

BSBPMG514

Manage project cost

Learners Guide



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About BSBPMG514 Manage project cost

Application

This unit describes the skills and knowledge required to identify, analyse and refine project costs to produce a budget, and to use this budget as the principal mechanism to control project cost.

It applies to individuals responsible for managing and leading a project in an organisation, business, or as a consultant.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Unit Sector

Management and Leadership – Project Management

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine project costs	1.1 Determine resource requirements for individual tasks identified in the work breakdown structure, with input from stakeholders and guidance from others 1.2 Estimate project costs to enable project budget to be prepared within agreed tolerances 1.3 Develop a project budget 1.4 Develop a cost-management plan, within delegated authority, to ensure clarity of understanding and ongoing management of project finances
2. Monitor and control project costs	2.1 Implement agreed financial-management processes and procedures to monitor actual expenditure against budget 2.2 Select and use cost-analysis methods and tools to identify cost variations and evaluate alternative actions 2.3 Implement and monitor agreed actions to maintain financial objectives 2.4 Provide accurate and timely financial reports
3. Complete cost-management processes	3.1 Conduct appropriate activities to signify financial completion

	3.2 Review project outcomes using available records to determine effectiveness of project cost management
	3.3 Review cost-management issues and document improvements

Foundation Skills

This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.

Skill	Performance Criteria	Description
Reading	1.1, 1.2, 2.2, 3.2, 3.3	<ul style="list-style-type: none"> Interprets and analyses textual information from a range of sources Reviews, compares and contrasts information related to budget
Writing	1.3, 1.4, 2.4, 3.3	<ul style="list-style-type: none"> Drafts and develops documents using appropriate format and language for context
Oral Communication	1.1	<ul style="list-style-type: none"> Participates in verbal exchanges using clear language and appropriate tone and syntax to provide relevant information Uses active listening and questioning to elicit views and opinions of others
Numeracy	1.1-1.4, 2.1, 2.2, 2.4, 3.1, 3.2	<ul style="list-style-type: none"> Uses mathematical formulae to calculate resources against predetermined budgets, solve variances and finalise project costs
Navigate the world of work	1.4, 2.1	<ul style="list-style-type: none"> Adheres to organisational policies and procedures and understands responsibilities of own role
Interact with others	1.1	<ul style="list-style-type: none"> Selects and uses appropriate conventions and protocols when communicating with internal and external stakeholders to confirm requirements, seek guidance or share information
Get the work done	1.1, 1.3, 1.4, 2.2, 2.3, 2.4, 3.2, 3.3	<ul style="list-style-type: none"> Plans and schedules complex activities, monitors implementation and manages relevant communication Monitors actions against goals, adjusting plans and resources where necessary Uses analytical skills to review and evaluate process and decide on future improvements

		<ul style="list-style-type: none"> Uses digital applications to access, organise, integrate and share relevant information in effective ways
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Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
BSBPMG514 Manage project cost	BSBPMG514A Manage project cost	Updated to meet Standards for Training Packages	Equivalent unit

Assessment requirements

Modification History

Release	Comments
Release 1	This version first released with BSB Business Services Training Package Version 1.0.

Performance Evidence

Evidence of the ability to:

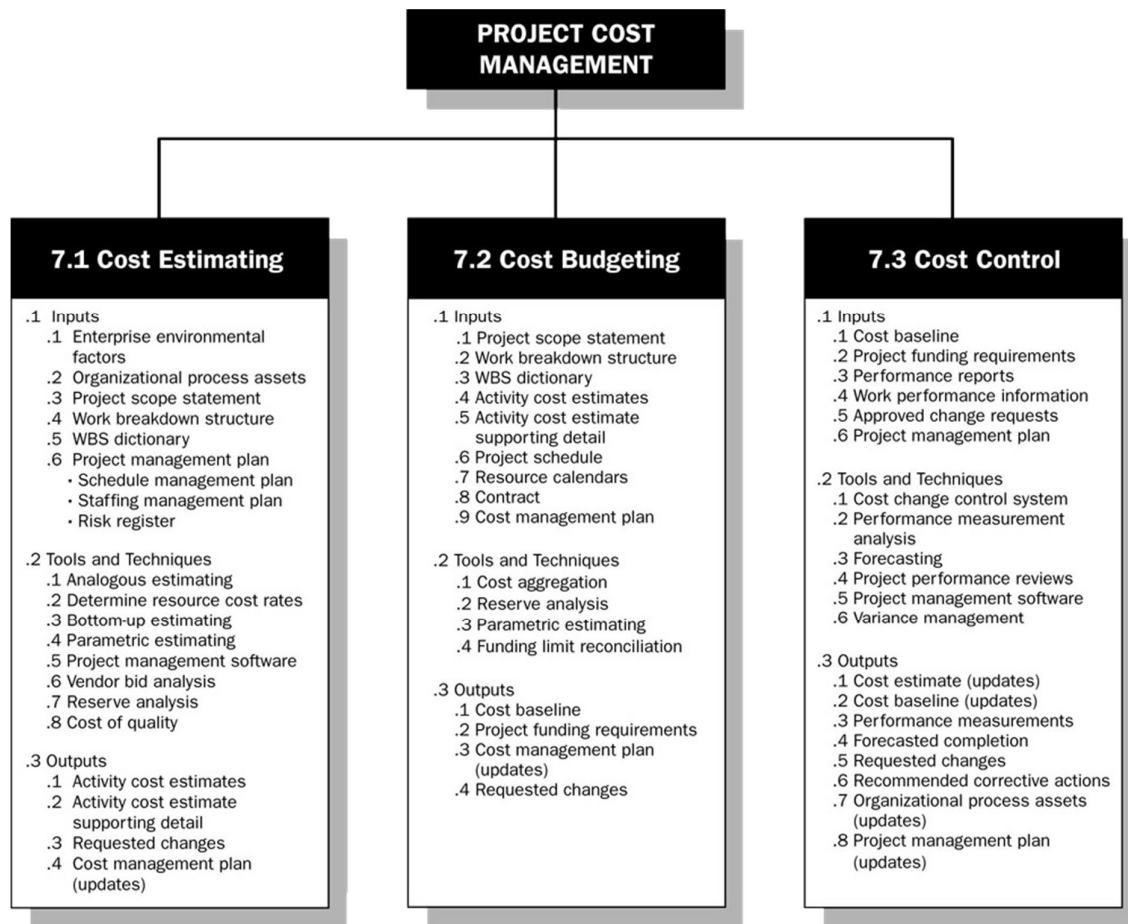
- work closely with others to determine resources against budgetary frameworks
- prepare a budget and cost-management plan for a project
- monitor costs across a project's life cycle including solving cost variations and analysing possible alternatives
- record expenditure, create accurate financial reports and review cost-management processes.

Note: If a specific volume or frequency is not stated, then evidence must be provided at least once.

Knowledge Evidence

To complete the unit requirements safely and effectively, the individual must:

- explain appropriate budgeting processes, tools and techniques
- describe methods and tools for costing and cost analysis
- explain strategies for managing costs and their application in different situations
- outline processes for reviewing costs against outcomes
- summarise key organisational policies and procedures applicable to this role.



Definition

Project Cost Management is a series of activities for estimating, allocating, and controlling costs within the project. It allows determining and approving budget for the project and controlling spending. For example, in construction project cost management it is vital to estimate cost of materials, equipment, salary of workers, etc. In IT project cost management, it is critical to estimate cost of software development, salary of IT staff, etc.

Effective **project cost management** allows each project to be specific and unique because that project entails costs and requires specific funding. However, no matter whether you lead a software development project (IT project cost management) or construction project (construction project cost management), you should consider project cost management as a process that consists of the three key steps.

Project Cost Management is one of the ten *Knowledge Areas* outlined in A Guide to the Project Management Body of Knowledge (aka the PMBOK Guide). It is used during the Planning and Monitoring & Controlling *Process Groups*.

There are 4 processes in this knowledge area including

1. Planning Cost Management
2. Estimating Costs
3. Determining Budget
4. Controlling Cost

In order to succeed in managing a project, the project manager needs to learn how to make cost calculations, estimate resources required for the project, develop cost spreadsheets, use cost management templates, and more. The manager should understand that all information on the need, availability and consumption of project resources (like labour, money, time, technology) can be gathered, filtered, sorted and managed by project cost management and its special methods. Let's find out what the process of managing project expenses means and what basic software functionality is necessary for performing the process.

Process

The process of managing project costs is an activity for estimating costs, developing project budget and controlling spending. The project cost management process includes the following key steps:

- **Cost Estimation.** It is the project cost management process step when the project manager cooperates with the financial department to estimate costs required for purchasing all necessary good/services and undertaking necessary activities to deliver the project. Project Cost Estimation is conducted at the planning phase. The project manager uses project cost management software to develop spreadsheets and make calculations.
- **Budget Determination.** At this step of the cost management process, cost spreadsheets are used to develop the budget framework and determine the budget. The project manager can use project cost management software to work in collaboration with the financial department to determine items of the budget and sources of funding and then to allocate the budget. The step entails close cooperation with the project sponsor.
- **Spending Control.** It is the step of the project cost management process when the allocated budget is reviewed and spending is tracked. The project manager takes responsibility for control spending and to ensure that the budget allocation is optimized and costs are fully covered with the planned and allocated budget.



Work Breakdown Structure¹

Why use a work breakdown structure?

The Work Breakdown Structure (WBS) serves a number of purposes. It helps in the efficient planning of the project by enabling the project manager to better organise time-limited activities, and allows the project and its stakeholders to fulfil the needs of the client. These needs will include quality and cost considerations, and by listing individual tasks required to complete the project the WBS will help to more completely define project scope (in addition to the project scope document).

Finally, the WBS will help to define responsibilities associated with each task, as well as the resources needed to successfully complete each task. Here we look at how this human resource function is accomplished by the WBS.

¹ Source: Your Project Manager, as at <http://yourprojectmanager.com.au/human-resource-function-work-breakdown-structure/>, as on 27th October, 2016; Kanbanize, as at <https://kanbanize.com/blog/how-work-breakdown-structure-improves-productivity/>, as on 27th October, 2016.

Determine resource requirements for individual tasks identified in the work breakdown structure, with input from stakeholders and guidance from others²

The project management questions answered by the WBS

A question of resources

By defining the independent and interlocking nature of each task required by the project, the WBS helps to clearly pinpoint all resources needed at each stage. These resources include ensuring the right people with the relevant qualifications and experience are employed to oversee and work on each task. When examining this, the project manager needs to take a human resources management approach to project management. Having the wrong people in place will have an adverse effect on quality, cost, and time.

WBS and Cost³

You can use a work breakdown structure to help you gain an overview of your project and facilitate project accounting. With the systematic approach of the work breakdown structure, you can establish projected costs for individual activities and control actual costs as the project incurs them. As the project progresses, cumulative costs from the completed activities let you determine whether you are on budget and let you make adjustments if needed.

The work breakdown structure divides the work to be done for a project into individual, self-contained tasks. Starting with major project segments like design, deliveries and installation, you divide each segment further until you reach a level where a task is the responsibility of one person. For example, a construction project could be divided into building design, site preparation, foundation, structure and finishing. Dividing design work further, it might include architectural, electrical and mechanical drawings. Breaking down the work of electrical drawings you would include the details of the connection to the utility supply. By breaking the work down into activities such as preparation of the drawings for the utility connection you can identify small, individual tasks for which project accounting can assign costs.

Budget

Project accounting involves matching incurred costs against cost projections to ensure that the project comes in on budget. With a completed work breakdown structure, you can calculate how much the completion of each activity or task will cost. This exercise breaks the budget down into small dollar amounts that you can assign to individual work breakdown structure tasks.

² Source: My Management Guide, as at <http://www.mymanagementguide.com/project-cost-management-%E2%80%93-definition-process-and-software/>, as on 27th October, 2016.

³ Source: Chron, as at <http://smallbusiness.chron.com/understanding-work-breakdown-structures-project-accounting-66232.html>, as on 27th October, 2016.

If, for example, the amount budgeted for electrical drawings is \$200 but your work breakdown structure shows preparing the drawings will take 30 hours, the budget is unrealistic. In that case, you have to change how you plan to carry out the work to use fewer hours or change the budget.

Actual Costs

Once the project work has started, the project accumulates costs. The key purpose of project accounting is to assign the costs to the activity whose budget covers it, so you can see if the actual costs match the budgeted costs and to make sure the actual costs doesn't exceed the budget. For example, the costs for the technicians preparing the electrical drawings are paid out of the electrical drawings budget. You can immediately see when a task such as electrical drawings has used up its budget and threatens to exceed its assigned cost.

Tracking Costs

The critical value for project accounting is how well the project as a whole is adhering to the overall budget. The work breakdown structure allows you to calculate overall budgetary performance through the work you have completed.

If you add the budgets of all the tasks that you have finished, divide by the total budget and multiply by 100, you get a percent of budget that you should have spent. If you add the actual costs of the completed tasks, divide by the budget and multiply by 100 you get the percent of budget you have actually spent. If the percent of budget actually spent is more than the percent you should have spent, you immediately know you are over budget. You then have to spend less on the remaining tasks or revise the budget.

Cost Breakdown Structure

The purpose of a cost breakdown structure (CBS) is to aid efficient cost planning (budgeting and forecasting) and cost control during the project. The CBS must also assist the project manager identify areas where excessive costs can be reduced.

Project cost types can be grouped into a few main categories: These categories might for example be [direct costs](#) and [indirect costs](#). Direct costs can usually be attributed directly to a work package. An example of a direct cost might be the cost of design and procurement of an asset. Indirect costs on the other hand might need to be managed separately and are often allocated over a number of work packages. An example of indirect costs might be the project management costs.

These cost types (categories) are most often represented at the top level of the CMS hierarchy. So for example we might configure level 1 (the top of the hierarchy) being the project itself and level 2 immediately below being the direct and indirect costs.

It is often unnecessary to manage costs to the lowest level of detail in a work package.

For example, a single work package might be contracted to a third party who will manage the work as an entire sub project in its own right. In this scenario it might only be necessary for the project

manager of the main project to track the aggregated work package costs and leave the contractor to manage the detailed costs within that work package.

