SUK	SW	40%	5%	60	7	4	2	0	1	1				
	SRT	20%	5%	30	7	4	2	0	1	1				
IT	DH	50%	20%	80	32	10	12	10	0	12				
	EL	80%	49%	128	79	26	24	20	9	11				
	AFJ	80%	55%	120	83	16	25	27	15	15				
	DAZ	40%	72%	60	108	31	30	29	19	31				
TOTAL	Total			2759	1286									

As time spent is an early indicator of problems in a project, it is reviewed at every meeting of the project team or Steering Committee. It clearly highlights problem areas and indicates where people are spending too little or too much time. In many cases, the agreed time distribution percentage isn't followed. The Steering Committee has to take action to bring people back on track.



7.3 Cost Management

The main monitoring and controlling task performed as part of project cost management is cost control. Cost control includes:

- monitoring cost performance
- ensuring that only appropriate project changes are included in a revised cost baseline
- informing project stakeholders of authorized changes to the project that will affect costs

7.4 Issue Management

Issue management is the process of identifying and resolving issues. Problems with suppliers haven't delivered on time, technology hasn't performed as expected or you experience equipment faults, you need to put in place a process for resolving project issues quickly and efficiently. If the issue goes unresolved, you risk creating unnecessary conflicts, delays, or even failure to produce your deliverable.

The Issue Management Process is comprised of the following procedures:

- Identify the Issue
- Review the Issue
- Assign Issue Actions

7.4.1 Identifying the Issue

Any member of the project team has to identify new project issue. The issue is registered in an issue database describing the issue and rating its current impact on the project. The actions required to resolve the issue are also identified.

7.4.2 Reviewing the Issue

The Project Manager investigates the issue and determines the overall issue priority. The priority of the issue is determined by its current impact on the project's ability to achieve its stated objectives. If the issue is severely impacting the project, then it is assigned a high priority rating and also discussed in the Steering Committee.

When determining the issue priority, the Project Manager considers whether the:

- Deliverables listed in the Scope Statement are currently being affected by the issue
- Quality Targets specified in the Quality Plan are currently being affected by the issue
- Timeframes specified in the Project Plan are currently being affected by the issue
- Resources specified in the Resource Plan are currently being affected by the issue
- Budget specified in the Financial Plan is currently being affected by the issue

7.4.3 Assigning and Tracking Issue Actions

The steering committee reviews all high priority issues by considering the current impact of each issue on the project. It may then decide to:

- Ignore the issue, as Board members believe it is not impacting the project
- Validate the issue and request further information that is needed to make a decision
- Decide on a suite of actions to resolve the issue

The project manager is then responsible for scheduling and implementing these actions and reviewing the issue on a regular basis to ensure that it has been resolved accordingly.

Throughout the issue management process, the project manager can monitor and control issues impacting the project by keeping the Issue database up-to-date.

By completing these 3 steps for each issue that arises, you will be able to minimize the effect that issues have on your project and thereby increase its chances of success.

Sample of an issue database:

7.4.4 Lessons Learned on issue management:

- Issue management is the most important progress and controlling tool for the project manager.
- An issue database contains all issues with deadlines, priorities and responsibilities
- Issues have to be checked and followed continuously
- Issue management must be an agenda point in every project team and steering committee meeting
- Issues are a reliable indicator of the project state

7.5 Change Request Management

Often, a number of requests for changes emerge during project execution. It is important during project execution to formally and informally request appropriate changes. Project managers, team members, suppliers, and other stakeholders can make change requests, so it is important to have a good process in place for handling them.

Integrated change control involves identifying, evaluating, and managing changes throughout the project's life cycle. The three main objectives of integrated change control are as follows:

1. Influencing the factors that cause changes to ensure that changes are beneficial: Changes can often be good for a project, so it is important to let everyone know that and focus on promoting changes that are beneficial. For example, changes that improve quality, reduce costs, save time, or improve stakeholder relationships are beneficial.
2. Determining that a change has occurred: To determine that a change has occurred, project managers must know the status of key project areas at all times. In addition, they must communicate significant changes to senior management and key stakeholders, who normally do not like surprises - especially unpleasant ones.
3. Managing actual changes as they occur: Managing change is a key role of project managers and their teams. It is important that project managers exercise discipline in managing the project to help control the number of changes that occur. Managers should focus on achieving project goals rather than putting out fires.

7.5.1 Change Request Management Process

- Submit change request: document the change request by completing a change request form
- Review change request: the project manager or change manager reviews the CRF, formally records the change request and determines whether or not a feasibility study is required to assess the full impact of the change.
- Identify change feasibility: if deemed necessary, a change feasibility study is completed to determine the extent to which the change requested is actually feasible. The change feasibility study will define in detail the change requirements, options, costs, benefits, risks, issues, impact, urgency, recommendations and plan.
- Approve change request: a formal review of the CRF is undertaken by the steering committee to decide on the acceptance or rejection of the change request.
- Implementing change request: approved changes are then implemented.

7.5.2 Change Request Form

For change requests, especially those that may impact achieving scope, time, or cost goals of the project, a formal change request form should be submitted through the appropriate channels. It is important to have a good justification for the requested change and address the benefits of incurring any additional costs.

