
**DICTIONARY OF
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PROJECT MANAGEMENT**

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A

Activity sequencing. Identifying and documenting the relationships between project activities

Activity-on-arrow (AOA). A network diagramming technique in which activities are represented by arrows and connected at points called nodes to illustrate the sequence of activities

Actual cost of work performed (ACWP). The total of direct and indirect costs incurred in accomplishing work on an activity during a given period, also called the *actual cost*. Simply put, the considerations of 'what it actually cost to accomplish all the work completed as of the analysis date' and 'what did the work that was actually done actually cost?'

Analogous estimates. A cost estimating technique that uses the actual cost of a previous, similar project as the basis for estimating the cost of the current project, also called *top-down estimates*. See also *cost estimating*

Arrow diagramming method (ADM). Similar to AOA network diagramming technique. See also *Activity-on-arrow*

B

Baseline. The original project plan plus approved changes

Bottom-up approach. Creating a WBS by having team members identify as many specific tasks related to the project as possible and then grouping them into higher level items

Bottom-up estimates. A cost estimating technique based on estimating individual work items and summing them to get a project total. See also *cost estimating*

Budget at Completion (BAC). The original time and cost estimate for a project

Budget Cost of Work Performed (BCWP). The 'Earned Value' for completed work, the cost originally budgeted to accomplish the work, and 'how much work was actually done?', also defined as the percentage of work actually completed multiplied by the planned cost, and called *earned value (EV)*

$$BCWP = \sum \text{budgets of all tasks completed to date}$$

derived from project plan and progress reports, and BCWP to date

$$BCWP \text{ to date} = \sum \text{budgets of all tasks completed to date} + \sum \text{budgets of tasks currently engaged in} - \sum \text{cost to complete of tasks currently engaged in}$$

derived from project plan and progress reports and updated estimates

Budget Cost of Work Scheduled (BCWS). The total budgeted cost up to the analysis date and 'how much work should have been done?', also defined as that portion of the approved total cost estimate planned to be spent on an activity during a given period, called the *budget*

Budgetary estimate. A cost estimate used to allocate money into an organisation's budget

Burst. When a single node is followed by two or more activities on a project network diagram

C

Capability Maturity Model (CMM). A five level model defined by Software Engineering Institute (SEI), laying out a generic path to process improvement for software development in organisations, representing the levels or organisational ability to control, predict and implement quality

Change control. A formal, documented process that describes when and how official project documents may be changed, also defined as, a set of formal procedures which provide for the recognition, evaluation and orderly control of change in a dynamic business environment

Change Control Board (CCB). A formally constituted group of stake holders responsible for approving or rejecting changes to the project baselines, which role is responsible for the approval and review of changes being requested or planned that exceed predetermined standards

Change control process. The processes used in controlling change through change request, technical assessment, business assessment, management approval, change implementation, test change, management review

COCOMO II. A newer, computerised cost-estimating tool based on Boehm's original model that allows one to estimate the cost, effort, and schedule when planning a new software development activity. See also *Cost estimating*

Code Walkthrough Checklist. A checklist associated with software development project review for testing and inspecting activities throughout the life cycle, walking through the programming codes to ensure proper functionality, such as, loops termination correctness, calculations considerations for zero value possibility, etc

Configuration Management. A technique and process that ensures that the descriptions of the project's products are correct and complete. Provides a mechanism for identifying, controlling and tracking the versions of each software item (ISO 9000-3, paragraph 6.1.1)

Configuration management processes. Configuration identification, configuration reviews, configuration control and status accounting

Constructive Cost Model (COCOMO). A parametric model for estimating software development costs developed by Barry Boehm. See also *Cost estimating*

Contingency Budget. Sum of money assigned to a project outside the estimated costs to be used for unforeseen circumstances, determined by considering the project risks and by looking at previous projects and identifying its overspends

Contingency Plans. Pre-defined actions that the project team will take if an identified risk event occurs

Contingency reserves. Dollars included in a cost estimate to allow for future situations that may be partially planned for (some times called *known unknowns*) and are included in the project cost baseline

Contract administration. Ensures that the seller's performance meets contractual requirements, a legal relationship subject to state and federal contract laws

Contract close-out. The final process in project procurement management, which includes product verification to determine if all work was completed correctly and satisfactorily

Client Contract Manager. The sole point of official contact between vendor and client where all change requests, reports, are to be reviewed by him and who is empowered to agree contract changes, change requests, financial re-imburement of vendor/consultant