Within different companies, terms like **cost centres** and **cost elements** unfortunately have different meanings. To complicate matters even more, financial accountants also use these terms and usually ascribe different meanings than used by project managers. It is important therefore when using these terms to ensure that the context is clear to avoid confusion.

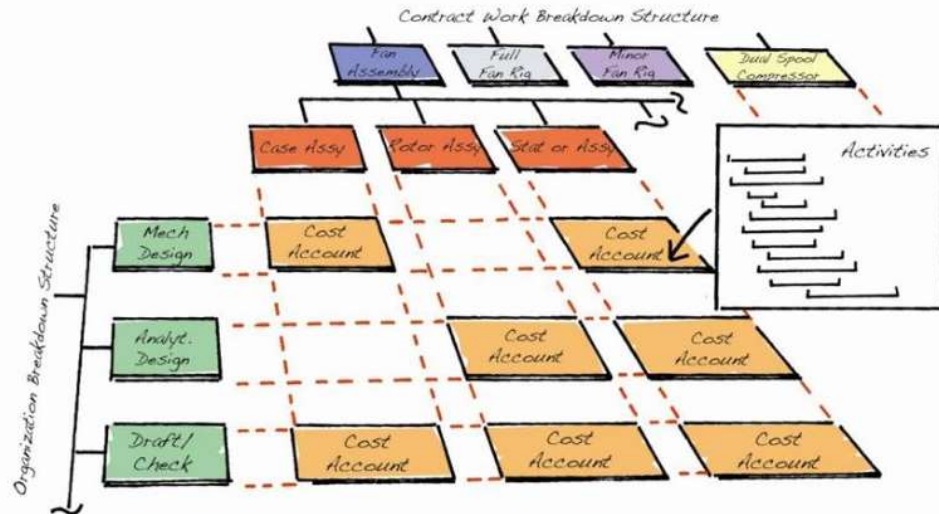
In summary; to structure an effective cost breakdown structure you should:

1. Recognise the different project cost types in terms of direct and indirect costs and organise these at the highest level
2. Map the cost breakdown structure as closely as possible to the WBS, remembering however that you sometimes need to manage costs at an aggregated (control account) level.
3. Always keep in mind the purpose of the cost reports: to *plan*, *control* and *optimise* costs on a project.

2. Ensuring accountability for costs

There is no point in controlling costs if you can't identify a single person who is accountable. Shared responsibility means no responsibility. This principle of single accountability needs to be designed into both your work breakdown structure and your cost breakdown structure.

When designing your cost breakdown structure, think of all those who are responsible for costs, whether they are in design, procurement or construction roles. Ask yourself who is accountable for cost control in each of these areas and who will be relying on your reports to track costs through the project. The intersection of the work breakdown structure and the organisational breakdown structure results in points of accountability where a single person can be held responsible. Can this person actually draw an aggregated report of costs under her control? If she "shares" costs with another manager you lose the principle of accountability and run the risk that these costs will not be managed but rather subject to endless dispute.



http://www.mosaicprojects.com.au/Mag_Articles/P009_Breakdown_Structures.pdf

3. Ensure you cover everything

All costs that need to be tracked in the budget, forecast and control process need to be included in the CBS, but no more. The total project budget must equal the sum of all the constituent costs in the breakdown structure.

This might seem obvious, but in practice things are not black or white: they can get a little grey. In a project, external resources are often secured from the business to support the work. These costs are either charged to the project or charged to the business. Or half way through the project they are employed in the business and their costs are now catered for by a different organisational unit. There should be no ambiguity about how this type of cost should be handled in the cost reports. A person charging time to the project that was not budgeted will result in overspend or resources cut back in another area. And conversely, if a budget is unused because the hours are paid for by another organisational unit, the project can seem to be more in control than it actually is because it will be underspending in a specific area.

Another practical example where costs between the project and business could get confused might be external costs such as the cost of acquiring permits to build and operate the plant etc. Are these included in the project budget or are they included in the operating business budget?

While you do need to cover everything, it is equally important not to over analyse and break down your CBS to too much detail. This creates a burden of data collection and analysis which might at the end of the day have no practical value or contribution to decision making.

Inexperienced project managers might be tempted to start managing project costs using standard financial accounting systems, using a chart of accounts, an asset register and standard monthly reporting protocols. Or you might want to use your resource scheduling system to accomplish the

same; after all work packages and cost packages are similar? Sometimes the financial manager will insist it be done that way because after all, financial systems are already in place managing procurement and capitalisation of assets...

Be very careful with these approaches. It should be evident from the above discussion that project costs must be controlled in line with the principles above: Managing the right costs at the right level, ensuring accountability and the 100% rule.

Project costs therefore should be tracked in a specialised system such as Costrac (for example). At the end of the project these costs are usually capitalised and captured in the financial system which then handles depreciation and calculation of book value of the asset. This transition can be made much easier if the project data is in a form that can be summarised into the financial chart of accounts and the asset register. Keep this in mind when designing the cost breakdown structure.

Building an effective cost breakdown structure can have a major impact on the way the project costs will be controlled and therefore the ultimate success or failure of the project to come in on budget. Getting the balance right between the right level of detail, the right structure and the accountability aspects takes experience. Shortcuts are a bad idea. While tools such as Costrac are indeed flexible in this regard; it is always advisable to enlist an experienced cost engineer in the planning phases to help design a structure that will work for you.



Determining the cost is done through the Cost Breakdown Structure (CBS). The CBS is a system for dividing a project into hardware elements and sub elements, functions and sub functions and cost categories. It is a hierarchical structure that classifies resources into cost accounts, typically labour, materials, and other direct costs. In addition, it represents the economic breakdown of the project into budgets per work package. This will allow the project manager to track project progress and expenditure according to planning breakdown of activities and responsibilities.

A CBS includes all direct full costs of labour and materials, as well as the so-called *project overhead*, which is still a direct cost required to execute the project. A Project overhead embraces the cost of construction equipment (usually under the terms of average amortisation of construction assets), project management, design services, permits and insurance fees. The CBS does not have to include the company's overhead not associated with the project, such as general office salaries, utilities,

insurance, taxes, interest, and other expenses out of the direct control of the project team, but rather inherent with corporate top management's action.

There are two main approaches to direct cost breakdown structuring and the approach used in a particular circumstance depends on the different purposes of cost accounting.

The first one makes use of the WBS as the project cost control structure as explained above, so that the CBS and WBS are the same structure and each cost account is consistent with a work package or detailed task. The end result is a hierarchical structure of cost to be used by the project team for both budgeting, accounting and control. With this kind of CBS, Activity Based Costing (ABC) method drives both estimation of budget and accounting of actual expenditures. The advantage is that project budgeting and tracking develop on the WBS exactly in the way the product is going to be built, with detailed analysis at the final level of decomposition of the WBS: the cost of an elementary activity may include a combined summation of full cost of labour, quantity of material, equipment, and lump-sum cost of subcontract or service.

To define the budget, a different methodology may apply to parts of the breakdown depending on the specific nature of items or elements. Subcontractor quotes are of practical use when a specialised subcontractor is assigned a job. Quantity take-offs are obtained by multiplying the measured quantities by the unit cost, which includes material, equipment and labour as a whole. Challenges here are the tremendous detail complexity of line items, the dependence of the estimated quantities on construction methods, and the determination of unit cost based on historical data.

Material take-off estimation is needed when data about unit costs for complete installation of materials are unknown. For each line item in the cost breakdown, a quantity of material required, Q , must be determined. For each item the unit cost of material, M , can be estimated using quotes from local material suppliers. For most line items equipment is involved in the construction process, and an equipment rate of cost, EM (cost per unit of material), must be determined. In addition, labour costs – which are often greater than material cost – must be incorporated by multiplying the hourly wage rate, W , and the labour cost per unit of material (productivity) L . Combining these factors in the following equation produces an estimate of the direct cost for a given item:

$$\text{Total cost } \$ = Q * (M + EM + W * L) \quad (8.1)$$

Regardless of the method applied, careful consideration of wages and productivity has to be taken into account for appropriate detailed budgeting. Labour cost estimation W is affected by several components, namely wages, insurance, social security, benefits and premiums. Productivity (L) impacts a project in many ways.

At the beginning of a project workers will typically have lower productivity on account of inexperience with the particular routine to be followed. As time progresses they become more efficient in their work with repetition due to the effects of learning: an effect expressed in learning curves (Kerzner 2001).

However, some projects have few repetitive tasks, and therefore must account for this factor in the project estimate. When productivity is less than initially expected a project may begin to fall behind schedule. As a result, the project manager may increase pressure in order to finish more quickly. However, as hours per day of work increase, worker productivity per hour is known to decrease.

Productivity also suffers greatly over the medium- and long-term as workers become fatigued and lose motivation. This reciprocal process can be damaging to the success of a project if it is not realised. Productivity can be measured, but the results of corrective actions are highly uncertain. In this realm, a project manager with good experience and a good understanding of his personnel can identify problems and attempt to remedy them – ideally before the time such problems begin to be evident in project reports and failure to meet the schedule of values. Lost time due to low productivity can be incorporated into an updated cost estimation, but prior to construction this additional cost is most easily calculated as a contingency. Applying probabilistic models to estimation calculations allows planners to gain a deeper insight into the effects of uncertainty in costs.

Estimate project costs to enable project budget to be prepared within agreed tolerances⁴

One of the first tasks when managing a project is the **cost estimate**. A cost estimate should be as accurate as possible, transparent and reliable. These factors are particularly important for a small business because its resources are limited. Using standard techniques lets you see the details of the cost calculations. Such techniques give accurate results, and their reliability is high as long as the inputs used for the calculations are exact. When you calculate project costs using effective cost-estimating techniques, you will be able to assign corresponding resources and develop schedules to manage the project successfully.

Resource Costing

A common technique for cost estimating is to list the resources you need for the project and to total their costs. Typical resources include equipment, material, services and labour. You can get costs for equipment, material and services by consulting price lists or by going out for bids for the larger pieces. Labour costs are hourly, and you can base the total costs on estimates from similar projects or ask for bids to carry out the work. Small businesses use resource costing for larger or more complicated projects.

Unit Costs

Small or simple projects can be evaluated using a cost-per-unit that is characteristic of the project. The characteristic unit is a measure of the size of the project that is indicative for the particular project. It might be a cubic metre or a square metre. Typical applications are for building costs, paving, renovating or for standard systems such as data processing. Costs are a dollar amount per unit. To get the total cost, you decide how large the building or surface is or how many people will be working on the data. Multiply that by the unit cost to get the total. You can get typical unit costs from prospective suppliers or from industry associations.

Empirical Methods

If your project is typical of your industry and businesses have completed similar projects over the past few years, an empirical approach can be highly accurate and take the least time. To use this approach, you usually have to buy software or a paper-based system that contains statistical information about the other, completed projects. You choose the characteristics that apply to your project from a list, fill in the overall parameters such as size and location, and ask for the cost breakdown. The system will provide typical costs for that kind of project. Consultants active in your industry will have information on empirical systems and might be able to supply them.

Historical Costing

One of the most transparent ways of estimating the cost of a project is to base it on previous work. If your company has completed a similar project recently, all the required costing information is available from the project files. If you don't have such a project, other work your company has done in the past can help determine the cost of similar work on the new project. If a local business that is

⁴ Source: Chron, as at <http://smallbusiness.chron.com/project-management-cost-estimating-techniques-40508.html> , as on 27th October, 2016; Frame Group, as at <http://www.framegroup.com.au/cost-estimating-and-planning/>, as on 27th October, 2016.

not a competitor has completed a similar project, it might be willing to help. Where available, historical data often gives the most accurate prediction of future costs.

In a world of limited funds, as a project manager you're constantly deciding how to get the most return for your investment. The more accurate your estimate of project cost is, the better able you will be to manage your project's budget. Therefore, estimating a project's costs is important for several reasons⁵:

- It enables you to weigh anticipated benefits against anticipated costs to see whether the project makes sense.
- It allows you to see whether the necessary funds are available to support the project.
- It serves as a guideline to help ensure that you have sufficient funds to complete the project.

Although you may not develop and monitor detailed budgets for all your projects, knowing how to work with project costs can make you a better project manager and increase your chances of project success.

A project budget is a detailed, time-phased estimate of all resource costs for your project. You typically develop a budget in stages — from an initial rough estimate to a detailed estimate to a completed, approved project budget. On occasion, you may even revise your approved budget while your project is in progress.

Your project's budget includes both direct and indirect costs.

Direct costs include the following:

- Salaries for team members on your project
- Specific materials, supplies, and equipment for your project
- Travel to perform work on your project
- Subcontracts that provide support exclusively to your project

Indirect costs fall into the following two categories:

- **Overhead costs:** Costs for products and services for your project that are difficult to subdivide and allocate directly. Examples include employee benefits, office space rent, general supplies, and the costs of furniture, fixtures, and equipment.

You need an office to work on your project activities, and office space costs money. However, your organisation has an annual lease for office space, the space has many individual offices and work areas, and people work on numerous projects throughout the year. Because you have no clear records that specify the dollar amount of the total rent that's just for the time you spend in your office working on just this project's activities, your office space is treated as an indirect project cost.

⁵ Source: Dummies, as at <http://www.dummies.com/careers/project-management/how-to-estimate-project-costs/>, as on 27th October, 2016.

- **General and administrative costs:** Expenditures that keep your organisation operational (if your organisation doesn't exist, you can't perform your project). Examples include salaries of your contracts department, finance department, and top management as well as fees for general accounting and legal services.

Suppose you're planning to design, develop, and produce a company brochure. Direct costs for this project may include the following:

- **Labour:** Salaries for you and other team members for the hours you work on the brochure
- **Materials:** The special paper stock for the brochure
- **Travel:** The costs for driving to investigate firms that may design your brochure cover
- **Subcontract:** The services of an outside company to design the cover art

Indirect costs for this project may include the following:

- **Employee benefits:** Benefits (such as annual, sick, and holiday leave; health and life insurance; and retirement plan contributions) in addition to salary while you and the other team members are working on the brochure
- **Rent:** The cost of the office space you use when you're developing the copy for the brochure
- **Equipment:** The computer you use to compose the copy for the brochure
- **Management and administrative salaries:** A portion of the salaries of upper managers and staff who perform the administrative duties necessary to keep your organisation functioning

Here are the basic (but not the only) differences between cost estimates and cost plans:

A **cost estimate** is an assessment or approximation of the likely costs of an initiative with an indication as to the degree of accuracy, usually +/- percent.

