Project Scheduling

Project-task scheduling is a significant project planning activity. It comprises deciding which functions would be taken up when. To schedule the project plan, a software project manager wants to do the following:

1. Identify all the functions required to complete the project.
2. Break down large functions into small activities.
3. Determine the dependency among various activities.
4. Establish the most likely size for the time duration required to complete the activities.
5. Allocate resources to activities.
6. Plan the beginning and ending dates for different activities.
7. Determine the critical path. A critical way is the group of activities that decide the duration of the project.

The first method in scheduling a software plan involves identifying all the functions required to complete the project. A good judgment of the intricacies of the project and the development process helps the supervisor to identify the critical role of the project effectively. Next, the large functions are broken down into a valid set of small activities which would be assigned to various engineers. The work breakdown structure formalism supports the manager to breakdown the function systematically after the project manager has broken down the purpose and constructs the work breakdown structure; he has to find the dependency among the activities. Dependency among the various activities determines the order in which the various events would be carried out. If an activity A necessary the results of another activity B, then activity A must be scheduled after activity B. In general, the function dependencies describe a partial ordering among functions, i.e., each service may precede a subset of other functions, but some functions might not have any precedence ordering describe between them (called concurrent function). The dependency among the activities is defined in the pattern of an activity network.

Once the activity network representation has been processed out, resources are allocated to every activity. Resource allocation is usually done using a Gantt chart. After resource allocation is completed, a PERT chart representation is developed. The PERT chart representation is useful for program monitoring and control. For task scheduling, the project plan needs to decompose the project functions into a set of activities. The time frame when every activity is to be performed is to be determined. The end of every action is called a milestone. The project manager tracks the function of a project by audit the timely completion of the milestones. If he examines that the milestones start getting delayed, then he has to handle the activities carefully so that the complete deadline can still be met.

**RISK ANALYSIS AND MONTE CARLO SIMULATION**

Modern technology provides managers and accountants the means to effectively and efficiently perform increasingly complex quantitative analyses related to decision-making and financial reporting. With software such as Microsoft Excel, CPAs can perform statistical "Monte Carlo" simulations to assess business decisions and accounting estimates, evaluating not only their expected values, but also their potential upside and downside risks. This article provides a brief description of the Monte Carlo technique, demonstrates how it can be performed using Excel's features, and illustrates its use in a common business application.

**MONTE CARLO: A BRIEF DESCRIPTION**

The Monte Carlo simulation technique, named for the famous Monaco gambling resort, originated during World War II as a way to model potential outcomes from a random chain of events. It is particularly useful when an outcome is the product of multiple random variables (i.e., sources of uncertainty) and is readily adaptable to model any situation that involves uncertainty. The simulation includes a mathematical formula that reflects the evaluated outcome based on random variables known to influence the outcome, places a value on each variable from its identified range of variation, and then computes an outcome.

Today, limited only by computing power and software constraints, CPAs can run this basic calculation and repeat it thousands, tens of thousands, or even millions of times, with each computation using an alternative set of randomly generated values for the determinant variables. The resulting output creates a range of possible outcomes from which one can assess the likelihood of a specific outcome, or for the application described in this article, the reasonableness of an accounting estimate based upon its modeled frequency of occurrence.

The example below demonstrates the use of a Monte Carlo simulation in Microsoft Excel for two decisions involving a loan covenant—a scenario familiar to financial managers, accountants, and auditors. The technique, however, could apply to myriad situations where a variety of outcomes are possible and the objective is to assess the likelihood of a specific outcome or the reasonableness of an accounting estimate.

**Six Sigma**

Six Sigma is a business methodology for quality improvement that measures how many defects there are in a current [process](https://www.techtarget.com/whatis/definition/process) and seeks to systematically eliminate them.

In 1984, a Motorola engineer named Bill Smith developed the Six Sigma [management system](https://www.techtarget.com/searchcio/definition/business-process-improvement-BPI) to reduce the variations in Motorola's electronic manufacturing processes that were causing product defects.

Since then, the strategies, tools and cultural norms that support the management system have been adopted by upper management and project teams in a wide variety of industries to increase operational excellence.

Additionally, the meaning of the word "defect" has broadened to include any deficiency in business processes that prevents a company from meeting its customer's needs.

**How does Six Sigma work?**

In [statistical analysis](https://www.techtarget.com/whatis/definition/statistical-analysis), the Greek letter sigma is used to denote a standard deviation from the [mean](https://www.techtarget.com/whatis/definition/arithmetic-mean). In the 1920s, statistical process control pioneer Walter Shewhart proposed that in lean manufacturing, three sigma from the mean is the [tipping point](https://www.techtarget.com/whatis/definition/tipping-point) that indicates there are too many defects and process improvement is required.

This was the accepted norm for many years until Bill Smith proposed gathering and analyzing data at a more granular level and making six sigma the point at which a process has to be corrected.

Because it is almost impossible to achieve zero defects -- a concept known as infinity sigma -- six sigma allows for 3.4 defects per million opportunities for a defect to occur. In contrast, three sigma allows for 66,807 defects per million opportunities.

Once the necessary data has been gathered, a company that is implementing Six Sigma methodologies uses statistics to create a baseline sigma. The baseline illustrates how close -- or how far -- the company is from achieving six sigma and serves as a measuring stick for assessing future improvement.