COCOMO (Constructive Cost Model) Model. A Parametric Model cost estimation technique, where method relies on the ability to estimate the size of the software and depends very much on the experience of the estimator. See also *Cost estimating, Effort*

Contract Review. ISO9001:1994, paragraph 4.3 in the context of software development, principally concerns the decisions relating to initiating software projects

Control of Quality Records. ISO9001:1994, paragraph 4.16, in the context of software development, defines quality records in the form of completion of forms associated with procedures, standards or guidelines, meeting minutes documenting to follow procedures, documents showing evidence of review and approval and evidence that a procedure has been followed

Cost budgeting. Project cost budgeting involves allocating the project cost estimate to individual work items, based on the WBS for the project, a required input to the cost budgeting process

Cost control. Project cost control includes monitoring cost performance, ensuring that only appropriate project changes are included in a revised cost baseline, and informing project stakeholders of authorized changes to the project that will affect costs

Cost estimating. Developing an approximation or estimate of the costs of the resources needed to complete the project

- i. *Bottom-up estimates.* A cost estimating technique based on estimating individual work items and summing them to get a project total, also called *transactional estimating*
- ii. *Expert judgment.* A cost estimating technique by experts to make assessments of work to be done, where experts are experienced in the application area, with the organisation, capable, reputable and committed
- iii. *Cost-by-Analogy.* A cost estimating technique that uses the actual cost of a previous, similar project as the basis for estimating the cost of the current project, also called *analogous estimates*
- iv. *Top-down estimates.* A cost estimating technique that sets a budget at high level for entire project (based on budget, agreed prices, earlier estimate, expert judgement), then decomposed into individual task budgets (WBS, outline plan, historical ratios) where individual estimates are then assessed, trimming off extra budget to be used for contingency or assigned to tasks which are under-budgeted
- v. *Parametric modeling.* Uses project characteristics (parameters) in a mathematical model to estimate project costs
- vi. *Constructive Cost Model (COCOMO).* A parametric model for estimating software development costs based on parameters such as the source lines of code or function points, where functions points are technology-independent assessments of the functions involved in developing a system and COCOMO II is a computerised version of Boehm's model that allows estimating cost, effort and schedule when planning new software development activity

Cost performance index (CPI). The ratio of work performed to actual costs and can be used to estimate the projected cost of completing the project

Cost plus fixed fee (CPFF) contract. Buyer pays the seller for allowable performance costs plus a fixed fee payment usually based on a percentage of estimated costs, where this fee does not vary unless the scope of the contract changes

Cost plus incentive fee (CPIF) contract. Buyer pays the seller for allowable performance costs along with a predetermined fee and an incentive bonus, where if the final cost is less than the expected cost, both the buyer and the seller benefit from the cost savings based on a pre-negotiated share formula

Cost plus percentage of costs (CPPC) contract. Buyer pays the seller for allowable performance costs along with a predetermined percentage based on total costs

Cost reimbursable contracts. Involves payment to the seller for direct and indirect actual costs

Cost variance (CV). The budgeted cost of work performed minus the actual cost of work performed

Cost-by-analogy. The use of past experience of similar project to estimate new ones through intelligent comparisons, providing a quick, easy and (reasonably) accurate estimate

Crashing. A technique for making cost and schedule trade offs to obtain the greatest amount of schedule compression for the least incremental cost

Critical Path. The series of activities in a project network diagram that determines the earliest completion of the project. It is the longest path through the network diagram and has the least amount of *slack* or *float*

Critical Path Analysis. See *Critical path method*

Critical Path Method (CPM). A project network analysis technique used to predict total project duration

D

Deliverables. Product or service committed in a contract to be performed, such as a report or segment of software code, produced as part of a project

Delphi Technique. An open-ended technique used in risk management to apply to individual participants, where participants are asked to state what they see as top key requirements, sources of risk and indicate how each risk affects each requirement

Discount factor (DF). A formula used in calculating present value:

$$DF = 1/(1+r)^n$$

where r is rate of interest and n is number of years

Discount rate. The minimum acceptable rate of return on an investment, also called, the required rate of return, hurdle rate, or opportunity cost of capital

Document and data control. ISO 9001-1994(E), paragraph 4.5, states that the supplier shall establish and maintain documented procedures to control all documents and data that relate to the requirements of this International Standard, including, to the extent applicable, documents of external origin such as standards and customer drawings. Documents and data can be in the form of any type of media, such as hard copy or electronic media

E

Earliest Finish Time (EFT). The earliest possible time an activity can be completed without delaying the project finish date

Earliest Start Time (EST). The earliest possible time an activity may begin without delaying the project finish date