A **cost plan** determines the fiscal feasibility of an initiative. This is done by setting the lifecycle budgets and cost controls to manage the delivery and quality of the initiative's outcomes over a set timeframe.

That means that cost plans are living artefacts, just like project management plans. They must be managed throughout the lifecycle of any initiative in any industry.

The art, or for that matter the science, of where cost estimation migrates into cost planning, relies on sound commercial principles. It requires the right modelling tools and a good dose of experience.

Some guiding principles

The guiding principles to cost estimating and cost planning are:

1. Time is money.
2. Appropriate controls to develop, implement and manage cost estimates and cost plans are the key to repeatable quality outcomes and commercial success.

Cost estimating and cost planning outcomes provide the framework for cost control through the lifecycle of any initiative. Cost control is making sure you stay within the budget set during the cost estimating and cost planning processes.

The execution or implementation of guiding principles comes in many forms and permutations. Most project management knowledge has a chapter on cost estimating and cost planning, and the need to control this scarce resource.

Managing cost sits at the top of project management criteria, along with managing scope, time and quality. I could argue that if costs are not managed then it's likely the other three are not under control either.

So, the capability to develop such financial models is dependent on your commercial intellect and your relevant industry experience.

An experienced cost estimator/cost planner must have a multi-disciplined capability to visualise, over time, the cost of designs, materials, effort, risk etc., and apply commercial strategies to present the plan in a logical and structured manner.

A look at cost estimating

The notion that cost estimates don't need to be that accurate — since by definition, they predict the future — is a fallacy.

It's true that cost estimates are a rough order-of-magnitude figure. And, yes, the basis for the estimates is in the assumptions, constraints, limitations, etc. But in business, we can't plan for and bid for work without estimates.

The trick is to ensure that the numbers, and the strategies to support the numbers, have substance. The difference between a good estimate and a bad estimate can result in not winning work, or in winning the work but losing money.

Types of cost estimates and tolerances

Here are the most commonly named estimates I've come across:

- **Ballpark estimates (BPE).** These generally have a +/- 50% tolerance. They can range up to 100%.
- **High-level estimates (HLE).** These have tolerances of +/- 30% up to 50%.
- **Detailed estimates (DE).** These have the least tolerance with about +/- 10% to 20%.

Obviously, as the level of detail and knowledge of an initiative increases, the level of tolerance required of the estimate decreases.

The cost estimating lifecycle

Cost estimating (and cost planning) requires sound commercial principles, the right modelling tools and experience.

Here are four elements that will raise your chances of cost estimating success:

1. Subject matter expertise and industry knowledge

To estimate well, you need to have a broad understanding and experience in the products that you're estimating.

That means you need to know of and understand the industry benchmarks. For example, it helps to know that the industry benchmark for a daily rate is \$800 or for a metre of cable is \$2.50 + GST.

2. Estimating techniques

You need an understanding of different estimating techniques.

PMBOK® Guide, developed by the Project Management Institute, explains techniques such as: bottom up, top down, and plus or minus tolerances.

Your expertise, knowledge and use of the right technique contributes about 50% to your estimate's accuracy.

3. Tools

A good Excel workbook, with a number of cross-check traps and macros, can serve you well. There are estimating programs, although they're more suited to the construction industry.

Using the right tool adds about 30% accuracy to your estimate.

4. Governance and management reviews

These are essential elements that ensure your estimates are checked and cross-checked, meet industry standards and fit business expectations.

Cost reviews contribute 20% to the accuracy of your cost estimate.

A brief look at cost planning

Successful cost planning is made up of diversified choices in approach and execution. There's no one approach that fits all scenarios. It's a case of making the best and most appropriate choices to fit the situation.

Before developing the cost plan for any initiative, you need to consider the framework. And there's a lot to consider — more than can be covered in this article.

Here are some of the decisions that need to be made in order to determine the best approach for your cost plan and deliver the desired outcome and accuracy:

- What is being planned? IT? Construction? Something else?
The principles are the same but the environment, approach and tolerances will be different.
- Should I amortise costs, or do I declare a contingency to cover risk?
- Is the opportunity a deal or a contract?
A contract may have penalties for non-performance or delays. A deal is more of a partnership. There are obvious cost implications for both.
- Do I need to test the market with an RFI or RFP/RFT/RFQ?
- What is the commercial envelope? Is it fixed lump sum, target sum, open book, or other?
- Has there been a sound assessment of the risk versus the complexity?
- What is the degree of confidence and/or accuracy?
- Do I need to obtain market coverage to sharpen the accuracy?
- Is there a comprehensive work breakdown structure (WBS) for services and materials?
- Do I have a strong understanding of the concept of money and the methods to determine the investment value or the return on investment? What about developing present and future value-of-money models using discount cash flow (NPV/IRR)?
- Have the business investment rules been factored into the planning framework? Things such as the hurdle rate, CPI, tax rate?
- How does time affect the proposed cost plan?
- Is risk covered and are there adequate contingencies?

There's a lot to consider but effective cost planning depends on your decisions regarding these matters.

It's not an insurmountable task

The success formula for repeatable execution of quality cost estimates and cost plans is a combination of experience, commercial intellect, and choices of optimal tools and approach.

Cost estimating and cost planning are both an art and a science.

But, most importantly, they require a strong dose of structure and discipline.

And never underestimate what experience brings to the table!



Analogous Estimating⁶

This technique is used to estimate the project cost when very little detail about the project is available. Therefore, this technique does not provide a very reliable estimation. The primary benefits of this technique are its lower cost and quick results.

In Analogous Estimation, the cost of the project is estimated by **comparing it with similar projects previously completed by your organisation**. Here you will look into your organisation's historical records (i.e. in Organisational Process Assets) for previously completed projects. You will select the project which is closest to your project and use your expert judgment to determine the cost estimate of your current project.

The Analogous Estimating is also known as *The Top-Down Estimating*.

Parametric Estimating

Like Analogous Estimating, Parametric Estimation **uses historical data** to calculate cost estimates, however, it also utilises statistical data. It takes variables from similar projects and applies them to the current project.

⁶ Source: PM Study Circle, as at <https://pmstudycircle.com/2012/06/4-tools-to-estimate-costs-in-the-project-management/>, as on 27th October, 2016.

For example, in a previous project, we take the cost of concrete per cubic metre, then calculate the concrete requirement for the current project and multiply it with the cost obtained from the previous project. This will provide the total cost of concrete for your current project.

In the same way you can calculate the cost of other parameters (men, materials, and equipment).

The accuracy of this process is better than the analogous estimation because it employs more than one data set.

Three-Point Estimating

This technique is used to reduce the biases and uncertainties in estimating assumptions. Instead of finding one estimate, **three estimates are determined and then their average is taken** to reduce the uncertainties, risks, and biases.

PERT (Program Evaluation and Review Technique) is the most commonly used method in three-point estimation technique.

Three PERT estimates are as follows:

- **Most Likely Cost (C_m):** Considers a normal case and everything goes as usual.
- **Pessimistic Cost (C_p):** Considers the worst case and assumes that almost everything goes wrong.
- **Optimistic Cost (C_o):** Considers the best case and assumes that everything goes better than planned.

PERT Estimate formula is:

$$C_e = (C_o + 4C_m + C_p)/6$$

Where, C_e = Expected Cost

Estimates derived from this technique are better than the two techniques presented earlier because it reduces the biased view from the data and provides a more accurate estimate.

Bottom-up Estimating

The Bottom-up Estimating technique is also known as the “definitive technique”. This estimation technique is the most accurate, time-consuming, and costly technique for estimating the cost. In this technique, the cost of **each single activity is determined with the greatest level of detail at the bottom level** and then rolls up to calculate the total project cost.

Here, the total project work is broken down into the smallest work components. Each component cost is estimated and then, finally, it is aggregated to get the project’s cost estimate.

Project Budget⁷

When starting a project, it is difficult to know how much it will cost. Project managers are held to account for their budget estimates and with so much uncertainty in projects, it can be one of the project managers' greatest challenges.

The ability to create an accurate budget is an essential skill for a project manager. It can be a daunting task, especially for new project managers; however, once you have created your first budget, you will have an approach to use, and it will become easier for future projects.

Budgeting Basics

There are two main approaches you can take when creating a budget:

1. Top-down approach: deciding how much the project will cost and dividing the amount between the work packages.
2. Bottom-up approach: estimating the total cost of the project by costing the lowest-level work packages and rolling up.

Both approaches have their advantages and disadvantages and as a project manager, you will be faced with both at some time in your career. Let's take a look at each approach in more detail:

Top-Down Budgeting Approach

The decision is made, often by senior management, about how much the project should cost. This amount is divided between the work packages. Keep in mind that this approach is more than guessing; you need to explain how you will do the work within the allocated amount of budget for each work package. Prior experience from other projects will play a part in validating the budget allocation for work packages. It should be asked whether the budget looks realistic based on experience from past projects.

The advantage of the top-down budgeting approach is that it focuses on achieving the project within the budget allocated and leads to efficiencies and reduction in wasteful practices.

A disadvantage of the top-down budgeting approach is that it assumes that the person creating the budget has enough knowledge and expertise to make a reasonable cost estimate. If they do not, conflict may occur when a person required to execute the project is given an unrealistic budget that is insufficient to deliver the project. There is a risk of deliberately low budgets created with the belief that it will encourage cost savings.

Bottom-Up Budgeting Approach

⁷ Source: Project Smart, as at <https://www.projectsmart.co.uk/creating-a-project-budget-what-you-need-to-know.php>, as on 27th October, 2016.

The team, often involving the final budget holder, identify the tasks and activities needed to complete the project. The project is based on the lowest-level work packages and rolled up to arrive at the total project cost. The direct and indirect costs are calculated for each work package.

The advantage of the bottom-up budgeting approach is its accuracy (as long as you have not missed any task or activity). It is good for team morale because the project manager involves the team in budget creation. This approach is sometimes called participative budgeting for this reason.

A disadvantage of the bottom-up budgeting approach is the difficulty in getting a full list of tasks and activities needed to complete the project. It is easy to miss some that will be needed and that will later throw the budget out.

Reserve Analysis

A contingency reserve or buffer is added to projects (usually a percentage of the total project cost and time) to cover risk. This fund is used when encountering unexpected events during the project. You should adjust your contingency reserve to the risk level identified for the project. A routine, well-practised project will have a lower contingency reserve than a project breaking new ground.

Your budget will be made up of direct and indirect costs (see blue box above), with a small amount assigned for contingency reserve.

Monitoring the Budget

Once you have finalised your budget and it's been approved by the project steering committee or project sponsor and your project starts, you should regularly check actual spending against your budget estimate by using a spreadsheet. This will tell you whether the project is progressing as planned or corrective action is needed.

It is better to come in slightly under budget than over budget. Your customer will be happier, and it will reflect well on your ability to create an accurate budget and stick to it.

Whichever budgeting approach you choose, spend time to create your budget, check it carefully, and review it often to make sure you stay on track.

Develop a project budget⁸

For successful delivery of the project product, the project manager should effectively estimate costs, track expenditure over time and adequately react to situations when the financial resources are over-spent or under-spent, or there are opportunities for savings in the project budget.

Definition of "Project Budget"

A **Project Budget** is the total amount of authorised financial resources allocated for the particular purpose(s) of the sponsored project for a specific period of time. It is the primary financial document

⁸ Source: My Management Guide, as at <http://www.mymanagementguide.com/project-budget-and-financial-resources/>, as on 27th October, 2016.

that constitutes the necessary funds for implementing the project and producing the deliverables. The project budget gives a detailed statement of all the direct and overhead costs required to carry out the project goals and objectives.

A project budget template should be designed and managed under supervision and control of the project manager. Also the customer and sponsor should be involved in allocating and managing *financial resources*. Project budget management is a set of activities for estimating the necessary amount of financial resources for the project, controlling project costs within the approved budget and delivering the expected project goals.

Steps in the Budgeting Process

As an independent process, project budget management includes a series of steps to define and produce a budget sheet. The key steps include:

1. Development: estimating a necessary amount of financial resources and creating a project budget sheet.
2. Use: utilising the authorised financial resources and executing the budget.
3. Measurement: viewing cost performance and controlling the budget.
4. Updating: viewing changes to the cost baseline and making updates to the project budget sheet.

Step #1: Budget Development

The first step of the project budget management process involves the project manager in developing cost estimates and identifying the total amount of money resources necessary for implementation of all the tasks and activities defined and stated in the WBS and the Schedule.

Budget development should cover both capital and operating expenses to ensure successful project completion. The project manager needs to define funding requirements and then send a formal request to the sponsor who reviews the requirements and make a decision on providing the necessary money and **financial resources**. The sponsor can use the initiation documents (like Feasibility Study, Business Case and Project Charter) to make that decision.

Such estimation methods as expert judgement, cost baseline measurement and cost aggregation can be used for developing a project budget sheet. The project manager in cooperation with the key stakeholders can use a combination of the methods to estimate a necessary amount of financial resources and develop a *project budget template*.

Step #2: Budget Use

The second step in project budget management is to allocate the identified financial resources and start executing the budget. The project manager should control and keep track of the budgeted resources in order to make sure that every scheduled task or activity is performed with necessary funding and that there is no lack of money for the implementation of the entire project.

The greatest way to track and control budget use is to develop an *investment plan*. This formal document includes justifications and approvals for the acquisition of necessary procurement items

and services required in support of the project. An investment plan describes the acquisition process with reference to the feasibility study (often in larger projects a feasibility study template serves as a foundation for developing a project investment plan).

The project manager needs to send an investment approval request form to the stakeholders and wait for their approval/rejection. In case the plan is approved, the manager uses it to control the budget execution. In case the document is rejected, the project manager should receive stakeholder suggestions and make necessary amendments to the plan template. Then the process may repeat until the plan is approved.