Topics addressed in a change request form usually include the following:

1. Change request header: request ID, requestor, date, site/department, project, etc.
2. Description of change request: as-is, to-be, solution proposal
3. Justification for the change: reason, benefit
4. Impact of the change on: scope, schedule, cost, staffing
5. Risk assessment

6. Suggested implementation if the change request is approved
7. Change request approval

Sample change request:

<u>Change Request</u>															
Change Request ID: NW-701		Date: November 12, 2009													
Submitted by: Kean Chandler	Department: QM	Mail: kc@hotsprings.ch													
Project: Training Project		Ticket No: 847													
Application/process to be changed:		Category:													
Due date:	Priority:	critical important nice-to-have													
<p>Description of change requested:</p> <p>To avoid a schedule slip and have appropriate internal resources available, we are requesting the approval of paid overtime for creating and distributing the survey for the supplier management course.</p> <p>Events that made this change necessary or desirable:</p> <p>The IT person assigned to our project has several other important projects on hand. If these survey tasks are delayed, the entire project will be delayed.</p> <p>Justification for the change/why it is needed/desired to continue/complete the project:</p> <p>We must send out and analyze the survey in a timely manner because we need the information to develop the first supplier management course and select an appropriate supplier.</p> <p>Impact of the proposed change on:</p> <ul style="list-style-type: none"> ▪ Scope: None ▪ Schedule: None ▪ Cost: \$550 ▪ Staffing: One IT person will work f 0 hours of paid overtime over a period of several weeks. ▪ Other: None <p>Risk assessment:</p> <ul style="list-style-type: none"> ▪ Low. This person suggested the paid overtime and has successfully worked overtime in the past. ▪ <p>Suggested implementation if the change request is approved:</p> <ul style="list-style-type: none"> ▪ Include the overtime pay in the normal paycheck. <p>Required approvals:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Name/Title</th> <th style="width: 20%;">Date</th> <th style="width: 30%;">Approve/Reject</th> </tr> </thead> <tbody> <tr> <td>Evan George/Affected Employee</td> <td></td> <td></td> </tr> <tr> <td>Stella Jacobs/Employee's Supervisor</td> <td></td> <td></td> </tr> <tr> <td>Julia Portman, VP of IT</td> <td></td> <td></td> </tr> </tbody> </table>				Name/Title	Date	Approve/Reject	Evan George/Affected Employee			Stella Jacobs/Employee's Supervisor			Julia Portman, VP of IT		
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7.6 Human Resources Management

7.6.1 Conflict Management

Most large projects are high-stake endeavors that are highly visible within organizations. They require tremendous effort from team members, are expensive, require significant resources, and can have an extensive impact on the way work is done in an organization. When the stakes are high, conflict is never far away, and even small projects with low budgets have conflicts - it is a natural part of work and life in general. Project managers should lead their teams in developing norms for dealing with various types of conflicts that might arise. For example, team members should know that disrespectful behavior toward any project stakeholder is inappropriate, and that team members are expected to try to work out small conflicts themselves before elevating them to higher levels. The team contract, created during project planning, should address team conduct and conflict management.

Blake and Mouton (1964) delineated five basic modes for handling conflicts. Each strategy can be considered as being high, medium, or low on two dimensions: importance of the task or goal, and importance of the relationship between the people having the conflict.

1. **Confrontation:** When using the confrontation mode, project managers directly face a conflict using a problem-solving approach that allows affected parties to work through their disagreements. This approach is also called the problem-solving mode. It is best used when both the task and the relationship are of high importance. This mode reflects a win/win approach.
2. **Compromise:** With the compromise mode, project managers use a give-and-take approach to resolve conflicts, bargaining and searching for solutions that will bring some degree of satisfaction to all the parties in a dispute. This give-and-take approach works best when both the task and the relationship are of medium importance. This mode reflects a lose/lose approach, since both parties are giving up something.
3. **Smoothing:** When using the smoothing mode, the project manager de-emphasizes or avoids areas of differences and emphasizes areas of agreement. This method is best used when the relationship is of high importance and the task is of low importance.
4. **Forcing:** The forcing mode can be viewed as the win-lose approach to conflict resolution. People exert their viewpoints even though they contradict the viewpoints of others. This approach is appropriate when the task is of high importance and the relationship is of low importance. For example, if you are competing against another firm for a contract, it may be appropriate to use the forcing mode.
5. **Withdrawal:** When using the withdrawal mode, project managers retreat or withdraw from an actual or potential disagreement. This approach is the least desirable conflict-handling mode. It may be appropriate when both the task and the relationship are of low importance.

Effective project managers often use confrontation for conflict resolution instead of the other four modes. However, it is important to keep in mind that the term confrontation may be misleading. This mode focuses on a win-win problem-solving approach, in which all parties work together to find the best way to solve the conflict.

Project managers must also realize that not all conflict is bad. In fact, conflict can often be good. Conflict often produces important results, such as new ideas, better alternatives, and motivation to work harder and more collaboratively. Project team members might become stagnant or develop groupthink - conformance to the values or ethical standards of a group - if there are no conflicting viewpoints on various aspects of a project.

Research suggests that

- task-related conflict, which is derived from differences over team objectives and how to achieve them, often improves team performance.
- emotional conflict, which stems from personality clashes and misunderstandings, often depresses team performance.

Project managers should create an environment that encourages and maintains the positive and productive aspects of conflict.