Earned value. The original assigned budget of all tasks that have currently been completed during a certain point of the project

Earned value analysis (EVA). A project performance measurement technique that integrates scope, time, and cost data, also known as an industry standard way to measure a project's performance and depends on the project's progress, forecast of its completion date and final cost, and provides schedule and budget variances along the way based on three data points: *Budgeted Cost of Work Performed (BCWP)*, *Budgeted Cost of Work Scheduled (BCWS)*, and *Actual Cost of Work Performed (ACWP)*

Effort. Used in the parametric model of software cost estimate, such as COCOMO models and Function Point Counting. Also used in formula,

$$\text{Effort} = 2.4 * (\text{KLOC})^{1.05}$$

where KLOC represents thousand lines of code and Effort is measured in person-month (or man-month) and associated schedule is measured in months using formula,

$$\text{Schedule} = 2.5 * (\text{Effort})^{0.38}$$

Elicitation Techniques. Techniques used in risk management, most of which work by trying to extract from individuals or groups their opinions of what the risks are, such as, delphi, group assessment, questionnaire

Estimate. The quantification of the effort or duration required to accomplish the tasks identified in the work breakdown structure, such as an estimate of project duration. It is not a figure derived in response to a management imposed delivery date, nor a figure biased by misguided ego, nor the customers' budget nor the most optimistic prediction that has only a glimmer of hope of being achieved

Estimate at completion (EAC). An estimate of what it will cost to complete the project based on performance to date

Expected Monetary Value. A risk calculated by using the formula:

$$\text{Expected Monetary Value} = \text{Probability} \times \text{Impact}$$

where *probability* is an estimate of the probability (usually expressed in %) that a given risk event will occur, and *impact* is an estimate of the gain or loss (usually expressed in \$) that will be incurred if the risk event does occur

Example

Given that there is a 0.5% chance that Addy's house will catch fire, and if his house does catch fire, he will lose \$100,000. Therefore, the expected monetary value of the risk = $0.5/100 \times \$100,000 = \500

Expert Judgement. Using expert judgement to make assessments of work to be done, through the expert's experience in application area, experience with organisation, capability, reputation and commitment, consisting of a single figure describing the estimate, with assumptions upon which this is based, and confidence felt in estimate

Exposure. A risk of exposure is the product of probability and impact

F

Fast Tracking. A schedule compression technique where you do activities in parallel that you would normally do in sequence or in slightly overlapping time frames

Fishbone diagrams. Diagrams that trace complaints about quality problems back to the responsible production operations, sometimes called *Ishikawa diagrams*

Fixed price contracts. Involves a fixed total price for well defined product or service contract, also called *lump sum contracts*

Float. The amount of time a project activity may be delayed without delaying a succeeding activity or the project finish date; also called *slack*

$$\text{Float} = \text{LST} - \text{EST} = \text{LFT} - \text{EFT}$$

where LST stands for Latest Finish Time, EST stands for Earliest Start Time, LFT stands for Latest Finish Time, and EFT stands for Earliest Finished Time

Free Float. Earliest Start Time (EST) of succeeding activities minus Earliest Finish Time (EFT) of this activity

Function Point Counting (FPC). Number of data flows and files versus weighting factors. See also *Cost estimating*

G

Gantt chart. A standard format for displaying project schedule information by listing project activities and their corresponding start and finish dates in a calendar format

Group Assessment. An open-ended technique used in risk management that is applied to peer groups (ie. Groups of people with similar tasks and equal status), where each group is shown the requirements and resources and asked to discuss reasons why the requirements or schedule might not be met, the answers of which are consolidated and documented

H

Human Resource management. Includes the processes required to make the most effective use of the people involved (stakeholders) with a project, such as organisational planning, staff acquisition and team development. See also *Knowledge Areas*

I

Impact. A quantitative estimate of the loss caused by a future event, if it does occur

Initiating processes. Actions to commit to begin or end projects and project phases

Initiation. Committing the organisation to begin a project or continue on to the next phase of a project

Insourcing. Involves contracts which call for the market to provide resources to be deployed under the buyer's management and control

Inspection and Testing. ISO9001:1994, paragraph 4.10 in the context of software development, defines essentiality to of documented test plan and test results to ensure compliance to ISO9001

International Organisation for Standardisation (ISO). A body that defines standards of quality control systems and provides guidelines to organisations wishing to set quality certified standards for the continuous cycle of planning, controlling and documenting quality practices. The International Standard is one of three International Standards dealing with quality system requirements that can be used for external quality assurance purposes, aimed primarily at achieving customer satisfaction by preventing non-conformity at all stages from design through to servicing:

ISO 9001. Model for quality assurance in design, development, production, installation and servicing

ISO 9002. Model for quality assurance in production, installation and servicing

ISO 9003. Model for quality assurance in final inspection and test

Ishikawa diagrams. See *Fishbone diagrams*

J

Joint Application Design (JAD). Using highly organised and intensive workshops to bring together project stakeholders (the sponsor, users, business analysts, programmers, and so on) to jointly define and design information systems

K

Kickoff meeting. A meeting held at the beginning of a project or project phase where all major project stakeholders discuss project objectives, plans, and so on

Knowledge Areas. Project integration, scope, time, cost, quality, human resource, communications, risk and procurement management

- i. *Integration management.* Includes the processes involved in coordinating all the other project management knowledge areas throughout a project's life cycle. The main processes involved in project integration management include project plan development, project plan execution, and overall change control
- ii. *Scope management.* The processes required to acquire goods and services for a project from outside the performing organisation
- iii. *Time management.* The processes required to ensure timely completion of a project
- iv. *Cost management.* The processes required to ensure that the project is completed within the approved budget
- v. *Quality management.* The totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs (ISO).
- vi. *Human Resource management.* Includes the processes required to make the most effective use of the people involved (stakeholders) with a project, such as organisational planning, staff acquisition and team development

- vii. *Communications management*. Involves the ensuring of timely and appropriate generation, collection, dissemination, storage, and disposition of project information, processes of which include communications planning, information distribution, performance reporting and administrative closure
- viii. *Risk management*. The art and science of identifying, assigning, and responding to risk throughout the life of a project and in the best interests of meeting project objectives, similar to a form of insurance, an activity undertaken to lessen the impact of potentially adverse events on a project, an investment with costs associated with it
- ix. *Procurement management*. The processes required to acquire goods and services for a project from outside the performing organisation

L

Latest Finish Time (LFT). The latest possible time an activity can be completed without delaying the project finish date

Latest Start Time (LST). The latest possible time an activity may begin without delaying the project finish date

Leveling. The process of shifting the use of resources to even out the workload of team members and equipment

Loading. The amount of time individual resources (people, vendors, and so on) have committed to a project

M

Matrix organisation. An organisational structure that uses functional supervisors as well as project supervisors to manage the same people, depending on the assignment (example: project organisation)

Milestone. A clearly identifiable point in a project that summarises the completion of a related or important set of tasks

Mitigation. An act of mitigation is anything that reduces ones exposure, such as insurance, reducing the probability and impact, contingency planning

N

Net Present Value (NPV). 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. See appended methods for details.

Method 1

Calculate the net present value by summing the discounted benefits plus the discounted costs, assuming costs are entered as a negative number:

$$NPV = \sum_{t=1...n} A/(1+r)^t$$

where t equals the year of the cash flows, A is the amount of cash flow each year, and r is the discount rate

Method 2

The Net present Value (NPV) calculates the expected net monetary gain or loss from a project by discounting all expected future cash flows to the present point in time:

$$\text{Sum of present value of expected cash flow} - \text{sum of investment cost}$$

where, present value (PV) = Amount * Discount Factor, where discount factor is: $1/(1+r)^n$

Method 3

The Net Present Value (NPV) is the summation of the expected net monetary gain or loss for a project by discounting all expected future cash flows to the present point in time:

$$NPV = \sum (A / (1+r)^n)$$

where n is the number of years, A is the amount of cash flow, r is rate of interest

The Present Value (PV) is the amount of money an investment is worth, taking into consideration the discount factors such as rate of interest, inflation, tax, etc, calculated using formula:

$$PV = A \times \text{Discount Factor (DF)}$$

where A is the amount of cash flow, $DF = 1/(1+r)^n$
where r is rate of interest and n is number of years

Example

Question: If a completed software development returns \$2000 per annum, what is the net present value of this over the next two years, assuming a discount rate of 10%

Answer:

$$\begin{aligned} NPV &= \sum (A / (1+r)^n) \\ NPV &= \sum (\$2000 / (1+0.10)^1 + \sum (\$2000 / (1+0.10)^2) && \text{ie. Calculation for year 1 + year 2} \\ NPV &= \sum (\$2000 / 1.10) + (\$2000 / 1.21) \\ NPV &= \sum (\$1818 + \$1653) \\ NPV &= \$3,471 \end{aligned}$$

ie. The net present value equals to the summation of the annual cash flow amount divided by one plus the interest rate to the power of the accumulated number of years of project (individually calculated per year)

Method 4

NPV calculates the net present value of an investment by using a discount rate and a series of future payments (negative values) and income (positive values).

$$NPV(\text{rate}, \text{value1}, \text{value2}, \dots)$$

Rate in formula is the rate of discount over the length of one period.