**What is the importance of Six Sigma?**

Six Sigma proponents claim its business strategy benefits include up to 50% process cost reduction, [cycle-time](https://www.techtarget.com/whatis/definition/cycle-time) improvement, less waste of materials, a better understanding of customer requirements, increased customer satisfaction and value stream, and more reliable products and services.

Motorola holds the federal trademark for Six Sigma, and it is generally acknowledged that Six Sigma can be costly to implement and can take several years before a company begins to see bottom-line results.

In 1995, [General Electric](https://www.techtarget.com/searcherp/feature/GE-Digitals-transformation-rocky-but-ongoing) CEO Jack Welch's very public endorsement of Six Sigma helped businesses outside of manufacturing understand how Six Sigma methodologies can be used to improve customer satisfaction in any industry.

**What are the key principles of Six Sigma?**

The key sigma principles are the following:

* Customer focus
* Use data
* Improve continuously
* Involve people
* Be thorough

**Six Sigma methodologies**

The above principles can be applied with one of two improvement methodologies: Six Sigma [DMAIC](https://www.techtarget.com/whatis/definition/DMAIC) and Six Sigma [DMADV](https://www.techtarget.com/whatis/definition/DMADV). Each term's name is derived from the major steps in its process, but each has its own use.

* DMAIC (define, measure, analyze, improve, control) is used to correct a process that already exists.
* DMADV (define, measure, analyze, design, validate) is used to create a new process.

What is Risk?

"Tomorrow problems are today's risk." Hence, a clear definition of a "risk" is a problem that could cause some loss or threaten the progress of the project, but which has not happened yet.

These potential issues might harm cost, schedule or technical success of the project and the quality of our software device, or project team morale.

Risk Management is the system of identifying addressing and eliminating these problems before they can damage the project.

We need to differentiate risks, as potential issues, from the current problems of the project.

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Different methods are required to address these two kinds of issues.

For example, staff storage, because we have not been able to select people with the right technical skills is a current problem, but the threat of our technical persons being hired away by the competition is a risk.

Risk Management

A software project can be concerned with a large variety of risks. In order to be adept to systematically identify the significant risks which might affect a software project, it is essential to classify risks into different classes. The project manager can then check which risks from each class are relevant to the project.

There are three main classifications of risks which can affect a software project:

1. Project risks
2. Technical risks
3. Business risks

**1. Project risks:** Project risks concern differ forms of budgetary, schedule, personnel, resource, and customer-related problems. A vital project risk is schedule slippage. Since the software is intangible, it is very tough to monitor and control a software project. It is very tough to control something which cannot be identified. For any manufacturing program, such as the manufacturing of cars, the plan executive can recognize the product taking shape.

**2. Technical risks:** Technical risks concern potential method, implementation, interfacing, testing, and maintenance issue. It also consists of an ambiguous specification, incomplete specification, changing specification, technical uncertainty, and technical obsolescence. Most technical risks appear due to the development team's insufficient knowledge about the project.

**3. Business risks:** This type of risks contain risks of building an excellent product that no one need, losing budgetary or personnel commitments, etc.

**Other risk categories**

1. **1. Known risks:** Those risks that can be uncovered after careful assessment of the project program, the business and technical environment in which the plan is being developed, and more reliable data sources (e.g., unrealistic delivery date)
2. **2. Predictable risks:** Those risks that are hypothesized from previous project experience (e.g., past turnover)
3. **3. Unpredictable risks:** Those risks that can and do occur, but are extremely tough to identify in advance.

Change Management

Change Management in software development refers to the transition from an existing state of the software product to another improved state of the product. It controls, supports, and manages changes to artifacts, such as code changes, process changes, or documentation changes. Where CCP (Change Control Process) mainly identifies, documents, and authorizes changes to a software application.

Each software development process follows [Software Development Life Cycle (SDLC)](https://www.geeksforgeeks.org/software-development-life-cycle-sdlc/) where each phase is accordingly followed to finally deliver a good quality software product. Change Management does not come under any phases of SDLC still it has great importance in the entire software development process. There are various types of change management tools that are used for various purposes like to adopt, control, represent and effect the change required. For example Change management tools for Flow Charting, Project Planning, Data collection, etc.

**Process of Change Management :**

When any software application/product goes for any changes in an IT environment, it undergoes a series of sequential processes as follows:

* Creating a request for change
* Reviewing and assessing a request for change
* Planning the change
* Testing the change
* Creating a change proposal
* Implementing changes
* Reviewing change performance
* Closing the process

**Importance of Change Management :**

* For improving performance
* For increasing engagement
* For enhancing innovation
* For including new technologies
* For implementing new requirements
* For reducing cost

**Source of Change :**

There may be multiple reasons involved during the development process for which certain changes are required to be implemented in the product. These sources are as follows :

* Business reorganization
* New Market conditions
* New equipment
* Fixing any bugs/errors
* New customer needs
* Performance or reliability improvement
* Budgetary or scheduling constraints

**Key points to be considered during Change Management :**

* Reason of change
* Result of change
* The portion to be changed
* Person will change
* Risks involved in change
* Alternative to change
* Resources required for change
* Relationship between changes