7.6.2 Change Management

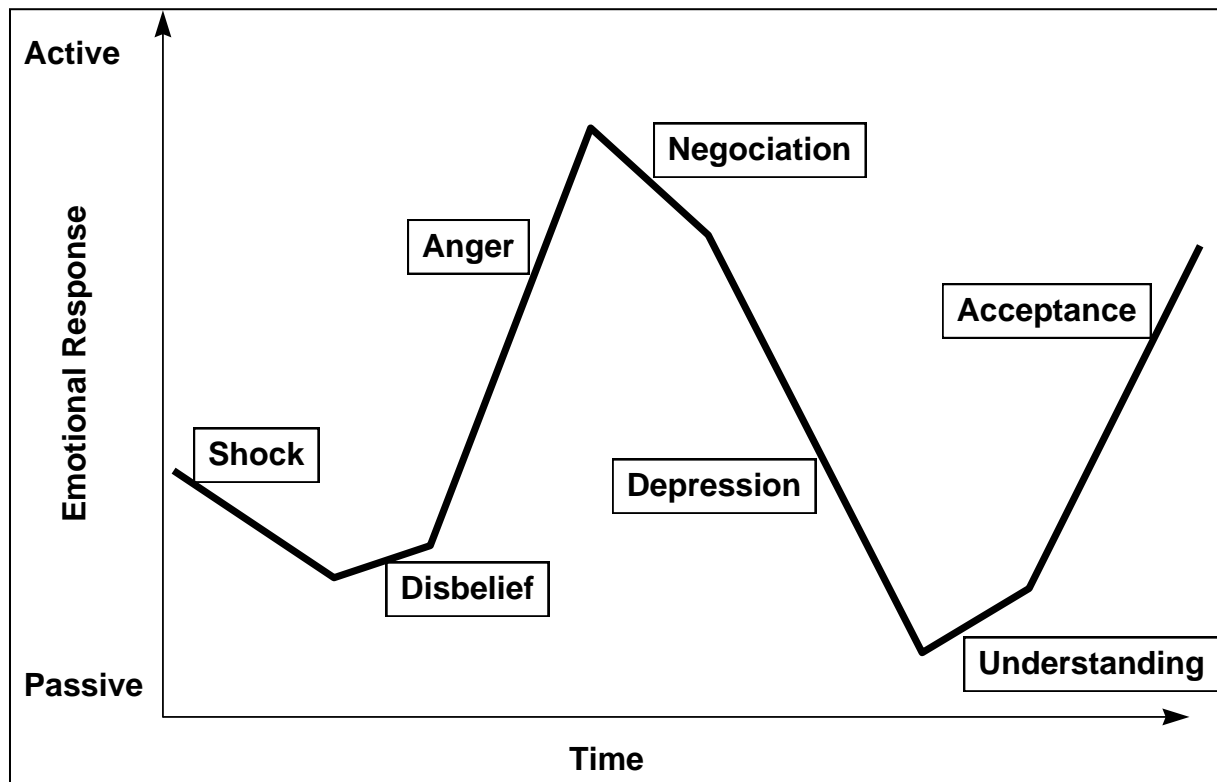
It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who profit by the old order, and only lukewarm defenders in all those who would profit by the new order, this lukewarmness arising partly from fear of their adversaries, who have the laws in their favour; and partly from the incredulity of mankind, who do not truly believe in anything new until they have actual experience of it.

Niccolò Machiavelli, in
The Prince, 1532, (this translation: 1935)

The implementation of a project may have a major impact on a company and especially on its employees. The usual reaction to major change is resistance. Resistance is a natural and inevitable reaction to a disruption of expectations. Resistance to positive change is just as common as resistance to negatively perceived change and both reactions follow their own respective cycles which have to be anticipated and managed.

1.1.1.4 Change Perceived as Negative

A minority of the users perceive a project implementation as negative. The Pareto principle (the 80-20 rule) can also be applied here. About twenty per cent of the users are negative toward a new project and extremely difficult to deal with; 80% are in favor of a change. The people with a negative attitude followed the typical cycle shown in the figure below:



Negative perceived changed with an example of an software implementation:

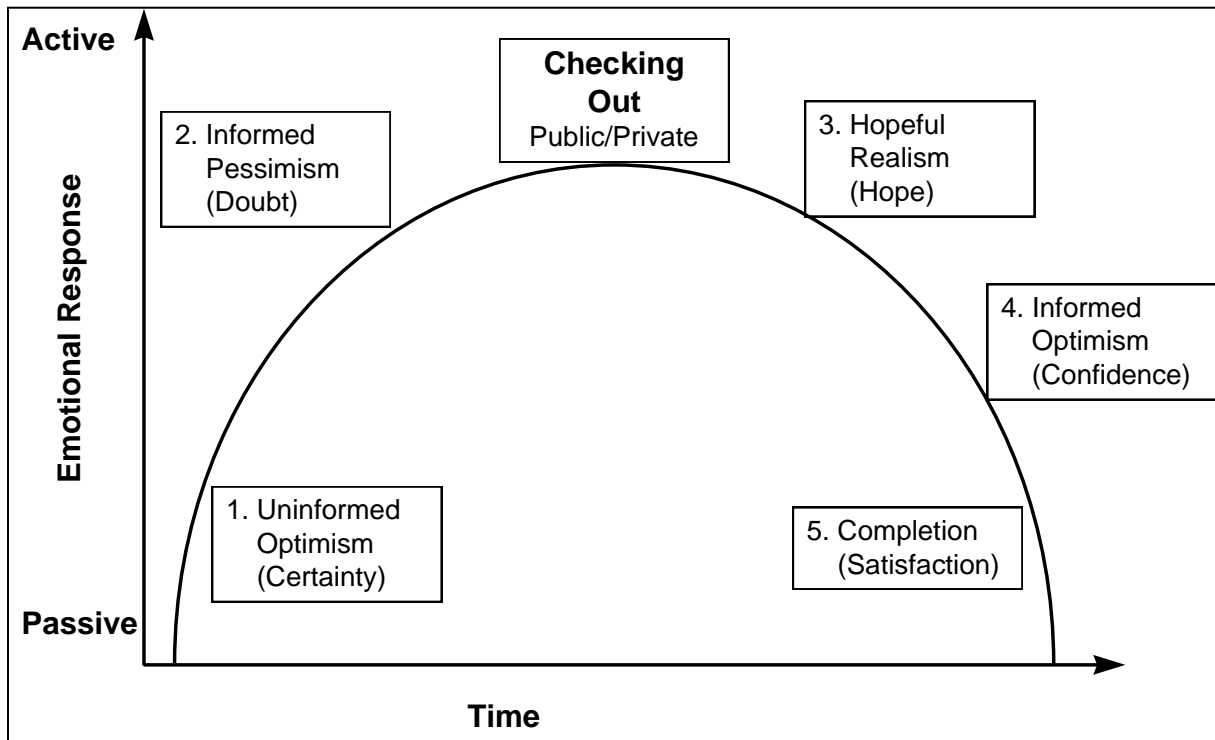
1. Shock: They were shocked when looking at this new software for the first time. Everything seemed to be so complicated, user-unfriendly and not at all like the old software they were used to and could operate well.
2. Disbelief: Based on these fears, they perceived the change as very negative and could not really believe that this software could help them in their daily work.
3. Anger: The frustration turned to anger once they realized that they would have to work with this software.
4. Negotiation: After realizing that the project was fully supported by our top management and there was no way out, people started to ask for help and support in their daily work. The project team tried to make access to the software easier by installing user-specific menus.
5. Depression: The negotiation phase could not make the software any easier for them to handle. This confrontation with reality gave way to a depression phase.
6. Understanding: Only after going through the depression phase, were they really ready to learn and understand the software.
7. Acceptance: Finally, even these people accepted the new SAP software, but it needed a lot of effort and strength from the project team to guide them through the various phases.

