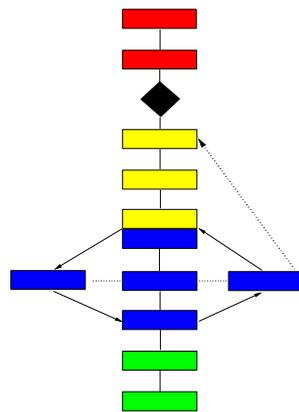


Financial Management Guide

MITP
v5.1



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PREFACE About This Document

This document describes the MITP financial management technique.

For information about the MITP life cycle, the key techniques, and the support techniques, see the MITP Handbook. A glossary of terms may be found at the back of the MITP Handbook

Who Should Read This Document

The 'you' in this document is the project manager, but other people can read it too and extract useful information from it.

How to Use This Document

The table of contents provides a clear roadmap to the main topics outlined in this document.

ISO9000 Control Information

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1 Financial Management Overview

Project Financial Management is the collection of tasks and processes necessary to ensure that a project:

- Is financially viable and prudent for your company.
- In this context, assessing financial viability means the following:
 - Is it affordable?
 - What is the risk of it going wrong?
 - Is any potential loss affordable?
 - If it goes right, will the return on our investment and other benefits be sufficiently worthwhile?
- Has effective financial controls to track performance against plan and to provide management information to enable managers to make financial or financially-based decisions about the project.

Financial Management is divided into three stages of activity:

- Financial Planning
- Financial Performance and Management
- Completion

Subtopics

- 1.1 Financial Planning
- 1.2 Financial Performance and Management
- 1.3 Completion



1.1 **Financial Planning**

Financial planning includes all the tasks necessary to ensure that, before work starts:

- A business case has been established
- The project has a financial plan and budget
- Effective financial controls are in place

Financial planning takes place during Phase 1 (Identifying the Project) and Phase 2 (Establishing the Project) of the MITP life cycle, and involves:

- The business case
- The project budget
- The financial plan.

The four main Financial Management activities for any given project are:

- Establish cost schedule
- Prepare cash-flow forecast
- Get acceptance of cost schedule and cash-flow forecast.
- Allocate funds.

1.2 **Financial Performance and Management**

Financial performance and management includes all of the tasks necessary to track, analyse and provide management information on:

- Costs
- Earned value
- Revenue.

Financial Performance and Management takes place during Phase 3 (Managing the Project) of the MITP life cycle, and encompasses the following activities related to other MITP techniques:

Progress Reviewing Agree the following:

- What financial information needs to be reviewed
- What form the reviews will take
- Criteria for assessment
- Who will be involved
- Frequency of reviews

For further information on progress reviewing, see the Progress Reviewing Guide.

Progress reporting Agree the following:

- What financial reports need to be produced
- What their format and content will be
- What method and frequency of production will be used
- Who will receive them.

For further information on progress reporting, see the Progress Tracking Guide.

1.3 Completion

Financial management completion includes all of the tasks necessary to review and report on the following:

- Client satisfaction with cost and benefits
- Effectiveness of financial control process
- Possible improvements.

Completion takes place during Phase 4 (Ending the Project) of the MITP life cycle, and involves the following activity:

- Plan for the project completion review with the client, which should include satisfaction level and cost/benefit achieved.

For further information on project completion, see the Project Completion Guide.



2 Business Case

For any project, you should:

- Develop business case
- Review business case
- Assess business case risk
- Get acceptance and approval of business case

This topic examines the background and purpose of the business case, how it is structured and developed, and what are some of the considerations when preparing one.

It is intended for anyone who has to prepare or contribute to the preparation of a business case. It does not assume that you have specialist knowledge of business finance, but does assume a general understanding of project and business management.

Subtopics

- 2.1 What Is a Business Case?
- 2.2 Why Produce a Business Case?
- 2.3 Who Will Benefit From the Business Case?
- 2.4 When to Produce a Business Case
- 2.5 How to Produce a Business Case
- 2.6 Business Case Checklist



2.1 What Is a Business Case?

In MITP, a business case is:

A formal, detailed, and documented justification for the commitment of financial, human, or physical resources to a proposed business activity.

It is important to recognize that, while all business cases need to have a similar structure and general contents, they may need to address very different business environments. The following describes a generic business case, that is, one that can be adapted to a variety of purposes.

In MITP, the business case is one of the deliverables of project endorsement, and provides the foundation for project definition, with the subsequent project plans directed towards ensuring the fulfilment of the business objectives. In a few situations some specific project planning is done in parallel with, and providing input to, the development of the business.

Business cases are not only prepared for the justification of one complete project. They can also be prepared for individual phases of a project or for specific elements, such as the acquisition of specific goods, facilities or services.

2.1.1 Basic Elements

While the specific content of individual business cases may vary considerably depending on the proposals for which they are prepared, all business cases need to address the following topics:

- Proposed solution description
- Underlying business need
- Why this solution
- Implications of doing nothing
- Other solution options
- Corporate supporters
- Benefits analysis
- Financial analysis
- Benefit management plan
- Risk analysis
- Decisions required.