Value1, value2, ... are 1 to 29 arguments representing the payments and income.

- Value1, value2, ... must be equally spaced in time and occur at the end of each period.
- NPV uses the order of value1, value2, ... to interpret the order of cash flows. Be sure to enter your payment and income values in the correct sequence.
- Arguments that are numbers, empty cells, logical values, or text representations of numbers are counted; arguments that are error values or text that cannot be translated into numbers are ignored.
- If an argument is an array or reference, only numbers in that array or reference are counted. Empty cells, logical values, text, or error values in the array or reference are ignored.

Remarks

- The NPV investment begins one period before the date of the value1 cash flow and ends with the last cash flow in the list. The NPV calculation is based on future cash flows. If your first cash flow occurs at the beginning of the first period, the first value must be added to the NPV result, not included in the values arguments. For more information, see the examples below.
- If n is the number of cash flows in the list of values, the formula for NPV is:

$$NPV = \sum_{i=1}^n \frac{values_i}{(1 + rate)^i}$$

- NPV is similar to the PV function (present value). The primary difference between PV and NPV is that PV allows cash flows to begin either at the end or at the beginning of the period. Unlike the variable NPV cash flow values, PV cash flows must be constant throughout the investment. For information about annuities and financial functions, see PV.
- NPV is also related to the IRR function (internal rate of return). IRR is the rate for which NPV equals zero: $NPV(IRR(...), ...) = 0$.

Example

Suppose you're considering an investment in which you pay \$10,000 one year from today and receive an annual income of \$3,000, \$4,200, and \$6,800 in the three years that follow. Assuming an annual discount rate of 10 percent, the net present value of this investment is:

$NPV(10\%, -10000, 3000, 4200, 6800)$ equals \$1,188.44

In the preceding example, you include the initial \$10,000 cost as one of the values, because the payment occurs at the end of the first period.

Consider an investment that starts at the beginning of the first period. Suppose you're interested in buying a shoe store. The cost of the business is \$40,000, and you expect to receive the following income for the first five years of operation: \$8,000, \$9,200, \$10,000, \$12,000, and \$14,500. The annual discount rate is 8 percent. This might represent the rate of inflation or the interest rate of a competing investment.

If the cost and income figures from the shoe store are entered in B1 through B6 respectively, then net present value of the shoe store investment is given by:

$NPV(8\%, B2:B6)+B1$ equals \$1,922.06

In the preceding example, you don't include the initial \$40,000 cost as one of the values, because the payment occurs at the beginning of the first period. Suppose your shoe store's roof collapses during the sixth year and you assume a loss of \$9000 for that year. The net present value of the shoe store investment after six years is given by:

$$\text{NPV}(8\%, \text{B2:B6}, -9000)+\text{B1 equals } -\$3,749.47$$

Network diagram. The logical representation of tasks that defines the sequence of work in a project

Node. The starting and ending point of an activity on an activity-on-arrow diagram

O

Organisational breakdown structure (OBS). A specific type of organisational chart that shows which organisational units is responsible for which work items

Outsourcing. Acquiring goods and/or services from an outside source or the use of external agents to perform one or more organisational activities, also called *procurement*

P

Parametric cost estimates. Estimates based upon historical data, measurable features such as number of lines of code and statistical models

Parametric modeling. Uses project characteristics (parameters) in a mathematical model to estimate project costs. See also *Cost estimating*

Payback period. The amount of time required to pay back the initial investment for a project, and a popular method for calculating the amount of time required to pay off the initial investment or the period of time for the accumulated revenue to equal the initial cash investment

$$\text{Payback Period} = \text{Original Investment} / \text{Annual Benefits}$$

$$\text{Payback Period} = \text{Cost of project} / \text{Annual Cash Inflow}$$

The payback period of an investment is the period of time for the accumulated revenue to equal the initial cash investment

Example

Year	Initial Investment	Revenue	Accumulated Payback
1	\$40,000	\$8,000	\$32,000
2		\$12,000	\$12,000
3		\$14,000	\$6,000
4		\$18,000	(\$12,000)
5		\$12,000	(\$24,000)

From the above table, the break even point is somewhere between 3-4 years where the payback shows negative cost. Based on the fourth year revenue (\$18,000), per month revenue would be at \$1,500 per month of which revenue 4 months would be required to for the \$6000 payback, hence, the result of **Payback Period = 3 years, 4 months**