Those people perceiving the change as negative want to remain with the old order of things. Reasons for reluctance to change are:

- losing ownership of their work
- fear of failure in the new environment
- laziness to respond to change;
- afraid of structural changes;
- fighting with other personal or business related difficulties

1.1.1.5 Change Perceived as Positive

Most people are looking forward to changes. They perceive change as positive and undergo the cycle shown in the figure below:

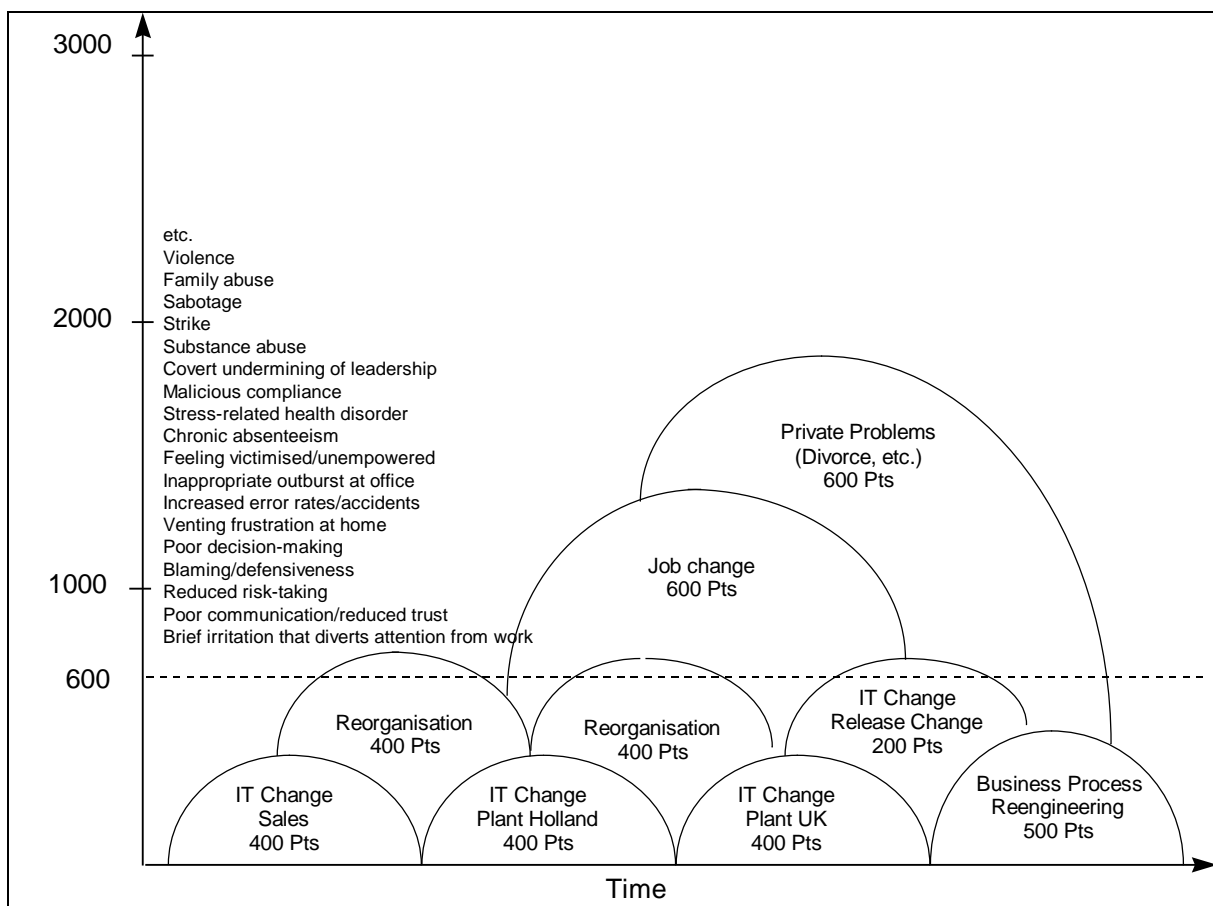


Positive perceived changed with an example of an software implementation:

1. Uninformed optimism:
These people had a basically positive attitude towards an expected project implementation without knowing exactly what to expect but are optimistic about
2. Informed pessimism:
They became doubtful after first contact with the software because it is not easy to get to know an integrated software pack
3. Checking out:
They started to compare their experience with that of a previous software change-over or other software implementations they had heard about publicly or from friends;
4. Hopeful realism:
With their feedback from other similar situations in private or public and their positive attitude towards the implementation, they appreciated the extent of change for operating such an integrated software;
5. Informed optimism:
They learned fast and gained confidence in operating the software;
6. Completion:
Knowing the software well, they were able to retrieve the necessary information fast and efficiently and appreciated having a tool that really helped to make their lives easier.