Step #3: Budget Measurement

The third step in managing the project budget refers to taking actions necessary for providing appropriate cost performance. The manager needs to use work performance data (like status of the deliverables, cost-schedule estimates), the funding requirements request and the cost performance baseline to check the budget appropriateness.

By conducting variance analysis, performance reviews and forecasting, the project manager can compare the current cost performance against the planned amount of financed resources stated in the project budget template. In case of any gaps or deviations it is necessary to make formal change requests and modify the budget accordingly.

The project manager can develop corrective actions and send suggestions for approval to the key stakeholders. The further budget control and measurement should be done with the necessary evaluations and approvals.

Step #4: Budget Updating

Once all the changes have been approved by the key stakeholders, the project manager can proceed with updating the budget sheet and make changes to the existing breakdown structure of financial resources. This will be the forth step of project budget management.

Cost estimates, resource activity estimates, the cost performance baseline and the cost management plan should be updated in accordance with the approved changes.

What is the Goal of a Project Budget?

The project manager will use this budget to determine whether the project is on track; project personnel will use it as a guideline to fulfil certain project milestones; and the client will use it to determine the success of the effort.

But the task of creating a budget for a new project may be a bit daunting- especially if the project manager has had little or no experience coordinating projects. Some expenses, such as salaries, utilities, rent, or equipment costs, may seem pretty straight forward. But there are many contingencies and unknowns that may affect how and when the project is carried out and ultimately completed.

The most important point to keep in mind is that although a project budget should be based on concrete numbers and accurate assessments of the resources needed to complete the task, the bottom line is that a budget is meant to be an estimate.

What Should You Include in Your Project Budget?⁹

A detailed, line-item budget should be divided into categories such as salaries, fringe benefits, travel, supplies, and equipment. Make sure to also include any overhead costs (called "indirect costs") that will be associated with the project.

Here is a brief description of some of the major expenses you will need to include:

- **Employee compensation:** This section includes the salaries and wages of all full, part-time, and temporary employees involved in the project. You should also include any other benefits and incentives that may not be reflected in their take home pay.
- **Contract Services:** Here you should include outsourced services or workers, such as consultants
- **Equipment/Supplies:** This section covers expenses for office supplies, postage, copier supplies, telephone, fax, computer supplies, equipment repair and maintenance, laboratory consumables, etc.
- **Travel/Related Expenses:** Make sure that you include any air travel, out of town expenses, conference travel expenses as well as daily parking and mileage expenses.
- **Overhead or Indirect costs:** Your budget should also include overhead expenses (indirect costs), which allow the project to bear a portion of the administrative costs of the day-to-day operation.

An Example of Project Management Budget

The following is a list of the typical expenses included in a project budget.

PROJECT EXPENSES:

EMPLOYEE COMPENSATION:

- Salary
- Bonus & Commissions
- Employee Incentive
- Employee Benefits
- Temporary Labour

Total Salary & Benefits

OTHER EXPENSES:

- Seminars & Training
- Consulting Fees
- Legal Fees
- Other Professional Fees
- Contracted Services
- Recruitment
- Advertising

⁹ Source: Bright Hub PM, as at <http://www.brighthubpm.com/templates-forms/61658-examples-of-a-project-management-budget/>, as on 27th October, 2016.

- Marketing Materials
- Travel & Entertainment
- Office Expense
- Telephone
- Computer Lease
- Repairs & Maintenance
- Utilities
- Office Supplies
- Dues & Subscriptions
- Office Rent
- Postage
- General Insurance
- Taxes & Licenses
- Software Licenses

Total Other Expenses

Total Budgeted Expenses

A budget is one of those pivotal tools that is used across many departments within a company. For the developers, it dictates how much time to spend on specific areas of the application. For the project manager, it's a baseline used to determine whether the project is on track. For sales or the client, it correlates directly to the success of the effort. It's no surprise that one of the biggest issues in creating a budget is interpretation¹⁰.

Regardless of circumstance, a number of basic philosophies can help your budgeting immensely by protecting it from subjective review. By understanding concepts, and making sure that everyone involved understands them, you'll be on the right track to an accurate projection:

- Project costs and project budgets are two different things. Always start by identifying project costs.
- Project costs are not defined solely in monetary amounts. *For example, include actual amounts, with shipping and taxes, for software or hardware purchases that must be made. But if you're pro-rating the costs of using pre-existing hardware and software tools, include it in number of hours. Likewise, developer effort costs are recorded in hours, not dollars.*
- Once you've laid out your costs, identify your risks and assign a percentage reflecting how much each risk factor may affect the project as a whole, or a portion of the project. Each development team should have a risk value assigned to it, to cover reasonable costs such as hiring the occasional contractor to get a timeline under control, unforeseen overtime, and so on.
- Your budget, then, is the total of the costs, as transcribed into a monetary figure, plus the total risk percentage of that cost. Define conversion values that you use to represent equipment pro-rating and development times.
- A budget should always be labelled as an estimate, until it is finalized and approved. This helps to manage expectations and prevent miscommunications from being written in stone.

¹⁰ Source: Tech Republic, as at <http://www.techrepublic.com/article/creating-your-project-budget-where-to-begin/>, as on 27th October, 2016.

- A single person does not create a budget. At the very least you will produce a project budget with the input from your selected subject matter experts on your project team in consultation with your project sponsor and project finance representative/manager.

Identifying project costs for an IT project:

When you're identifying the costs of development, be as close to reality as possible. Look at performance of the team members on past projects to get a feel for how long it will take to program a set amount of code. Consult with your lead developer. Watch out for boastful estimates, but save hour-padding for your risk assessment stage.

Don't forget to include costs of integration and deployment. Meetings, security certificates, license fees, quality assurance hours, debugging, documentation hours and material costs, and planning time are all areas that are frequently overlooked. Whether your company will be billing the client for these items or not, they are all valid and substantial expenses of a project. Including them will help you accurately measure the profitability of the solution down the road.

Next, itemise estimates for features that weren't included in the specification, but that you suspect will be asked for later, or that would be beneficial to the final product. List these separately as options. Another good thing to up-sell is developer support time for about 60 days after launch. Often when a project is rolled out, support groups aren't in place or may defer a lot of questions to the developers.

Once you've got your costs outlined, it's time to look at the probability of exactly hitting those costs.



Risk assessment

Risk assessment and assignment is very important to a successful budget. Without it, the crises that happen regularly and are an inherent part of any project will affect your bottom line. Values in your estimate should have this allowance built in.

All projects have a certain amount of risk involved that can be attributed to human existence. People get sick and take vacation. No one is an expert in everything. Always assign a percentage to this area. *For example: An average 10-developer, 6-month project justifies a risk assessment of 5% of the total project costs. For longer projects and smaller teams, it will be higher; for shorter projects and larger teams, it will be lower.*

Regardless of how close you come to reality, a client will be much happier if your project comes in below budget than over it; however, too high a risk value can create sticker shock, revealing inexperience and creating misgivings about your management abilities. By following the guidelines we've suggested and applying some common sense, you can be assured that your team, project drivers, and client will enjoy the benefits of a well-estimated project.

Develop a cost-management plan, within delegated authority, to ensure clarity of understanding and ongoing management of project finances¹¹

The Cost Management Plan clearly describes specifically the methodology for monitoring and control of project costs during the project lifecycle. It includes the system and baseline for measurement of the project costs, their reporting, and controlling mechanism. It also includes the following:

- Identification of the authority for cost management
- Nomination of the authority for approval of changes in costs
- Procedure for quantitative measurement of cost performance, and its reporting
- Formats for reports, their frequency, and to whom delivered

The Project Manager is normally assigned the responsibility for the management and control of the project cost during the project life cycle. During the project fortnightly status meetings with the project steering committee, the Project Manager will explain the project cost performance, with measures adopted for its control. Earned value management will be used for measuring cost performance. The Project Manager is accountable for all cost variance and recommending alternatives for getting the project back on to planned budget (if necessary). The Project Sponsor will use discretionary measures for authorising cost changes to exceed budget, if necessary.

Cost Management Approach

The approach to be maintained for the management of costs is documented in this part of the Cost Management Plan. Cost Accounts will be created at the third level of the Work Breakdown Structure. If a suitable Project Management Information System is being used, then it is recommended that the costs should be managed till the level of work package. If a detailed Project Management Information System is not available, then the level of cost control in the Work Breakdown Structure should be such that the cost can be efficiently reported and managed. The lower the cost is managed in the Work Breakdown Structure, the greater will be the effort required. Thus, the level should be balanced with the effort that can be utilised for this purpose.

Project financial cost performance will be measured and controlled by using the methodology of Earned Value Management, to be applied for the Control Accounts. Work will be monitored at the level of the Work Package. 50% credit to work will be granted on its initiation, while the remaining 50% will be assigned on its completion. Work hours will be determined to the level of hours, while the level of accuracy for the costs will be nearest dollar.

Variance of +/- 0.2 in the Schedule Performance Index (SPI) and Cost Performance Index (CPI) will indicate a caution to the Project Manager, and will be reflected in the status reports of the project. If these variances exceed +/- 0.3, an alert stage will be created, where appropriate remedial measures will be necessary by the Project Manager, to ensure reduction of the variances below the alert level. Corrective actions to be undertaken will be recommended to the Project Sponsor, by the initiation of a Change Request. **(See Page 41 for further explanations)**

¹¹ Source: Innovative Project Guide, as at <http://innovativeprojectguide.com/sample-project-plans/14-sample-plans/165-sample-cost-management-plan.html>, as on 27th October, 2016; Engineering Intro, as at <http://www.engineeringintro.com/initiating-planning-project/project-cost-management-plan/>, as on 27th October, 2016..

Additional elements of a Cost Management Plan

The following are additional elements of the Project Cost Management Plan that should be taken into account;

1. **Units of measure:** This part of the management plan will cover all the units used for measurement of resource quantities. These units will be, *for example, the length of a wall will be measured in centimetres, the door thickness will be in millimetres, the steel weight will be in kilograms and so on.*
2. **Level of Precision:** This will define how deeply activity cost estimates will be rounded up or down. And this depth will be defined based on the activities scope and project magnitude. *For example: If the amount of activity is \$1025 then it may be rounded down to \$1000. And if activity cost is \$975 then it may be rounded up to \$1000.*
3. **Level of Accuracy:** Accuracy will define the acceptable range in terms of percentage. If a cost occurs against a specific activity within a defined range, then it will not be reported. If the cost goes above that range, then the activity will be reported. *For example: An activity cost is \$100 and the accuracy level is +/- 5%. If the cost during execution is \$104 then it will be considered within tolerance of accuracy.*
4. **Organisational Procedural Links:** Organisational procedural links will provide the framework for the cost management plan. This will define which resource will be responsible for which specific part of the work breakdown structure (WBS).
5. **Process descriptions:** What processes are you going to be using on the project for cost management? These include planning, estimating costs and how you will establish the overall budget. Add in some detail about what processes you'll be following and where these can be found, for example if you intend to do bottom-up estimating or bypass the standard cost planning process on advice from your project accountant.
6. **Accuracy levels:** How accurate do you intend to be? Of course it would be great to say that you'll be 100% accurate in all your estimates, but that's unrealistic! State here what you are aiming for. You can also add that this will change as the project progresses. For example, you will start the project with lower accuracy targets because you won't have as much information as you will later on. Then as you get further into the project you can amend your estimates with the latest, more accurate figures. Set out here whether you intend to do that and how you will go about doing those revisions.
7. **Variance thresholds:** What variance is going to be acceptable before you have to flag a problem to your sponsor? Talk to them about how much leeway you have in your measurements and when they expect you to be bringing them issues. You may find that they are prepared to give you quite a big bracket either side of your target before it becomes a problem. Set out the percentage deviation from each of your major measures such as baseline budget so that you know exactly where your boundaries are.
8. **Performance measurements:** If there are any specific rules for performance measurements, make a note of them in this section of the cost management plan. This is particularly relevant if you are following Earned Value processes. If you aren't, you'll probably find that you don't need this section. If in doubt, talk to your Portfolio Office about what they expect to see.

9. **Reporting protocols:** When are you reporting? How frequently? Who to? These are all questions to answer in the reporting section of your cost management plan. Agree the format of your plans with the project sponsor and anyone else who will be receiving them. Then set out exactly how often you'll produce these reports. It is also worth including what you'll put in them so that there are no surprises. It can be difficult to gather new data items once the project has started if you haven't built in a way to record them, so get a clear idea now about what your stakeholders want to see.
10. **Anything else:** Finally, don't take this list as the only items to be included in your cost management plan! Your Portfolio Office may have other ideas and your corporate template may require you to complete other sections. Even if it doesn't, you can still amend your document and add in anything else that will help you manage costs on this project – be flexible, even if you use a template.

Other things that may be useful include roles and responsibilities of those involved in cost management, a note referring back to any criteria set out in the business case, a link to any corporate policies that you will be following or any critical dates such as end of year reporting timelines or reforecasting milestones.

Your cost management plan should give you a working document to help manage spending on your project, so make it work for you and adapt any template (and this list) so it is a practical, comprehensive guide for everyone on the team.

Implement agreed financial-management processes and procedures to monitor actual expenditure against budget¹²

The financial structure of projects, programs and portfolios takes many different forms but the financial management process is common to all.

The first step is to estimate what the work may cost and the value of its expected benefits. These estimates are made and refined in parallel with other planning processes for establishing the scope of work and estimating schedule, resources and risk.

The balance of cost and benefit is analysed using investment appraisal techniques and documented in the business case. Work is approved if it can be shown not only that the benefits outweigh the costs, but also that the organisation cannot get a better return by investing the same funds elsewhere.

The process of securing funds continues in parallel with these steps. During the early phases of the life cycle, funds may only be committed in principle, pending a more detailed understanding of the work.

As plans are defined in ever greater detail, with increasing levels of confidence, funds will be fully committed and approval given to commence work. Financial governance therefore involves:

- initially: committing funds to the concept phase of the life cycle and reserving funds for the definition phase;

¹² Source: International Project Management Association, as at <http://knowledge.apm.org.uk/bok/financial-management>, as on 27th October, 2016.