Person day. The capacity available for one person over one working day (usually 7-8 hours), also called man day

PERT weighted average. =
$$\frac{\text{optimistic time} + 4 \times \text{most likely time} + \text{pessimistic time}}{6}$$

Example

Suppose an optimistic estimate for a project input screen can be designed in 8 workdays, and a pessimistic time estimate is 24 workdays, apply the PERT formula, you get the optimistic time of 8 workdays plus 4 times the most likely 10 workdays plus the pessimistic time of 24 workdays divide by 6, which equals to 12 workdays

$$\text{PERT weighted average} = \frac{8 \text{ workdays} + 4 \times 10 \text{ workdays} + 24 \text{ workdays}}{6} = 12 \text{ workdays}$$

Post-Implementation Review. A review to determine what mistakes were made in the project and learn from them

Precedence analysis process. Used to create the project schedule in the scheduling process, where project activity networks are produced

Precedence Diagramming Method (PDM). A network diagramming technique in which boxes represent activities

Present Value (PV). The amount of money an investment is worth, taking into consideration the discount factors such as rate of interest, inflation, tax, etc, calculated using formula,

$$\text{PV} = A \times \text{Discount Factor (DF)}$$

where A is the amount of cash flow,
 $\text{DF} = 1/(1+r)^n$
where r is rate of interest
 n is number of years

Probability. A quantitative estimate of the likelihood a specific event will occur during a specific time

Process groups. The progress from initiating, planning, executing, controlling and closing activities or processes:

- i. *Initiating* processes. Actions to commit to begin or end projects and project phases
- ii. *Planning* processes. Devising and maintaining a workable scheme to accomplish the business need that the project was undertaken to address
- iii. *Executing* processes. Coordinating people and other resources to carry out the project plans and produce the products or deliverables of the project
- iv. *Controlling* processes. Actions to ensure that project objectives are met
- v. *Closing* processes. Formalising acceptance of the project or phase and bringing it to an orderly end

Procurement. Acquiring goods and/or services from an outside source, also called *outsourcing*

Program Evaluation and Review Technique (PERT). A project network analysis technique used to estimate project duration when there is a high degree of uncertainty with the individual activity duration estimates

Progress monitoring. The process of comparing the actual effort spent on a project with the planned effort and comparing the actual delivery schedule of the project with the planned delivery schedule

Progress Report. A report to management containing information on details of technical difficulties encountered in the project, current spend of the project and the cost-to-complete and the current resource status of the project

Progress review. An important medium of communication in a project in meeting with stakeholders to review tasks to monitor the progress, look for problems, resolve problems, produce record of progress review meeting

Project. A temporary endeavour undertaken to accomplish a unique purpose, product or service, and involving several people performing interrelated activities

Project acquisition. Project acquisition is a common reference to the last two project phases – implementation and close-out

Project Charter. A document that formally recognises the existence of a project and provides direction on the project's objectives and management, also defined as 'a document issued by senior management that provides the project manager with the authority to apply organisational resources to project activities' (PMI)

Project Communications Management. See *Knowledge Areas*

Project Cost Management. See *Knowledge Areas*

Project Execution. Involves taking the actions necessary to ensure that activities in the project plan are completed

Project Human Resource Management. See *Knowledge Areas*

Project Integration Management. See *Knowledge Areas*

Project Life Cycle. The beginning and the end of a project (example: feasibility, planning, designing, producing, turnover and start-up)

Project Management. The application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project

Project Management Knowledge Areas. See *Knowledge Areas*

Project organisational structure. An organisational structure that groups people by major projects, such as specific aircraft programs

Project phases. Phases marked by completion of one or more deliverables. See also *Milestones*

Project Plan. A document used to coordinate all project planning documents and guide project execution and control. Key parts of a project plan include an introduction or overview of the project, a description of how the project is organised, the management and technical processes used on the project, and sections describing the work to be done, schedule information and budget information. Key elements are: work plan, schedule, staff effort estimates, budget and milestones. Provides the basis against which to control the project

Project plan execution. Carrying out the project plan by performing the activities it includes

Project Procurement Management. Includes the processes required to acquire goods and services for a project from outside the performing organisation. Procurement processes include procurement planning, solicitation planning, solicitation, source selection, contract administration, contract close-out. See also *Knowledge Areas*