1.1.1.6 Coping with Change

According to the figure below an average person can deal with changes below 600 assimilation points, for example with an IT change, reorganization, a business process re-engineering exercise etc. Assimilation points are a measurement of the energy used to assimilate change. When a person must deal with a situation exceeding 600 points there is the probability of change-related dysfunction. Significant changes in life, such as divorce or cumulative change can overwhelm an individual's capacity to assimilate the new situation. 600 points are exceeded. IT change combined with reorganization for example, may cause change-related dysfunction. Change related dysfunction starts with irritability and the tendency to be easily distracted, continues with poor communication and lack of trust, through chronic absenteeism and ends finally with strike, sabotage or even physical violence.



Norbert Welti, author of Successful SAP R/3 Implementation³, has described his observations during an European wide rollout of an ERP project as follows:

To avoid any Change related dysfunction, we tried not to combine our IT change with Business Process Re-engineering. In a few cases we had to adjust or reorganize processes and this in itself caused some dysfunction for some people. We found change related

dysfunction especially in those departments where we combined the IT change with other projects.

About 80% of the people assimilate well to the new software because they had the necessary energy to cope with an IT change. Among the 20% of the employees who had problems adapting to this major change, we observed the following **symptoms**:

- **Poor communication:** As they distrusted the software these people shunned help; not even asking for advice when they had serious problems;
- **Increased margin of error:** As a result of their difficulties with handling the software, their errors increased;
- **Shifting responsibility:** The software was blamed for all kinds of problems and errors;
- **Stress-related health disorder:** Overwhelmed by the changes at work, many people, especially those in management positions, were extremely stress when the new software was introduced. In a few cases this led to serious illness.

Those people who had a negative perception of the changes received the following **support**:

- **Communication:** We approached these employees from various sides to encourage them to discuss their problems;
- **Education and training:** We specifically targeted them for education and training to help them overcome their problems;
- **Information:** We identified and explained difficult processes and procedures in our project bulletin. E-mail was used for communicating and explaining software-specific problems and changes;
- **Job transfers:** In several cases, we transferred people to other positions within the company;
- **Replacement:** In a few cases, the introduction of the IT software had such an impact on the job that it was more than they could handle and we had to replace them.

Conclusions:

- A common reason for dysfunction was the fact that people were incapable of adapting to the increased demands of the job resulting from the software change. In certain jobs the software required different or additional skills, which some people were incapable of acquiring.
- Approximately 15% of people at the plants had extreme difficulties in handling the software correctly and needed extensive support. Some of them even had to be replaced. However, such people had probably reached their limits before the implementation of the IT software. Frankly, the new software just highlighted weaknesses already existing within the organization.
- In Sales Administration about 40% of the staff had severe difficulties with operating the software. These people needed, and still do, a lot of support from our hotline. Intensive training brought their skills up to a level whereby they could carry out the basic functions required by their job.
- The organization as a whole comes under pressure during an implementation of an integrated software. All the additional projects; the as-is and to-be concepts etc. expose all the pre-existing weaknesses within the various departments.
- Line-managers were in a particularly stressful situation, with dual roles; in project and in line work. This demands vast reserves of energy and skill in order to be effective. In this way management's strengths and weaknesses were also revealed and quite a few were unequal to the task.

7.6.3 Lessons Learned for Change Management

1. Manage the change:

Project members, especially those on the Steering Committee and in project management, should be aware of the changes they are initiating with the project. They must manage the changes actively and help the users to make a smooth transition. This means guiding them, communicating the information and providing them with education and training throughout the respective project cycles.

2. Specifically focus on persons who perceive the change as negative:

Such people are usually a minority but they need the most attention. They are probably not the most adaptable employees or the easiest to deal with but for that reason they will require special coaching from project members.

3. Do not accumulate changes:

The implementation of integrated standard software demands a great deal of energy from the users. Too many simultaneous changes should be avoided because they may overstretch many individuals' capabilities and result in change-related dysfunction.

4. Expect about twenty per cent of employees to have serious difficulty:

Such people cannot cope with the changes and the increased demands of the job. They require extensive support and some of them may even need to be replaced.

5. Reorganize only where necessary:

Changes always reveal the underlying strengths and weaknesses of any organization. As a result, some reorganization may be unavoidable so as to have the right people on the right job.

6. Consider changes carefully but implement them resolutely:

With the introduction of a new software, job transfers or redundancies are unavoidable. Structural changes must be thoroughly evaluated. However, once a decision has been made, it must be carried out quickly and with determination. The longer action is delayed, the more difficult it will become.

7.7 Acceptance Management

Every project phase requires formal acceptance of the project deliverables by the project customer or designated stakeholders. This acceptance is often achieved through customer inspection and then sign-off on key deliverables. To receive formal acceptance of the project deliverables, the project team must develop clear documentation of the project's products and procedures, which the appropriate stakeholders can then evaluate for completion and their satisfaction with the results.