- at the end of the concept phase: committing funds for the definition phase and reserving funds for delivery;
- at the end of the definition phase: committing funds for delivery, or at least the first stage or tranche of work;
- at each review: funds for the next stage or tranche will be dependent upon a viable business case.

As work proceeds, cost-control mechanisms need to be implemented. These will forecast when funds need to be released and track progress of actual expenditure against planned. Funding is reviewed at the end of each stage or tranche of work. Funds are never unlimited and costs have to be balanced against time and scope in accordance with stakeholder requirements.

Financial management arrangements range from the very simple (e.g. a small project within a department) to the highly complex (e.g. a portfolio of international projects and programs owned by partner organisations), but the principle is always that of ensuring that costs are controlled and exceeded by the value of benefits delivered.

The approach to financial management within a project, program or portfolio is highly dependent upon the policies, procedures and standards used in the host organisation. These, in turn, are affected by the regulatory and legislative environment.

At the outset, financial procedures must be established that comply with all necessary standards and enable exchange of information with the host organisation's financial systems.

The detail of financial management on a project will depend upon its scale and context.

Small and medium-sized projects will not be able to justify any investment in financial systems unique to the project. They will be serviced by the accounting systems of the host organisation. These are often unable to aggregate and apportion costs according to the project structure, so additional local processing will be necessary.

Larger projects may be able to justify specialist financial systems, ideally linked to the project scheduling systems for progress reporting and forecasting.

In terms of context, a project may be stand-alone or be part of a program; it may be an internally sponsored and funded project; or a project performed by a contractor on behalf of a client. Financial management must adapt to the context with clear policies for the collection and reporting of cost data.

Create a Project Financial Plan¹³

Step 1: List the Financial Expenses

The first step taken when defining a Financial Plan and setting a project budget, is to **identify all of the types of expenses that are likely to be incurred throughout the Project Lifecycle**.

Typically, most projects spend the majority of their budget on purchasing, leasing, renting or contracting the resources to the project (e.g. labour, equipment and materials). However other types of expenses incurred may include those related to the:

- Procurement of resources from suppliers
- Establishment of a Project Office
- Administration of the project

Step 2: Quantify the Financial Expenses

Once you have identified a detailed list of expenses to be incurred throughout the project, the next step is to **forecast the unit cost** of each expense type listed. The unit cost is simply the cost of a single unit of a particular expense item. For instance, the unit cost for:

- labour may be calculated as the cost per hour supplied
- equipment may be calculated as the rental cost per day
- materials may be calculated as the purchase cost per quantity

After listing the unit costs, you should **calculate the total amount** of each expense item needed to undertake the project. For instance:

- Identify the number of roles required
- Quantify the items of equipment needed
- Determine the amount of materials required
- Quantify the procurement items to be sourced from suppliers
- Calculate the administration costs the project

Step 3: Construct an Expense Schedule

You have now collated all the information needed to build a detailed expense schedule. This schedule enables the Project Manager to calculate the total cost of undertaking the project on a daily, weekly or monthly basis.

To create an Expense Schedule, build a table which lists all of the expense types down the left hand side of page, and all of the weeks in the year across the page. Then identify for each week and for each expense type, the amount of financial expenditure to budget. Once complete, you can sum up all of the expenses for any particular week to gain a weekly budget for the entire project.

¹³ Source: Method 123, as at <http://blog.method123.com/2009/06/10/project-financial-plan/>, as on 27th October, 2016.

Of course you may wish to calculate a daily, monthly or yearly view, based on your particular project need. Also don't forget to list any assumptions made during the creation of this Financial Plan. For example, it may be assumed that:

- "The project delivery dates will not change during this project."
- "The unit costs forecast are accurate to within 5%."
- "The funds listed by this plan will be available as required."

And finally, list any constraints identified during this financial planning process. For example:

- "Limited information was available when identifying costs"
- "A market shortage has resulted in a high labour costs"

Step 4: Define the Financial Process

Now that you have created your Expense Schedule, you need to define the process for monitoring and controlling expenses (i.e. costs) throughout the Project Lifecycle. Define the Cost Management Process for your project by documenting the:

- Purpose of the process
- Steps involved in undertaking the process
- Roles and responsibilities involved in undertaking the process
- Templates used to support the process

Select and use cost-analysis methods and tools to identify cost variations and evaluate alternative actions¹⁴

Whether you know it as a cost-benefit analysis or a benefit-cost analysis, performing one is critical to any project. When you perform a cost-benefit analysis, you make a comparative assessment of all the benefits you anticipate from your project and all the costs to introduce the project, perform it, and support the changes resulting from it.

Cost-benefit analyses help you to

- Decide whether to undertake a project or decide which of several projects to undertake.
- Frame appropriate project objectives.
- Develop appropriate before and after measures of project success.
- Prepare estimates of the resources required to perform the project work.

¹⁴ Source: Dummies, as at <http://www.dummies.com/careers/project-management/performing-a-cost-benefit-analysis/>, as on 27th October, 2016; Bright Hub Project Management, as at <http://www.brighthubpm.com/project-planning/58181-writing-a-cost-benefit-analysis/>, as on 27th October, 2016.

Everything gets a dollar value in a cost-benefit analysis

You can express some anticipated benefits in monetary equivalents (such as reduced operating costs or increased revenue). For other benefits, numerical measures can approximate some, but not all, aspects. If your project is to improve staff morale, for example, you may consider associated benefits to include reduced turnover, increased productivity, fewer absences, and fewer formal grievances. Whenever possible, express benefits and costs in monetary terms to facilitate the assessment of a project's net value.

Consider costs for all phases of the project. Such costs may be **nonrecurring** (such as labour, capital investment, and certain operations and services) or **recurring** (such as changes in personnel, supplies, and materials or maintenance and repair). In addition, consider the following:

- Potential costs of not doing the project
- Potential costs if the project fails
- Opportunity costs (in other words, the potential benefits if you had spent your funds successfully performing a different project)

A cost benefit analysis is used to evaluate the total anticipated cost of a project compared to the total expected benefits in order to determine whether the proposed implementation is worthwhile for a company or project team.

If the results of this comparative evaluation method suggest that the overall benefits associated with a proposed action outweigh the incurred costs, then a business or project manager will most likely choose to follow through with the implementation.

Generally speaking, a cost-benefit analysis has three parts. First, all potential costs that will be incurred by implementing a proposed action must be identified. Second, one must record all anticipated benefits associated with the potential action. And finally, subtract all identified costs from the expected benefits to determine whether the positive benefits outweigh the negative costs.

📌 Identifying Costs

The first step is to identify and quantify all costs associated with a proposed action. In order to successfully identify all potential costs of a project, one must follow the subsequent steps.

1. Make a list of all monetary costs that will be incurred upon implementation and throughout the life of the project. These include start-up fees, licenses, production materials, payroll expenses, user acceptance processes, training, and travel expenses, among others.
2. Make a list of all non-monetary costs that are likely to be absorbed. These include time, lost production on other tasks, imperfect processes, potential risks, market saturation or penetration uncertainties, and influences on one's reputation.
3. Assign monetary values to the costs identified in steps one and two. To ensure equality across time, monetary values are stated in present value terms. If realistic cost values cannot be readily evaluated, consult with market trends and industry surveys for comparable implementation costs in similar businesses.
4. Add all anticipated costs together to get a total costs value.

📌 Identifying Benefits

The next step is to identify and quantify all benefits anticipated as a result of successful implementation of the proposed action. To do so, complete the following steps.

1. Make a list of all monetary benefits that will be experienced upon implementation and thereafter. These benefits include direct profits from products and/or services, increased contributions from investors, decreased production costs due to improved and standardized processes, and increased production capabilities, among others.
2. Make a list of all non-monetary benefits that one is likely to experience. These include decreased production times, increased reliability and durability, greater customer base, greater market saturation, greater customer satisfaction, and improved company or project reputation, among others.
3. Assign monetary values to the benefits identified in steps one and two. Be sure to state these monetary values in present value terms as well.
4. Add all anticipated benefits together to get a total benefits value.

☐ Evaluate Costs and Benefits

The final step when creating a cost benefit analysis is to weigh the costs and benefits to determine if the proposed action is worthwhile. To properly do so, follow the subsequent steps.

1. Compare the total costs and total benefits values. If the total costs are much greater than the total benefits, one can conclude that the project is not a worthwhile investment of company time and resources.
2. If total costs and total benefits are roughly equal to one another, it is best to re-evaluate the costs and benefits identified and revise the cost benefit analysis. Often times, items are missed or incorrectly quantified, which are common errors in a cost benefit analysis.
3. If the total benefits are much greater than the total costs, one can conclude that the proposed action is potentially a worthwhile investment and should be further evaluated as a realistic opportunity.

Cost-benefit analysis: Weighing future values today

The further into the future you look when performing your analysis, the more important it is to convert your estimates of benefits over costs into today's dollars. Unfortunately, the farther you look, the less confident you can be of your estimates. For example, you may expect to reap benefits for years from a new computer system, but changing technology may make your new system obsolete after only one year.

Thus, the following two key factors influence the results of a cost-benefit analysis:

- How far into the future you look to identify benefits
- On which assumptions you base your analysis

Although you may not want to go out and design a cost-benefit analysis by yourself, you definitely want to see whether your project already has one and, if it does, what the specific results of that analysis were.



Net present value (NPV)

Net present value (NPV) is a method used to determine the current value of all future cash flows generated by a project, including the initial capital investment. It is widely used in capital budgeting to establish which projects are likely to turn the greatest profit.

The NPV is based on the following two premises:

- **Inflation:** The purchasing power of a dollar will be less one year from now than it is today. If the rate of inflation is 3 percent for the next 12 months, \$1 today will be worth 97 cents just 12 months from today. In other words, 12 months from now, you'll pay \$1 to buy what you paid 97 cents for today.
- **Lost return on investment:** If you spend money to perform the project being considered, you'll forego the future income you could earn by investing it conservatively today. For example, if you put \$1 in a bank and receive simple interest at the rate of 3 percent compounded annually, 12 months from today you'll have \$1.03 (assuming zero-percent inflation).

The formula for NPV varies depending on the number and consistency of future cash flows. If there's one cash flow from a project that will be paid one year from now, the net present value is calculated as follows:

$$NPV = \frac{\text{Cash Flow}}{(1 + i)^t} - \text{initial investment}$$

In this equation:

i = Required return or discount rate

t = Number of time periods

If a longer-term project with multiple cash flows is being analysed, the formula for the net present value of a project is:

$$NPV = \sum_{t=0}^n \left(\frac{R_t}{(1+i)^t} \right)$$

In this equation:

R_t = net cash inflow-outflows during a single period t

i = discount rate or return that could be earned in alternative investments

t = number of time periods

If you are unfamiliar with summation notation, here is an easier way to remember the concept of NPV:

$NPV = (\text{Today's value of the expected cash flows}) - (\text{Today's value of invested cash})$

Many projects generate revenue at varying rates over time. In this case, the formula for NPV can be broken out for each cash flow individually. For example, imagine a project that costs \$1,000 and will provide 3 cash flows of \$500, \$300, and \$800 over the next three years. Assume that there is no salvage value at the end of the project and the required rate of return is 8%. The NPV of the project is calculated as follows:

$$NPV (\$355.23) = \left(\frac{\$500}{(1+8\%)^1} \right) + \left(\frac{\$300}{(1+8\%)^2} \right) + \left(\frac{\$800}{(1+8\%)^3} \right) - \$1,000$$

The required rate of return is used as the discount rate for future cash flows to account for the time value of money. A dollar today is worth more than a dollar tomorrow because a dollar can be put to use earning a return. Therefore, when calculating the present value of future income, cash flows that will be earned in the future must be reduced to account for the delay.

NPV is used in capital budgeting to compare projects based on their expected rates of return, required investment, and anticipated revenue over time. Typically, projects with the highest NPV are pursued. For example, consider two potential projects for company ABC:

Project X requires an initial investment of \$35,000 but is expected to generate revenues of \$10,000, \$27,000 and \$19,000 for the first, second, and third years, respectively. The target rate of return is 12%. Since the cash inflows are uneven, the NPV formula is broken out by individual cash flows.

$$\text{NPV of Project - X} = \left(\frac{\$10,000}{(1 + 12\%)^1} \right) + \left(\frac{\$27,000}{(1 + 12\%)^2} \right) + \left(\frac{\$19,000}{(1 + 12\%)^3} \right) - \$35,000$$

Project Y also requires a \$35,000 initial investment and will generate \$27,000 per year for two years. The target rate remains 12%. Because each period produces equal revenues, the first formula above can be used.

$$\text{NPV of Project - Y} = \left(\frac{\$27,000}{(1 + 12\%)^1} \right) + \left(\frac{\$27,000}{(1 + 12\%)^2} \right) - \$35,000$$

Both projects require the same initial investment, but Project X generates more total income than Project Y. However, Project Y has a higher NPV because income is generated faster (meaning the discount rate has a smaller effect).

How to Calculate Net Present Value (NPV) Summary

Net present value discounts all the future cash flows from a project and subtracts its required investment. The analysis is used in capital budgeting to determine if a project should be undertaken when compared to alternative uses of capital or other projects.

Start With Estimates and Projected Budget¹⁵

Having accurate project estimates and a robust project budget is necessary to deliver within the project budget. Both Estimating Costs and Determining Budget are project planning processes. Without keeping an eye on the actual costs while the project is being implemented, the project will most likely never be delivered on-budget. There are several techniques as stated in the PMBOK used to monitor and control the cost of a project, each of which is discussed below:

- Earned Value Management
- Forecasting
- To-Complete Performance Index (TCPI)
- Variance Analysis
- Performance Reviews

Earned Value Management or Analysis

Dwivedi, U. (2018). *Project Smart*. Retrieved from <https://www.projectsmart.co.uk/earned-value-management-explained.php>

Earned Value Management (EVM) helps project managers to measure project performance. It is a systematic project management process used to find variances in projects based on the comparison of work performed and work planned. EVM is used on the cost and schedule control and can be very useful in project forecasting. The project baseline is an essential component of EVM and serves as a reference point for all EVM related activities. EVM provides quantitative data for project decision making.