Project Risk Management. See *Knowledge Areas*

Project Scope Management. See *Knowledge Areas*

Project Quality Management. See *Knowledge Areas*

Project Time Management. See *Knowledge Areas*

Project tracking and controlling. The art of guiding the project to meet its objectives, such as, staff effort budget, project cost budget, required delivery schedule, required level of product quality, required functionality, required performance, simply put, project tracking and control aims to help ensure successful software development and management

Prototyping. Developing a working replica of the system or some aspect of the system to help define user requirements

Q

Quality. The totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs (ISO)

Quality assurance. Periodically evaluating overall project performance to ensure the project will satisfy the relevant quality standards

Quality circles. Groups of non-supervisors and work leaders in a single company department who volunteer to conduct group studies on how to improve the effectiveness of work in their department

Quality control. Monitoring specific project results to ensure that they comply with the relevant quality standards and identifying ways to improve overall quality

Quality Management System (QMS). A system that possess attributes in defining quality in areas of organisational policies, procedures, quality policies, standards and guidelines at lower-level how to information to support procedures, including provision of a mechanism to audit the work of the organisation to ensure QMS is followed

Quality planning. Identifying which quality standards is relevant to the project and how to satisfy them

Questionnaire. A closed technique used in risk management and others, and applied to peer groups, where each group is led through a questionnaire that gives attributes that might be sources of risk with questions taken from an historical data base, where positive answers imply risk (e.g. is the proposed product one that the developer has never built before?)

R

Resource constraint planning. Assigning resources in an attempt to find the shortest project schedule consistent with fixed resource limits

Resource Leveling. A technique for resolving resource conflicts by delaying tasks. See also *Leveling*

Resource Loading. The amount of individual resources an existing schedule requires during specific time periods. See also *Loading*

Resource Partitioning. Smoothing out resource requirements from period to period

Resource Planning. Determining what resources (people, equipment, and materials) and what quantities of each resource should be used to perform project activities

Return on Investment (ROI). Calculates the rate of return from an investment by adjusting cash flows produced by the investment for depreciation, an approximation of the accounting income earned by the project

$$\text{Return on Investment} = (\text{discounted benefits} / \text{discounted investment}) \times 100\%$$

ROI is income divided by investment. Hence,

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

In the event the calculation is for annual ROI instead of the total return of investment, the formula would be:

$$\text{Annual ROI} = (\text{Annual discounted benefits} / \text{discounted costs}) / \text{No. of years} \times 100\%$$

If no discount factor is involved, the annual ROI to be calculated would be:

$$\text{Annual ROI} = (\text{Total Revenue} / \text{Investment}) / \text{No. of years} \times 100(\%)$$

Risk. The possibility of loss or injury, highlighting the negativity often associated with risk and suggests that uncertainty is involved, where project risk involves understanding potential problems that might occur on the project and how they might impede project success

Risk Acceptance. Accepting the consequences should a risk occurs

Risk Analysis. A systematic study of existing sources of risk, their possible future consequences and appropriate mitigation actions, also called, *risk quantification*

Risk Assessment. An essential task in risk management, where project manager obtain information about possible risks from users, stakeholders, requirements definition team, design and implementation team, risk experts and peers

Risk Avoidance. Eliminating a specific threat or risk, usually by eliminating its causes

Risk Control. Basic risk response control and techniques include avoidance, acceptance and mitigation and involves executing the risk management processes and plan to respond to risk events

Risk Clinic. A workshop that takes the SEI, CRM and TRM and adapts and integrates it with a client's communication channels, infrastructure, existing practices, project management, risk management (if any), and technical problem management. See also *Software Risk Management*

Risk identification. Involves determining which risks are likely to affect a project and documenting the characteristics of each, using key inputs to the process of identifying risks through project description, nature of the products produced as part of the project, expertise

of the performing organisation and other stakeholders, and historical information. Tools used may include checklists, flowcharts, project WBS and interviews with stakeholders

Risk insurance. A risk control wherein the project manager know the risk existence and its consequences and provides sufficient resources to overcome it should it occur

Risk localisation. A method of managing risk control (e.g. by prototyping)

Risk Management. Informed decision making under conditions of uncertainty, such as what can go wrong, what will be the impact, and what can be done about it

Risk Management Approach. The four stage of risk management approach are: risk identification, assessment and quantification, response development, documentation and control

Risk Management Plan. Documents the procedures for managing risk throughout the project, including contingency plans so that when an identified risk event occurs, the project team may know what to do

Risk Minimisation. See *Risk Mitigation*

Risk Mitigation. Reducing the impact of a risk event by reducing the probability of its occurrence, also called *risk minimisation*