7.7.1 Acceptance Management Process

Acceptance Management is the process by which deliverables produced by the project are reviewed and accepted by the customer as meeting his/her specific requirements. The process entails the following steps:

- **Complete deliverable:**
before you request the formal acceptance of a deliverable by a customer, the deliverable must be completed to a level of quantity which is likely to gain customer acceptance.
- **Complete acceptance test:**
The project manager arranges an acceptance test of the deliverable by the customer to gain agreement that the deliverable matches the acceptance criteria and is now ready for final sign-off.
- **Review acceptance test:**
The acceptance test results are assessed by the customer to determine whether or not they met the criteria specified within the acceptance plan
- **Accept deliverable:**
the deliverable is then finally accepted by the customer.

7.7.2 Acceptance Form

To request the acceptance of a deliverable by the customer, an Acceptance Form is completed. The Acceptance Form describes the criteria from which the deliverable has been produced and the level of satisfaction of each criterion listed.

Sample acceptance form:

<u>Deliverable Acceptance Form</u>			
November 12, 2009			
Project Name:			
Project Sponsor:			
Project Manager:			
Deliverable Name:			
Deliverable Description: add a brief description of the deliverable for customer acceptance is being requested.			
Was this deliverable completed to your satisfaction?	Yes:	No:	
Reasons for satisfaction or dissatisfaction			
Outstanding issues			
<p>(We), the undersigned, acknowledge and accept delivery of the work completed for this deliverable on behalf of our organization. My (Our) signature(s) attest(s) to my (our) agreement that this deliverable has been completed. No further work should be done on this deliverable. If the deliverable is not acceptable, reasons are stated and corrective actions are described.</p>			
Name	Title	Signature	Date

8 Closing Projects

Closing projects involves gaining stakeholder and customer acceptance of the final products and services, and bringing the project to an orderly end. It includes verifying that all of the deliverables are complete, and often includes a final presentation and report. For both projects that are completed and those that are canceled before completion, it is important to formally close the project and reflect on what can be learned to improve future projects.

It is also important to plan for and execute a smooth transition of the project into the normal operations of the company. Most projects produce results that are integrated into the existing organizational structure.

8.1 Integration Management

The last task in project integration management is closing the project. To close a project, you must finalize all activities and transfer the completed or canceled work to the appropriate people. The main outputs of closing projects are as follows:

- **Administrative closure procedures:** It is important for project teams and other stakeholders to develop and follow a step-by-step process for closing projects. In particular, administrative closure procedures should define the approval process for all project deliverables and how records will be retained.
- **Contract closure procedures:** Many projects involve contracts, which are legally binding agreements. Contract closure procedures describe the methodology for making sure that the contract has been completed, including both delivery of goods and services, and payment for them.
- **Final products, services, or results:** Project sponsors are usually most interested in making sure that final products, services, or results are delivered on schedule and within budget. A final project report and presentation are also commonly used during project closing. The section of the final report summarizing project results should also address how well the project met key project metrics. It is important for project teams to set aside time to prepare a good final report and presentation, as these items often receive high visibility.
- **Updates to organizational process assets:** During project closing, the project team should update appropriate process assets, especially lessons learned.

8.1.1 Final Report

The final report includes a transition plan and a plan to analyze the benefits of the project. Also notice that the final report includes attachments for all the project management and product- related documents.

Sample table of contents for a final project report:

<u>Final Project Report</u>

June 20, 2010

Project Name:

1. Project Objectives
2. Summary of Project Results
3. Original and Actual Schedule
4. Original and Actual Budget
5. Project Assessment
6. Transition Plan
7. Training Benefits Plan

Attachments:

A. Key Project Management Documentation

- Business case
- Project charter
- Project management plan
- Performance reports

B. Product-Related Documentation

- Survey and results
- Summary of user inputs
- Report on research of existing training
- Partnership agreements
- Course materials
- Intranet site training information
- Summary of course evaluations

8.1.2 Transition Plan

The transition plan includes information related to what work had to be done, by whom, and when. When developing a transition plan, the project team should work with managers in affected operating departments, and the contents of the plan should be tailored to fit the support needs of the project.

8.1.3 Lessons Learned

Describe the lessons learned from undertaking this project and list any recommendations for similar projects in the future.

An example list of 11 key success factors:

1. Ownership assumed by the management:

Top management must play an active role in the project. They need to participate on the Steering Committee and take over ownership, to support the project with their expertise and to endow it with the necessary authority. Active participation by upper management is crucial to the adequate resourcing of the project, to taking fast and effective decisions and to promoting company-wide acceptance of the project.

Departmental managers also must be members of the project team to assume project

ownership, and to contribute the necessary line know-how. Doing this, they also keep themselves up to date with the system.

Ownership taken over by the departmental manager is again a clear signal to the department staff to accept the project. At the same time, departmental managers usually know the most about processes and procedures in their departments and therefore can provide the best support for the project.

2. **Relationship of trust among the project members:**

Trust among the project members including members of the Steering Committee is essential for a successful outcome, because the project organization has hardly any hierarchical authority but must rely on natural authority, which involves trust. Without trust an extensive coaching and controlling effort is needed to prevent a rapid decline. Trust can be built up with intensive communication, coaching, delegation of responsibility, personal care and attention, among other things.

3. **Simple, clear and measurable project objectives:**

Well-defined objectives help to keep the project constantly focused and are essential for analyzing and measuring success. They must clearly-defined, measurable, controllable and the savings must be quantified for each objective.