EVM Rewards and Recognition

According to the NASA Headquarters Library, the first version of Earned Value Management (EVM) was developed by the Defence Department (DoD) to track its programs in 1967. Since 2005, EVM has been a part of general federal project risk management. Today EVM is a mandatory requirement of the US government. The Office of Management and Budget (OMB) promotes use of EVM as a preferred performance-based management system to manage software projects. EVM is also used in the private sector by companies in a variety of industries, consulting firms and educational establishments.

Earned Value Management (EVM) is a mathematical method by which you can measure the actual performance of a project. You will use EVM to monitor your project in terms of schedule and cost. For example, suppose your project is on track as per the schedule. Through EVM, you **will be able to understand whether the project is also on-budget**. If it is not, you can take corrective action. EVM principles can be extended to Forecasting, TCPI, and Variance Analysis. EVM is an input to project performance reviews. Therefore, it is critical for you to understand EVM formulae so that you can use them as inputs to other cost control techniques.

Forecasting

EVM provides formulae to forecast the future performance of a project. The forecast is based on the current actual performance. **As a project manager, having the ability to tell whether your project will be delivered on-time and on-budget is critical**. Let's take an example to understand this.

¹⁵ Source: Bright Hub Project Management, as at <http://www.brighthubpm.com/monitoring-projects/57317-tools-used-to-monitor-and-control-costs-in-projects/>, as on 28th October, 2016.

Suppose you have completed 25 percent of your project. As per the schedule you are on track. However, after completing 50 percent of the project, you realise your project is delayed. By using forecasting formulae, you can determine the degree of delay. This will also enable you to investigate the cause of delay and the corrective action, such as [Crashing](#), required to get the project back on track. In addition, to the schedule delay you can use EVM Forecasting formulae to determine the actual cost of the project on completion and take measures to rectify any anomaly before it is too late.

EVM Measures

EVM consists of the following primary and derived data elements. Each data point value is based on the time or date an EVM measure is performed on the project.

Primary Data Points

- Budget At Completion (BAC)
- Total cost of the project
- Budgeted Cost for Work Scheduled (BCWS) / Planned Value (PV)
- The amount expressed in Pounds (or hours) of work to be performed as per the schedule plan
- $PV = BAC * \% \text{ of planned work}$
- Budgeted Cost for Work Performed (BCWP) / Earned Value (EV)
- The amount expressed in Pounds (or hours) on the actual worked performed
- $EV = BAC * \% \text{ of Actual work}$
- Actual Cost of Work Performed (ACWP) / Actual Cost (AC)
- The sum of all costs (in Pounds) actually accrued for a task to date

For example say we should have completed £800 pounds of work by today. We completed £600 worth of work. The BCWP is £600. The BCWS is £800. And if we actually paid £700 then (ACWP) = £700.

Derived Data Points

Cost Forecasting:

- Estimate At Completion (EAC)
- The expected TOTAL cost required to finish complete work
- $EAC = BAC / CPI$
 - o $= AC + ETC$
 - o $= AC + ((BAC - EV) / CPI)$ (typical case)
 - o $= AC + (BAC - EV)$ (atypical case)

Here atypical means it is assumed that similar variances will not occur in the future.

- Estimate to complete (ETC)
- The expected cost required to finish all the REMAINING work
- $ETC = EAC - AC$
 - o $= (BAC / CPI) - (EV/CPI)$
 - o $= (BAC - EV) / CPI$

Variances:

- Cost Variances (CV)
- How much under or over budget
- $CV = EV - AC$
- NEGATIVE is over budget, POSITIVE is under budget
- Schedule Variances (SV)
- How much ahead or behind schedule
- $SV = EV - PV$
- NEGATIVE is behind schedule, POSITIVE is ahead of schedule
- Variance At Completion (VAC)
- Variance of TOTAL cost of the work and expected cost
- $VAC = BAC - EAC$

Performance Indices:

- Cost Performance Index
- $CPI = EV / AC$
- Over (< 1) or under (> 1) budget
- Schedule Performance Index
- $SPI = EV / PV$
- Ahead (> 1) or behind (< 1) schedule

EVM Example

The best way to understand an EVM example is to solve it.

Problem: A project has a budget of £10M and schedule for 10 months. It is assumed that the total budget will be spent equally each month until the 10th month is reached. After 2 months the project manager finds that only 5% of the work is finished and a total of £1M spent.

Solution:

$$PV = £2M$$

$$EV = £10M * 0.05 = £0.5M$$

$$AV = £1M$$

$$CV = EV - AC = 0.5 - 1 = -0.5M$$

$$CV\% = 100 * (CV/EV) = 100 * (-0.5/0.5) = -100\% \text{ overrun}$$

$$SV = EV - PV = 0.5 - 2 = -1.5 \text{ months}$$

$$SV\% = 100 * (SV/PV) = 100 * (-1.5/2) = -75\% \text{ behind}$$

$$CPI = EV/AC = 0.5/1 = 0.5$$

$$SPI = EV/PV = 0.5/2 = 0.25$$

$$EAC = BAC/CPI = 10/0.5 = £20M$$

$$ETC = (BAC - EV) / CPI = (10 - 0.5)/0.5 = £19M$$

$$\text{Time to compete} = (10 - 0.5)/0.25 = 38 \text{ Months}$$

This project will take TOTAL £20M (19+1) and 40 (38+2) Months to complete.

EVM Benefits

EVM contributes to:

- Preventing scope creep
- Improving communication and visibility with stakeholders
- Reducing risk
- Profitability analysis
- Project forecasting
- Better accountability
- Performance tracking

To-Complete Performance Index (TCPI)

If the project is delayed or over-budget, you can **use TCPI to determine the project performance required to complete the project as budgeted or estimated**. TCPI also leverages the EVM formulae.

Variance Analysis

Variance analysis is the comparison of expected project performance to the actual cost performance. This analysis helps you understand the causes of variance, if any. Preventative and corrective actions are determined based on the variance analysis.

Performance Review

Performance reviews in projects are required to check the health of a project. This usually involves Cost and Schedule as the main parameters to assess. However, other parameters, such as Scope, Quality, and Team Morale may be used. **Reviews may include the client, Product Owner or other Project Managers.**

Tip: In Agile project management, you should evaluate your project's performance at the end of every iteration, assuming an iteration is less than two weeks long. The length of an iteration is critical in Agile projects.

Project Costs Measurement

This part of the Cost Management Plan describes the procedure for measuring the project cost. **Earned Value Management** is a useful tool that is used globally for the measurement and control of the costs in a project. The following metrics concerning Earned Value Management will be utilised for the measurement of project cost performance:

- Cost Variance (CV)
- Cost Performance Index (CPI)
- Schedule Variance (SV)
- Schedule Performance Index (SPI)

Detailed procedure should be mentioned in this section, including the measurements that will be captured and analysed. If any software is to be used then it should be mentioned, including its

installation and training for the users of this application. This section will also describe if the cost performance will be reviewed with reference to work packages, time, or schedule of activities. These measurements will provide adequate status of the project cost performance for efficient control and management.

- **Cost Variance (CV):** It is a measurement that determines the project budget performance, and can be measured at any stage of the project. CV is the difference of Earned Value (EV) and the Actual Costs (AC). EV represents the budgeted cost of an activity, and is the real value achieved for the project. AC is the amount actually spent for the completion of that activity. CV will indicate if the cost performance is below, equal to, or above the planned budget at any stage of the project. If value of CV is zero, then it implies that the project cost performance is the same as was planned, and the project is on budget. If value of CV is greater than zero, then it is a good indicator representing that more is being earned by the project than was planned and the project is under budget. If CV is less than zero, then the cost performance is not good, and needs to be analysed for remedial action. The project in this situation is earning less than what was planned, and the project is over budget.
- **Cost Performance Index (CPI) :** It measures the value of the completed work, comparing the actual cost incurred for the completion of that work. CPI is determined by dividing EV by AC, EV/AC . If the value of CPI is 1, then the project is precisely on budget. If the value of CPI is greater than 1, then it is a good indicator for the project cost performance and the project is under budget. If CV is less than 1, then the project is over budget and corrective actions are necessary.
- **Schedule Variance (SV):** It is a measurement that indicates the project schedule performance. It is calculated by subtracting the Planned Value (PV) from the Earned Value (EV), and the formula is $SV = EV - PV$. Since EV is the real value earned at any stage of the project, and PV is the value that was planned at that stage, then SV will indicate the variance, whether the project is behind or ahead of the schedule baseline, or on schedule. If SV is greater than zero, then the project performance is good, it is earning more value than that was planned and project is ahead of schedule. If value of SV is less than zero, this indicates the project schedule performance is not satisfactory and needs to be analysed for necessary remedial actions.
- **Schedule Performance Index (SPI) :** It signifies the project progress attained at any stage against the value that was planned. SPI is the ratio of EV and PV, and calculated as EV/PV . If EV is same as PV, then SPI will be 1, implying that the project schedule is on track. If the value of SPI is greater than 1, then the project schedule performance is good and the project is ahead of schedule. A well planned and controlled project should have a value of SPI close to 1. A value less than 1 indicates that the schedule performance needs to be reviewed.

If the variance of Cost Performance Index (CPI) or Schedule Performance Index (SPI) is between 0.2 and 0.3 the Project Manager will report the reasons for this status, including recommendations for improvement.

Performance Measurement	Yellow	Red
Cost Performance Index (CPI)	Between 0.8 and 0.9 or Between 1.2 and 1.3	Less than 0.8 or Greater than 1.3
Schedule Performance Index (SPI)	Between 0.8 and 0.9 or Between 1.2 and 1.3	Less than 0.8 or Greater than 1.3

Reporting

Reports regarding the project cost performance will be included in the project's fortnightly or monthly status reports which are provided to the project steering committee. The Project status report will comprise a part called "Cost Performance Management". This portion will include the Earned Value Metrics which were established in the previous part. All cost variances, which exceed the limits defined, will be communicated to all concerned, including any remedial actions planned. Change Requests which are necessitated due to project cost overruns, will be tracked in this report.

Cost Variance Response Process

This section of the Cost Management Plan defines the control thresholds for the project and what actions will be taken if the project triggers a control threshold. As a part of the response process the Project Manager typically presents options for corrective action to the Project Sponsor who will then approve an appropriate action in order to bring the project back on budget. The Project Manager may propose to increase the budget for the project, reduce scope or quality, or some other corrective action.

The thresholds for the financial control of a project may be an SPI less than 0.8, and a CPI of less than 0.9. In that instance, if the project attains any one of the thresholds, corrective action will be necessary. The Project Manager will analyse and recommend options to the Project Sponsor for remedial actions, within a specified number of business days of the occurrence of the variance. After approval by the Sponsor, the Project Manager will implement the desired course of action within three business days.

Implement and monitor agreed actions to maintain financial objectives¹⁶

Finance management is the primary attribute of any organisation. When it comes to project management, finance is a critical area of focus. The finance management team will take care of the organisation and deals with the analysis and review of the activities and the financing and determine the ability to create value for the company and its shareholders.

Factors that make Project Finance Management important

The financial analysis involves several key issues to ensure the prosperity of the company. Therefore, all the companies have a finance management team dedicated to taking care of the monetary needs and transaction.

The financial management team deals with various aspects of the business including the economic environment of the company and the growth prospects along with the degree of the competition witnessed and expected. The stakeholder relationship and production tools are also included in the team's actions.

If the monetary aspects are not taken care of in a project, then the projects will not be able to complete with the required results. It will also affect the overall growth of the company. The availability of the resources, salary of the employee, managing cost of production and sanctioning funds for the project are the important aspects the finance management team handles.

Current thinking revolving around the project management methodologies is discussing the financial aspects of the project with the prime focus on it. Therefore, the business case is receiving minimum time and effort from the project team resulting in the rushed job in the end. Investing in the correct resource and people is important to ensure the total on target delivery of the project.

In the current financial climate, the budgets and costs are being cut it is time to ensure wise investment of the available funds for the project. For achieving the desired result, it is important comprehensively to review the budget and costs involved in the project.

Project management involves planning and overseeing all aspects of a plan from start to completion. Strategic elements of a successful project plan typically relate to establishing specific parameters, assigning tasks and developing steps to implementation. It also includes developing workflow charts to track all of the elements of individual plan components and creating an oversight approach to monitoring progress.

Setting Goals

The foremost strategic objective of managing a project plan is to outline project goals. This means defining why the project is necessary and what outcomes are desired. For example, if you have a project plan for developing a new client newsletter, the goal may be to create a vehicle that helps

¹⁶ Source: Tools 4 Management, as at <https://www.tools4management.com/article/understanding-the-importance-of-project-finance-management/>, as on 28th October, 2016; Chron, as at <http://smallbusiness.chron.com/examples-strategic-objectives-project-management-61479.html>, as on 28th October, 2016.

maintain communication channels between your company and your consumers. One anticipated outcome could include maintenance of repeat business, up-selling existing customers and branding your company.

Fulfilling Goals

Once goals are established, the next strategic objective is creation of a workflow chart that details how to proceed with fulfilment of goals. This often requires a step-by-step approach. Using the same newsletter example, to fulfil the goal of creating a form of communication between business and its customers requires the action steps of designing a template and layout, creating newsletter categories and developing and editorial calendars. Subsets of individual steps may include assigning tasks, establishing timelines and designating budget expenditures.

Maintaining Oversight

Most small-business projects involve several employees working together toward a common goal. An objective of good project management is to select the right people for the project and oversee them to ensure they can effectively operate together as a team. Ask for regular progress reports and hold project group meetings on a regular basis to make sure everyone is operating with the same information.

Staying On Budget

Most small-business budgets are finite in nature, and significant cost overruns in project planning can be financially detrimental. Staying on budget involves diligence at the estimation point of project planning, as well as through implementation of various steps. Exceeding budget can potentially force elimination of certain key elements of the project or endanger the project altogether.