Risk Paradigm. Associated with software development risk management, essentially, a framework where a project may structure a risk management practice best fitting into its project management structure in areas of: identify, analyse, plan, track, control, and communicate. Risk paradigm application includes identifying and analysing risks at each major stage in the development, planning resolution actions for every known risk, tracking known risks until resolution, monitoring to ensure risks are under control and hoarding resources needed for contingency plans

Risk priority. Risks should be prioritised in two ways: magnitude of exposure and urgency of response, starting with investigative actions based on exposure and start mitigation actions based on urgency

Risk quantification. The process of evaluating risks to assess the range of possible project outcomes, also called *risk analysis*

Risk review. A formal method of identifying risk, where documents include requirement project methodology, schedule, list of project team members, the skills the project team members possessed, etc and where all project related aspects should also be reviewed, including people, such as, project manager or line manager, workers, software quality assurance personnel

Risk Taxonomy. Follows the life cycle of software development and provides a framework for organising data and information, where identification method provides the organisation developing software with a systematic interview process (e.g. questionnaire) with which to identify sources of risk, organised into three levels: class, element, and attribute

S

Schedule performance index (SPI). The ratio of work performed to work scheduled and can be used to estimate the projected time to complete the project

Schedule variance (SV). The budgeted cost of work performed minus the budgeted cost of work scheduled

Service Level of Agreement (SLA). A pre-defined service level requirements and expectation drawn with the outsourcing vendor in areas of reliability, availability, performance, penalties, etc

Slack. The amount of time a project activity may be delayed without delaying a succeeding activity or the project finish date; also called *float*

Soft skills. The soft skills required of the project manager, such as, team building, motivation, project leadership, conflict management, project politics

Software Risk Management. A framework supported by three groups of practices: software risk evaluation (SRE), continuous risk management (CRM), team risk management (TRM), based on three basic constructs developed at the Software Engineering Institute (SEI): Risk Management Paradigm, Risk Taxonomy, Risk Clinic, and Risk Management guidebooks

Solicitation. Involves obtaining proposals or bids from prospective sellers who do most of the work in this process, normally at no cost to the buyer or project

Solicitation planning. Involves preparing the documents needed for solicitation and determining the evaluation criteria for the contract award (e.g. Requests for Proposals – RFPs, Requests for Quotes – RFQs)

Sponsor. Most projects have various parties or stakeholders, but someone (the sponsor) must take the primary role of sponsorship, usually the directive and funding factor of the project

Stakeholders. Individuals and organisations who are actively involved in the project or whose interest may be positively or negatively affected as a result of project execution or successful project completion, or in simple term, people involved in or affected by project activities (example: project manager, customer, performing organisation, sponsor)

Statement of work (SOW). A description of the work required for the procurement in sufficient detail to allow prospective sellers to determine if they are capable of providing the goods and services required and to determine an appropriate price

SWOT analysis. Analysing Strengths, Weaknesses, Opportunities, and Threats, which is used to aid in strategic planning

T

Technical role of project managers. To determine the technical strategy for the project, and reviewing the deliverables and the technical progress of the project

Test and Inspection. See *Inspection and Test*

Time and Materials contract. See *Unit price contract*

Trade-off. Allowing one aspect of a project to change, usually for the worse, in return for another aspect of the project getting better

Transactional estimating. A people oriented approach in cost estimation that identify major activities and decompose it into small sets of tasks, determining the effort necessary to complete each task, the duration and then sum up the overall tasks to obtain all effort, including overhead tasks and ensurance of no tasks have been missed

Triggers. An event that causes us to abandon the main plan and to follow the contingency plan. A trigger should exist in every contingency plan, which should be agreed in advance, an objective criterion of failure, without which it is almost impossible to implement the contingency plan in good time

Triple Constraints. Balancing scope, time and cost goals for a project

U

Unit price contract. Buyer to pay the seller a predetermined amount per unit of service, and the total value of the contract is a function of the quantities needed to complete the work, also called a *time and materials contract*

User acceptance testing. An independent test performed by the end user prior to accepting the delivered system

V

Vendor. The outsourced external agent performing the procured services in a project, also called the contractor supplying hardware, software, labour and/or consulting services or suppliers of IT services in the case of outsourcing

W

White Box Testing. Focused on the correctness of logic or control structure and guarantees all independent paths within a module have been exercised at least once

Work authorisation system. A method for ensuring that qualified people do work at the right time and in the proper sequence

Work Breakdown Structure (WBS). An outcome-oriented analysis of the work involved in a project that defines the total scope of the project

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