4. **Effective and strong project management:**

The project management has to lead, manage and coach the whole project. To fulfil this task efficiently and effectively, the management needs broad authority over all aspects of the project. Their authority should be sufficient to permit the project management to engage in all necessary managerial and technical actions required to complete the project successfully, regardless of organizational barriers. The more powerful the project management, the better the chances for a successful implementation. If the project management falls below par in its tasks and responsibilities, the project is likely to fail since they play a key role in the whole project.

5. **Clear and simple project organization:**

A flat and streamlined organizational project structure is very effective, with its short communication- and decision-lines, especially between the project management and the Steering Committee. Problems can be tackled quickly and unbureaucratically. Clearly-defined tasks and responsibilities at all levels of the project organization allow everyone to work efficiently towards project goals, avoiding political struggles over matters of authority and control.

6. **Highly-qualified project members:**

Project work is very demanding and complex and therefore requires people with a high learning potential. The project will need capable members from the line organization. High caliber project members ensure a fast and proper implementation. As the driving force of the whole project, members of the project management team must be particularly skilled and able. Any project organization is only as good as the individuals who comprise it.

7. **Full-time project members:**

Adequate human resourcing is essential. At the very least, all key project members must be available full-time to ensure project continuity and progress. If human resourcing is inadequate, the project is likely to make only slow progress and ultimately may disintegrate. Part-time project members always tend to give higher priority to line work since it is easier and more convenient for them to do.

8. **Open and honest communication policy:**

Open and honest communication is of paramount importance to satisfy the information needs of users and to prevent the circulation of unfounded rumours. Users need reliable information because any project affects them directly and may even threaten their jobs. The open information policy helps the user to become acquainted with the new situation, to build up confidence in the project and its members, and finally to accept the project.

9. **Project plan as project guideline:**

The project plan is the foundation and guideline for the whole project. All relevant matters concerning the future organization, processes, procedures and methods must be thoroughly researched, discussed in depth and recorded in writing before commencing the realization phase. A comprehensive and well set up to-be concept protects the project team from lengthy disputes and therefore avoids any delays from the line side.

10. **Good consultants improve throughput time and quality:**

Good consultants have a major impact on the throughput time and the quality of a project. An external consultant on the project team must help with the designing, setting up the project schedule and controlling the project. A consultant at the Steering Committee level is needed to advise it about organization, processes and procedures and to assist the project manager.

11. **Regular and continuous project control:**

The project should be tightly controlled as this is the essence of good project management. Any deviation from the implementation schedule and defined project goals must be identified and tracked carefully with appropriate corrective action taken. Progress must be measured constantly and reported regularly in weekly meetings. The frequency of the meetings has a direct impact on the effectiveness of control. The more frequently meetings are held, the more efficient and effective the control, the better the quality and the faster the throughput time.

Robert Butrick, author of The Project Workout, wrote an article on best practices in project management for the Ultimate Business Library book. He suggests that organizations need to follow these basic principles of project management:

- **Make sure your projects are driven by your strategy.** Be able to demonstrate how each project you undertake fits your business strategy, and screen out unwanted projects as soon as possible.
- **Use a staged approach.** You can rarely plan a project in its entirety. Use pro-gressive steps or stages to project planning, and use the same generic stages for all types of projects. Have gate reviews before starting each stage to revali-date a project and before committing more resources and funding for the project. Place high emphasis on the early stages of a project to reduce risks and decrease time to market.
- **Engage your stakeholders.** Ignoring stakeholders often leads to project failure. Be sure to engage stakeholders at all stages of a project, and encourage team-work and commitment at all times.
- **Ensure success by planning for it.** To help projects succeed, the balance of power often needs to be tipped toward the project and away from line management.
- **Monitor against the plan.** Everyone working on projects must have guidance, training, and support in creating plans and making project- related decisions. Organizations must develop and follow control techniques for managing risks, issues, scope changes, schedule, costs, and project reviews. Monitoring and forecasting against a plan ensure that everyone is on the same page and prevent unwanted surprises.

- **Manage the project control cycle.** Monitoring should focus more on the future than on the past. Project managers must continuously check that the project plan is still fit for the purpose of the project and likely to deliver the business benefits on time. Project changes must be managed to ensure that only those enabling project benefits to be realized are accepted. Avoid the dangers of scope creep, and let stakeholders know that project benefits drive the scope.
- **Formally close the project:** Every project should be closed to make sure that all work ceases, that lessons are learned, and that remaining resources are released for other purposes.

8.1.4 Project Close-Out Meeting and Knowledge Transfer

It is good practice to hold a close-out meeting as a project nears completion or termination. At this meeting, like the kick-off meeting, you should invite key project stakeholders. The project champion should start off the meeting, and the project manager and his/ her team should review information like the following:

- The scope, time, and cost goals and outcomes
- The success criteria and results in achieving them
- Main changes that occurred during the project and how they were addressed
- The main lessons learned on the project
- A summary of the transition plan

It is also important to take time to transfer knowledge learned while working on the project. In particular, people who will take over products or results produced as part of the project would need to spend time with project team members so they understand what is involved in detail.

Many organizations are working hard to improve the knowledge transfer process, since employee knowledge or human capital is one of their key assets. It is crucial, therefore to make project knowledge transfer a priority, especially if the benefits of a project are not achieved immediately.

8.2 Human Resources Management

The reintegration of project members into the line organization is a sensitive issue. Most committed project members undergo extensive personal and professional development in the course of the project. They acquire knowledge of project management, learn about the company's processes and procedures and increase their specific line skills. As a result, they gain in confidence and potential. When they return to their former line positions they are ready for fresh challenges and may even demand them.