Meeting Deadlines

A project with numerous components stays on track with carefully selected deadlines for various phases of the project. Meeting deadlines during the completion of a project plan is essential to keeping your small business on track. Anything that delays the project's timetable has the potential to negatively impact the viability of the project. Diligence and oversight on behalf of a project manager can ensure that project planning tasks stay on budget.

Project accounting¹⁷

Project accounting (sometimes referred to as **job cost accounting**) is the practice of creating financial reports specifically designed to track the financial progress of projects, which can then be used by managers to aid project management.

Standard accounting is primarily aimed at monitoring financial progress of organisational elements (geographical or functional departments, divisions and the enterprise as a whole) over defined time periods (weeks, months, quarters and years).

¹⁷ Source: Wikipedia, as at https://en.wikipedia.org/wiki/Project_accounting, as on 28th October, 2016.

Projects differ in that they frequently cross organisational boundaries, may last for anything from a few days or weeks to a number of years, during which time budgets may also be revised many times. They may also be one of a number of projects that make up a larger overall project or program.

Consequently, in a project management environment costs (both direct and overhead) and revenues are also allocated to projects, which may be subdivided into a work breakdown structure, and grouped together into project hierarchies. Project accounting permits reporting at any such level that has been defined, and often allows comparison with historical as well as current budgets.

Project accounting is commonly used by government contractors, where the ability to account for costs by contract (and sometimes contract line item, or CLIN) is usually a requirement for interim payments.

Percentage-of-completion is frequently independently assessed by a project manager. It includes the continuous recognition of revenues and income related to longer-term projects. By doing this, the seller is able to identify some gain or loss relevant to a project in every accounting period that is ongoing active. Funding advances and actual-to-budget cost variances are calculated using the project budget adjusted to percent-of-completion.

Where labour costs are a significant portion of overall project cost, it is usually necessary for employees to fill out a timesheet in order to generate the data to allocate project costs.

The capital budget processes of corporations and governments are chiefly concerned with major investment projects that typically have upfront costs and longer term benefits. Investment go / no-go decisions are largely based on net present value assessments. Project accounting of the costs and benefits can provide crucially important feedback on the quality of these important decisions.

An interesting specialised form of project accounting is production accounting, which tracks the costs of individual movie and television episode film production costs. A movie studio will employ production accounting to track the costs of its many separate projects.

Percentage of Completion Method

The percentage-of-completion method permits companies to record profits as development is made toward the finishing of the project. This method is not to be used when compelling uncertainties about the percentage of completion of the remaining costs to be incurred. The method instead works at its finest when it is rationally likely to estimate the stages of the project in process.

The percentage-of-completion may be measured in any of the resulting ways:

Cost-to-cost method: This is an example of the contract cost acquired to date the total expected cost. The price of the products already bought for a contract however have not yet been installed should not be added in the perseverance of the percentage of completion of a project, not unless they were particularly created for the contract. Also, assign the cost of equipment over the contract course, rather than direct, unless title to the supplies is being transported to the customer.

Efforts-expended method: This is the share of effort consumed to date in comparison to the total effort expected for the agreement. E.g. the percentage of completion may possibly be established on direct work hours, machine hours, or material size.

Units-of-delivery-method: This is the portion of units delivered to the buyer to the overall number of units to be brought under the terms of a contract. It should only be in use when the builder produces a number of units to the requirements of a buyer. The recognition is established on:

- For revenue, the contract price of units delivered
- For expenses, the costs reasonably allocable to the units delivered

However, the necessary steps are the following:

1. Subtract the total predicted contract costs from total approximated revenues to appear at the total estimated gross margin.
2. Measure the range of process toward completion, using one of the methods mentioned above.
3. Increase the total likely contract revenue by the estimated finishing percentage to arrive at the total amount of revenue that can be acknowledged.
4. Subtract the contract revenue allowed to date through the foregoing period from the complete amount of revenue that be accepted. Recognise the development in the current accounting period.
5. Consider the cost of the received revenue in the same manner. This means raising the same percentage of completion by the total supposed contract cost, and subtracting the amount formerly realised to arrive at the cost of collected revenue to be recognised in the current accounting period.

Calculations

The following calculation is used to determine the completion percentage:

Percent Complete = Cost Incurred to Date / Total Cost Estimate

The current period revenue to be recognised during production would then be:

Current Period Revenue = (Percent Complete x Total Contract Revenue) - Revenue Recognised in Prior Periods

Production Accounting

Production Accounting involves the person who is essential in the film industry to manage the finances and financial records during the film production. Working in this position requires being in close association with the producer and the production office for the development of the film budget and to arrange schedules. Further into this role, as the accountant for a film, day-to-day duties are expected such as the normal accounting tasks of an office and maintaining the budget by recording the expenses accumulated to make sure they do not go over the allocated budget.

Other duties the production accountant would perform include:

- Managing the payroll
- Managing the petty cash
- Analysing costs
- Provide weekly cash reports

- Estimating future costs

Financial Accounting

Financial Accounting is a functional branch of accounting that keeps record of the company's financial activity. Using standardised guidelines, the transactions are undertaken, summarised, and given in a financial report or statement such as an income statement or balance sheet.

Financial accounting creates the following general-purpose, external, financial statements:

1. Income statement - Reports a company's advantage during a certain period of time.
2. Balance sheet - Separated into three sections: (1) assets: reports the company's assets such as cash and accounts. (2) liabilities: reports the company's duties. These are the obligations due towards the end of the balance sheet. (3) stockholders': the difference between assets and liabilities.
3. Statement of cash flows - Reveals the change in a company's cash and equivalents that have change due to movement.
4. Statement of stockholders' equity - Lists the alteration in stockholders' equity for the same duration as both the income and cash flow statement.

Managing Finances¹⁸

Step 1: Set the Budget

The first step towards managing your project finances is to set a budget. This isn't as easy as it sounds. You need to forecast the total amount of people, equipment, materials and other expenses, needed to deliver the project. You then need to work out when in the project plan, these expenses will take place. By doing this, you can get a picture of your "project cash flow" which tells you the amount of money you need for every week in the project.

Step 2: Backup Funding

Before you need it, find backup funding in the business. This is additional funding that can be used to deliver your project, if you need it. Few Project Managers actually do this in advance, but if you have almost completed a major deliverable and you suddenly run out of money, then that backup funding might "make or break" the project. You are always in a better position to get backup funding before you need it, rather than asking for more cash when you've already overspent. Get backup funding as early in the Project Life Cycle as possible. It will be sure to reduce your stress.

Step 3: Weekly Tracking

The next step after setting your budget and securing backup funding is to start tracking your daily spend on the project. You need to track every expense that occurs. Ask your team to complete expense forms and submit them to you for approval. If you can get your team to wait until you have approved an expense before it is incurred, then you can more easily control expenditure on the project. Next, you need to track your people expenses. This is easy in ProjectManager.com because

¹⁸ Source: Method 123, as at <http://blog.method123.com/2009/04/29/financial-plan-template/>, as on 28th October, 2016.

every person is assigned an hourly rate. The total cost of the hours undertaken by those people is automatically shown on the Project Dashboard, so you can see whether your people cost is under or over budget.

Step 4: Realignment

When you start spending more than your budget, you have 3 options available to help you stay within budget:

1. Re-forecast your expenses and present a new budget to your Sponsor for approval.
2. Start reducing costs immediately. This means spending less to get the same job done. Or alternatively, see if your Sponsor will agree to a reduced scope, so that you have less to produce for them.
3. Start using your backup funding to get you through the crux of the project.

Step 5: Cashflow Management

Make sure you always have enough funds available to cover your spending over the months ahead. Cashflow management is about managing the cash needed to deliver your project. So make sure your Sponsor has approved the next 1-2 months of work ahead of time, and that the funds needed to manage the project have been made available. Then track the spending of that funding every week.

Guidelines for Successful Project Financial Management

Here are important steps to achieve project financial management successfully:

1. Provide sufficient time to create accurate feasibility studies instead of rushing the job when it is a new project. Otherwise, it will result in overspends at the end.
2. Project portfolio must be reviewed for identifying the positive and the negative aspects of the project. Finding out the importance of a project and if they are correct and they are adding value to a robust business case and for the future benefit of the firm. There should not be any political reasons for carrying out the project which will impact negatively on the company in the future.
3. Concentrating on the costs, as well as the benefits, is valuable in the progress of the project. In most cases, there is no review of the promised and delivered result of the project. Therefore, it is important to concentrate on the project and continuously check on the costs included in the budget that changes the project and not altered in the benefits of the project.
4. Cutting the costs of the project is not the best answer to the issue when it comes to the investment. Allocating resources that adds value to the project is critical in the current trend of leaving the projects in flight without having right amount of resources that in turn affects the project in a negative way. Instead, it is beneficial to review the project ad spend as required and focus on the aspect of adding the value to the project.
5. Skill is an important tool for the success of any project. Workforce development should be one of the main aspects the company is focusing. The workforce must be knowledgeable about financial management especially the non-finance manager who is in charge of a large project. It is not a wise decision to leave the financial management to chance. Therefore development of the workforce is critical.

6. Breaking down the financial aspects of the project into manageable sections can help in handling the finances better. Treating the budget of the project like a pot of cash which is accessible for any requirement in the project leading to the shortage of budget is one of the main problem that can be avoided using this technique. The manageable sections can be mapped to the project structure that will help in understanding the workstream and their spending characteristics such as over spending and under spending.
7. Too many accounting managers may lead to budget overspend. Following the above information, the overall budget must be under direct control of the project manager. Each head of the project must be in control of their allocated amount of the budget. The setup of one point of contact accounting will result in better handling of the budget and completion of the project in the expected result.
8. Delivering meaningful and focused financial report is critical to enable perfect decision-making. The report must start with minimum and continuously improve from the start to the end of the project needs that has to be managed through the program of the work. The reporting containing exact and meaningful information will reduce the time required for making the right decision. Therefore, the report must be minimum in length and maximum in information.
9. Communication has a higher potential to make the relationship between the project and the financial managers of the project. The finance management must be kept inside the project groups, and it should not be back office affair. Finance management must be part of the project and actively participating in the progress of the project. Honest communication is achieved through the method of involving the finance managers in the project.
10. The finance management must be kept aware of the potential risks and the probable cost. It will ensure they will handle the issues when it comes to finances in the situation of the financial crisis. Early warning and awareness play a significant role in managing the finances and the progress of the project in a positive manner.

Without project management, it is impossible to handle the fluctuation in the finance of the project. Every project must be ready to face the financial ups and downs well ahead of their occurrence.

Provide accurate and timely financial reports¹⁹

Cash-flow forecasting is another element of business practice that may be applied to organisations.

Once annual budgets are decided and allocated, the organisation needs to have systems in place to monitor performance. The complexity of arrangements for monitoring the budget will depend on the size of the organisation and the availability of administrative staff and appropriate systems. The following guidance on best practice as to basic processes applies to organisations of all sizes.

The main purpose of some kind of budget-monitoring system is to evaluate actual results against approved budgets to guide current and future decision-making and to provide managers with relevant information so that they are more accountable for performance.

¹⁹ Source: World Meteorological Organisation, as at <https://www.wmo.int/pages/prog/dra/eguides/index.php/en/10-financial-management/10-5-budget-monitoring-and-reporting>, as on 28th October, 2016; Chron, as at <http://smallbusiness.chron.com/write-accounting-report-74432.html>, as on 28th October, 2016.

Key processes to manage approved budgets effectively include:

- Monitoring and reporting against internal budgets on a consistent and regular basis to assess whether targets are being met;
- Revising the internal budget through a coordinated process;
- Forecasting to manage gaps between budget estimates and actual results in order to identify quickly, and respond to, changes in the external environment or internal activities;
- Reviewing and improving internal budget processes by monitoring the accuracy and timeliness of budget processes to identify areas for improvement.

To measure budget performance, the organisation needs to monitor the extent to which budget estimates match actual results. This helps ensure financial control and identify where change is required. Monitoring budget accuracy is the responsibility of all managers.

Effective monitoring of budget performance requires that managers be provided with relevant, timely and accurate information appropriate to their level of responsibility. It also requires managers to provide feedback in a timely manner about underlying causes and effects of budget variations, as well as planned actions to manage variations.

Ideally, the finance area of the organisation will provide monthly reports to show actual results against budget. They will consult with the line managers responsible for spending and identify reasons for variations. The situation for the whole organisation should then be reviewed by senior management and the results of that review made available to all managers. The effectiveness of internal financial reporting is likely to be enhanced when reports are prepared for each level of budget accountability and summarised appropriately for each level of management. When output and organisational accountabilities differ (for example, where a manager has both branch and output responsibilities), budget-to-actual financial reports should be designed to enable the assessment of budget accuracy against both accountabilities.

The budget-monitoring process allows the organisation to keep track of capital expenditure and development projects. This can help identify project variations, such as cost overruns or delays in key milestones and enable early corrective action. Routine reporting of detailed information on individual projects, such as milestones, percentage of completion and phasing of total projected costs, provides decision-makers with useful information on current and future impacts of project activity.

Financial statements allow accountants to periodically report on the financial health of a company. However, numbers have little value without context and analysis. An accounting report is an opportunity to translate accounting information into an easily readable format. Accounting reports can discuss the financial results of certain departments, products, operations or the company as a whole. When crafting an accounting report, understand the audience you are writing for. Accounting reports can be written for business owners, managers, current lenders or potential investors.

Readers need context to understand financial results. The writer should lead an accounting report with a summary of the subject area. This can include business operations, industry changes, new strategies and competitive advantages. If the readers are not versed in accounting and finance, the writer should define any complex financial terms used in the report. The overview is an opportunity to define the objective of the report and identify the time period being examined.

Results

This is the writer's opportunity to dig into the meat of the accounting data. Financial data should be presented in terms of financial ratios and trend percentages with reference to supporting financial statements. Financial statements are extremely detailed, and this is the writer's opportunity to highlight what is important. Discuss a handful of significant financial changes during the time period. It's also useful to compare actual results to projections to determine positive and negative financial variances

Analysis

Accounting reports not only highlight important financial information but help the reader understand the reasons for the results. Isolate significant company events that could have affected financial results. Did the company change its product line? Was there a total software overhaul? This is the time to draw correlations and offer your professional opinion on what the results mean to the company. However, don't feel pressured to ferret out the reason for every change. The business owners and executives reading the report typically have a wider breadth of knowledge regarding operations and will incorporate their own conjecture.