Some project members become dissatisfied with their former line jobs and are looking for more stimulating challenges elsewhere in the company. Such people, project leaders in particular, suffer an identity crisis as the end of the project approached, if the company doesn't clearly define their future role in the organization.

This presents a dilemma for the company as an appropriate new job is not always available and yet the company would not want to lose such highly-trained employees. Therefore it is essential that these people discuss and agree upon their career development with their line

managers before the project ends. The whole issue should be brought to the attention of the Steering Committee early enough for them to take the appropriate measures.

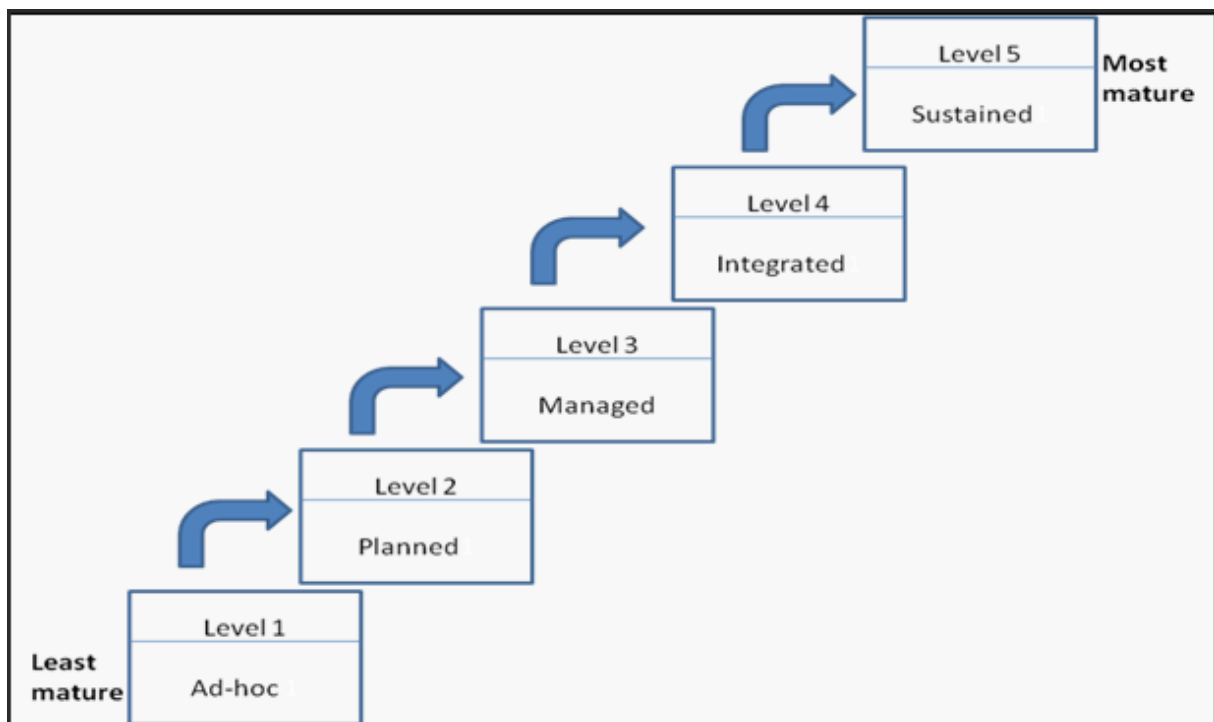
8.3 Procurement Management

The final process in project procurement management is closing the contract, or contract closure. Contract closure involves completion and settlement of contracts, and resolution of any open items. The project team should determine if all work required in each contract was completed correctly and satisfactorily. The team should also update records to reflect final results and archive information for future use.

8.3.1 Organizational Project Management Maturity Model (OPM3) Best Practices

The Project Management Institute (PMI) Standards Development Program published the Organizational Project Management Maturity Model (OPM3) in December 2003 to address the need to bridge the gap between organizational strategy and successful projects.

OPM3 defines organizational project management as “the systematic management of projects, programs, and portfolios in alignment with the achievement of strategic goals.” OPM3 is a standard developed to provide a way for organizations to measure their organizational project management maturity against a comprehensive set of best practices. A best practice is “an optimal way recognized by industry to achieve a stated goal or objective.” OPM3 lists 586 best practices, which PMI says are achieved through developing and consistently demonstrating their supporting capabilities, as observed through measurable outcomes. Capabilities are incremental steps that lead to best practices, and outcomes are the results of applying



Maturity Level	Process	Planning	Data Collection & Analysis	Process Control	Tools & Techniques	Problems
Level 1 Ad hoc	None	Poor	Not conducted	Poor	Inconsistent	Adhoc Management
Level 2 Planned	Informal	Poor	Conducted, not documented	Partially recognized, controlled by PMs	Individual basis	Corrected, not documented
Level 3 Managed	More robust	Systematic	Used for project planning & control	Systematic	Identified, informally documented for control	Lessons learned sharing
Level 4 Integrated	Formal	Multi-project capability	Data used for risk management and productivity improvement	Well defined, measured, multi-project control	Fact-based decision making	Documented, anticipation
Level 5 Sustained	Continuous Process Improvement (CPI)	Innovative ideas pursued to ensure CPI	Automatic to support CPI	CPI	Project-centric, and project-driven	On-going problem solving

¹ PricewaterhouseCoopers, "Boosting Business Performance through Programme and Project Management," (www.pwc.com/extweb/pwcpublishings.nsf/docid/1ccdd87f4daa410c852571290051976f) (June 2004).

² Jim Johnson, "CHAOS 2006 Research Project," CHAOS Activity News, vol. 2: issue 1, (2007).

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