Recommendations

In the final section of an accounting report, summarise findings and offer recommendations for the future. The writer could recommend a re-evaluation of the product mix or a suggestion to investigate rising costs in certain operational areas. If you were unable to obtain any important information or ran into problems analysing the data, mention it to the reader so that he can incorporate it in his follow-up plan.

Monthly Reports²⁰

Monthly reports are used by project managers and program directors to inform supervisors of the progress of projects. The reports are based on one calendar month and are usually turned in within a week after the month ends. A report typically consists of one or two pages of easily digestible information.

²⁰ Source: Reference, as at <https://www.reference.com/business-finance/write-monthly-report-c59a02a33153b37d>, as on 28th October, 2016.



Writing a monthly report starts with placing identifiable information at the top of the page. This includes the name of the project; the department where the project is based; the intended beginning and end dates and the overall goal of the project. This section also includes the name of the person writing the report, the date the report is written and the month it focuses on.

Step Two involves listing the names of those on the project team along with their specific roles. The hours spent by each team member are listed, explained and recorded next to their names. In Step Three, a brief introduction details the scope of the project, serving as a helpful reminder to the supervisor.

Any progress made over the course of the month is then stated in Step Four, which compares the progress to the original schedule created at the beginning of the project. Notations identify whether or not the team is reaching present deadlines. If it is not, recommendations are made on how to keep the project moving forward.

Step Five is to outline tasks performed by the team that month, limiting the list to the major and important tasks. Step Six provides a review of problems or issues that the team faced throughout the month, and it offers solutions and recommendations where applicable.

Finally, any documentation that supports the information in the report is added. This includes statistical data, budget information or a summary of the research conducted.

Conduct appropriate activities to signify financial completion²¹

Project closure is the final phase of a project lifecycle. During this phase, the project manager is responsible for identifying and recording the outcomes of all objectives, and getting customer sign-off on all facets of the project.

Dividing the project closure into a series of more manageable tasks aids the process of closing. These tasks can be delegated where necessary and more easily tracked. With a plan in place, all activities related to project closure will naturally draw to a satisfactory end-point.

Here we look at the elements involved in finalising project costs.

The project closure report

The project manager should write a closure report that includes all relevant information including cost management details, lessons learned, and sub-contract closures. Project records will need to be collected and collated. This report should confirm that:

- The project has met all customer expectations
- All deliverables have been delivered and accepted
- All project contracts have been finalised and closed

Finalise project deliverables

Client sign-off must be obtained as to the delivery of all final project deliverables. It is at this point that the client agrees the project may be closed, and as such should be the first step in the project closure process.

Closing contracts

When closing contracts, the project manager will need to verify that all work has been completed satisfactorily with contracts updated to reflect findings. Contract closure can only take place when it has been confirmed that the project has addressed contract terms and conditions and all exit criteria have been met.

Financial reconciliation

The credits and debits associated with the project and all sub-tasks must be agreed, with all revenues collated and accepted.

Transferring knowledge

The post-project review will include recording project history, documenting planned and actual budget outcomes and baseline and actual schedules, and detailing lessons learned. Successes and failures should be identified, and these used later to recommend best practices going forward.

²¹ Source: Your Project Manager, as at <http://yourprojectmanager.com.au/finalising-project-costs-key-elements-progression-project-closure/>, as on 28th October, 2016.

Summing up

Even though it is the last phase in the project lifecycle, project closure should be anticipated and planned well in advance. Attention must be paid to the essential elements involved in project closure:

- Verify with the client acceptance of all project deliverables
- Conduct post-project analysis and capture lessons learned
- Reconciliation of project finances
- Ensure all project revenues are received

Review project outcomes using available records to determine effectiveness of project cost management²²

Before the team is dissolved and begins to focus on the next project, a review is conducted to capture the lessons that can be learned from this project, often called a **lessons-learned meeting** or document. The team explores what went well and captures the processes to understand why they went well. The team asks if the process is transferable to other projects. The team also explores what did not go well and what people learned from the experience. The process is not to find blame, but to learn.

Quality management is a process of continual improvement that includes learning from past projects and making changes to improve the next project. This process is documented as evidence that quality management practices are in use. Some organisations have formal processes for changing work processes and integrating the lessons learned from the project so other projects can benefit. Some organisations are less formal in the approach and expect individuals to learn from the experience and take the experience to their next project and share what they learned with others in an informal way. Whatever type of approach is used, the following elements should be evaluated and the results summarised in reports for external and internal use.

Trust and Alignment Effectiveness

The project leadership reviews the effect of trust—or lack of trust—on the project and the effectiveness of alignment meetings at building trust. The team determines which problems might have been foreseen and mitigated and which ones could not have been reasonably predicted. What were the cues that were missed by the team that indicated a problem was emerging? What could the team have done to better predict and prevent trust issues?

Schedule and Budget Management

The original schedule of activities and the network diagram are compared to the actual schedule of events. Events that caused changes to the schedule are reviewed to see how the use of contingency reserves and float mitigated the disruption caused by those events. The original estimates of contingency time are reviewed to determine if they were adequate and if the estimates of duration and float were accurate. These activities are necessary for the project team to develop expertise in estimating schedule elements in future projects—they are not used to place blame.

²² Source: BC Open Textbooks, as at <https://opentextbc.ca/projectmanagement/chapter/chapter-18-project-completion-project-management/>, as on 29th October, 2016.

A review of budget estimates for the cost of work scheduled is compared to the actual costs. If the estimates are frequently different from the actual costs, the choice of estimating method is reviewed.

Risk Mitigation

After the project is finished, the estimates of risk can be reviewed and compared to the events that actually took place. Did events occur that were unforeseen? What cues existed that may have allowed the team to predict these events? Was the project contingency sufficient to cover unforeseen risks? Even if nothing went wrong on this project, it is not proof that risk mitigation was a waste of money, but it is useful to compare the cost of avoiding risk versus the cost of unexpected events to understand how much it cost to avoid risk.

Procurement Contracts

The performance of suppliers and vendors is reviewed to determine if they should still be included in the list of qualified suppliers or vendors. The choice of contract for each is reviewed to determine if the decision to share risk was justified and if the choice of incentives worked.

Customer Satisfaction

Relationships with the client are reviewed and decisions about including the client in project decisions and alignment meetings are discussed. The client is given the opportunity to express satisfaction and identify areas in which project communication and other factors could be improved. Often a senior manager from the organisation interviews the client to develop feedback on the project team performance.

A general report that provides an overview of the project is created to provide stakeholders with a summary of the project. The report includes the original goals and objectives and statements that show how the project met those goals and objectives. Performance on the schedule and budget are summarised and an assessment of client satisfaction is provided. A version of this report can be provided to the client as a stakeholder and as another means for deriving feedback.

Senior Management

The report to senior management contains all the information provided to the stakeholders in a short executive summary. The report identifies practices and processes that could be improved or lessons that were learned that could be useful on future projects.



Review cost-management issues and document improvements

The Cost of Bad Project Management²³

Projects often fail because organisations put more emphasis on rational factors than on employees' psychological engagement -- and the cost to organisations is enormous

When it comes to project management, most organisations put their practices before their people. They place more emphasis on rational factors -- the process itself -- and less on emotional drivers that could lead to project excellence -- like their employees' engagement with the project and company.

Large projects, especially those in the IT sectors, have a poor record.

But forcing team members to adapt to project management processes and procedures makes it more likely that the project will fail. The resulting cost from bad project management is reaching astronomical levels. It represents a significant waste of money, and it poses a threat to organisations that rely on the success of large-scale projects.

²³ Source: Gallup, as at <http://www.gallup.com/businessjournal/152429/cost-bad-project-management.aspx>, as on 29th October, 2016; Aspire Learning, as at https://aspirelr.com.au/assets/document/1340852654-bsbpmg504a_sample.pdf, as on 29th October, 2016.

Gallup's behavioural economics research suggests a different, more powerful approach: behaviour-based project management. This approach enables project groups to gain higher levels of emotional commitment and performance from their team members -- and increased levels of emotional involvement from stakeholders -- in a way that improves both engagement and performance.

Behaviour-based project management applies the principles of behavioural economics to manage an organisation's emotional economy. More importantly, it uses scientific research on human nature and the workplace to develop more effective project teams and to enable better project delivery.

The high cost of failure

Project management is integral to the business world. Milestones, kickoff meetings, deliverables, stakeholders, Gantt charts, and work plans constitute the everyday world of most managers, whether they are called "project managers" or not. Given the vast experience organisations have with project management, it's reasonable to wonder why all projects aren't completed on time, on scope, and under budget.

Yet large projects, especially those in the information technology sectors, have a poor record. Multiple studies show that a significant share of projects overrun their original timelines or are never completed. A study by PricewaterhouseCoopers, which reviewed 10,640 projects from 200 companies in 30 countries and across various industries, found that only 2.5% of the companies successfully completed 100% of their projects. A study published in the *Harvard Business Review*, which analysed 1,471 IT projects, found that the average overrun was 27%, but one in six projects had a cost overrun of 200% on average and a schedule overrun of almost 70%. And we all have heard about large construction projects -- the Channel Tunnel, Euro Disney, and Boston's "Big Dig" -- that ended up costing almost double their original estimate.

Cost and time overruns also have a profound effect on national economies. One estimate of IT failure rates is between 5% and 15%, which represents a loss of \$50 billion to \$150 billion per year in the United States. Another study estimated that IT project failures cost the European Union €142 billion in 2004.

While bad project management comes with an enormous price tag, the costs aren't always just financial. The seven deaths resulting from the Columbia Shuttle disaster have been attributed to organisational problems, including a weakened safety culture at NASA. The failure of the FBI's Virtual Case File software application cost U.S. taxpayers \$100 million and left the FBI with an antiquated system that jeopardizes its counterterrorism efforts.

What's more, it seems that this trend is here to stay. With an ever-growing need for accessible and integrated data, organisations require larger platforms to manage supply chains, customer relationships, and dozens of other crucial systems. Mega-software projects are now common in private and governmental organisations. Development is not slowing down, especially in emerging economies.

Considering the failure rate of these endeavours, a great deal of human effort and organisational resources likely will be squandered. So why haven't organisations become better at managing

projects, especially large ones in the IT sector?

Why most projects fail

A typical project management approach focuses on processes, policies, and procedures. Every task and step is described in detail by a set of rules. Many companies implement rigid processes that dictate behaviour and use statistical methods to control quality (such as total quality management, kaizen, lean management, and Six Sigma). Process guides and rulebooks support work practices, while quality control systems assess and improve these practices.

Everybody is concerned about how to do the job, not about the job's outcome.

In spite of these approaches, the rate of project failure does not seem to be decreasing. That's because current project management tools, techniques, and theories account for the *rational* components of project management, but they overlook the *emotional* components. And these emotional factors account for a large part of a project's success.

Project delivery requires quality control, scheduling, and budgeting. Yet controlling for these factors does not prevent project delays or failure. When projects fail, it usually can be traced to one or more of the following causes:

- technical (technology developed, project management techniques)
- individual (project leadership, scope management, communication)
- stakeholder (user involvement, executive buy-in, goal specificity)

Typical project management techniques such as quality control, budgeting, scheduling, and critical path analysis are good at solving the first type of problem. Their record is less impressive for solving the second and third type of problem, primarily because these techniques are less effective at managing the human, emotional, and social factors at play in individual and stakeholder problems.

Open *A Guide to the Project Management Body of Knowledge*, and you will see an array of techniques for controlling quality, risk, budget, schedule, and scope. There is a chapter on project human resources management with some keys to select, develop, and manage a team. It shows how to develop a responsibility assignment matrix to define team members' roles and a resource histogram to manage available hours. It indicates the importance of recognition and performance evaluations and suggests how to use interpersonal skills to resolve conflicts. It's all spelled out in black and white, often with charts.

None of this is wrong. But again, these techniques mainly address rational factors such as planning and controlling. They only provide more methodologies and processes and more charts and graphs, which is hardly emotionally engaging for project team members -- or project managers, for that matter.

The problem with a single-minded focus on processes and methodologies is that once people are given procedures to follow, compliance replaces results. Everybody is concerned about *how* to do the job, not about the *outcome* if the job is done well.

Companies that take this approach do so for valid reasons: They can't manage what they don't

measure. More importantly, they can't let projects run without any direction, hoping for the best. However, by relying on managing only these rational factors, organisations fail to harness the power of human nature by engaging employees' emotions.

To summarise, the rate of failure for projects has not really decreased -- and there's a reason for that. It's time to update project management not with more methodologies, but with more emotional content. Employees' and stakeholders' disengagement can make a project fail, but behaviour-based management can make projects succeed.

Managing project costs involves resolving cost-management issues that arise throughout the project. Analysing these issues and identifying potential improvements helps you develop your project management skills. It can also contribute to the continuous improvement of organisational procedures.

Reviewing cost-management issues

Cost-management issues arise during most complex projects. Some issues may be due to external factors, such as a rise in material costs or a change in project scope. Others may be related to project processes, such as how project resources were identified and estimates calculated.

The following table provides examples of cost-management issues that may arise during the course of a complex project.

Cost-management procedure	Example issue
Identifying required resources	Required resource not identified in the planning stage.
Estimating costs of required resources	Estimate too low, so insufficient budget is approved. Estimate too high, causing concerns with related approvals.
Approving expenses	Unauthorised commitments made to suppliers, requiring additional payments to be made.
Authorising expenses	Delegated authority process unclear, causing delays in payment.
Processing invoices	Delays in processing invoices causes inaccurate financial reporting.
Managing project team members	Change of personnel due to unforeseen illness caused time delays resulting in cost overruns as no back-up personnel had been identified.
Reporting information	Misalignment of reporting period and financial management system information.
Finalising costs	Project audit reveals incomplete procedures.

At the end of the project, review any cost-management issues and the actions taken to address them. The evaluation should consider:

- the root cause of the issue
- the success of actions taken during the project to address the issue
- how the issue and related actions were communicated to affected stakeholders.