2.2 Why Produce a Business Case?

Projects are undertaken for a variety of reasons and motivations, but share the following characteristics:

- Change from the status quo will result.
- Costs will be generated to effect the change.
- Expectations of benefits to the business will be created.

All too often the outcome of a project is criticized for failing to meet its business objectives. Equally often, examination reveals that the supposed business objectives were neither clearly defined nor specifically agreed.

However, the business case addresses the following questions, which will be taken into consideration by an executive making a decision about whether or not to fund a project:

- Is the proposal clearly and unambiguously stated?
- Is the business need genuine, or contrived to address someone's 'pet' scheme?
- Have alternatives been properly evaluated and described?
- Is the proposed solution the most favorable in terms of:
 - Addressing the need?
 - Cost benefit?
- How much risk is there? Is it understood and what is the likelihood of success?

Leaving out or disguising relevant information from the business case is more common than might be at first thought and, once discovered, can destroy or seriously weaken the credibility of the business case.

2.3 Who Will Benefit From the Business Case?

Business cases are primarily prepared for executives who have the authority and responsibility to approve and make decisions about the specific proposals under consideration. The business case provides a clearly defined statement on which business decisions may responsibly be made.

Note: It also provides a frame of reference for the subsequent measurement of achievement.

Business cases are also valuable to those managers and professionals involved in promoting the activity the business case addresses by requiring them to justify proposals. It forces a careful evaluation and, in so doing, can identify potential fundamental flaws and weaknesses at an early stage.

2.4 When to Produce a Business Case

The business case is produced after the project identification workshop, using material collected from discussions in the workshop



2.5 How to Produce a Business Case

The following looks at the various aspects of producing a business case for a project.

2.5.1 Origination and Sponsorship

Be certain that the foundation for the business case is solid in terms of a general business need that, if addressed effectively, will bring benefit to the business.

Find a manager with the seniority, experience, personality, and credibility to be the sponsor of the project. Often the ideal sponsor either has most to gain by the project being a success or most to lose if it goes wrong.

2.5.2 Attitude

Treat the preparation of the business case as a (small) project.

Make sure you know the scope of the business case. Make sure you know who is going to be responsible for every task and that you have an agreed timetable.

2.5.3 Contributors

It may be more appropriate to have a number of people prepare individual sections or items within the business case, particularly where the subject is complex and there is a need for specialist input.

Advisors might be better employed to write up their own subject in the business case - against a clear brief.

2.5.4 Specialist Advisors

Don't try to do it all yourself. If you have no experience of preparing a business case, find someone who has and who can offer guidance and support.

When considering alternative solutions, or ways of presenting proposals, analysis or conclusions, find people with whom you can share your ideas.

Note: The objective is to produce a credible business case that gets accepted, not to prove your personal intellectual prowess.

If aspects of your business case involve technicalities or specialist information, get people with the necessary expertise.

In all cases where you are seeking advice, make sure to explain the background fully and ensure that the person from whom you are asking for help clearly understands what you are expecting of them.

If you are going to write up the content from information supplied by others, review your draft with them to ensure you've got it right.

2.5.5 Evaluating Business Benefits

There are a number of ways in which business benefits can be categorized and evaluated, including:

- Financial
- Operational
- Tangible
- Intangible.

These are not covered in detail here. However, you are advised to ensure that the potential business benefits of the project have been identified and agreed, as success against them may well form one of the measurements of the success of the project.

2.5.6 Evaluating Business Risk

Adapt the MITP risk management technique to the context of business risk. For details, see the Risk Management Guide.

2.5.7 Decision Criteria

Be sure to establish what the decision criteria for the approval of a business are in the environment in which it is being prepared.

2.5.8 Documentation

Business cases must always be fully documented and should include all the information necessary for a business decision to be made objectively.

The document should be complete in itself and should only contain reference to other material where necessary. Such material should always be provided with the business case document.

Where documentation standards exist these should be followed, including ISO9000 standards.

2.5.9 Progress Reviews (Phase 1)

Review progress as well as content. Business cases may be required at different stages of a project. Therefore, do not assume that a single business case, prepared at the very earliest point in the life cycle of the project, will cover everything. Indeed, at the beginning there may be very little hard information on which to build a full business case. There may be an assumptive business case that is used to establish the basic need for the project. This may justify a feasibility study which, in turn, is used to build the business case for the major work of the project, and so on.



Once you have a feel for the size and shape of the business case there is nothing wrong with giving senior management an indication of what to expect. This can often be helpful in identifying potential objections or other problems before you get to the final presentation.

If a number of people have prepared material to be incorporated directly into the business case, this should be carefully reviewed and modified where appropriate to ensure as much uniformity of style as possible. A document written in a number of clearly different styles can be irritating and distract the reader from the content.

2.5.10 Outline Structure of Business Case

The business case document should broadly be structured under the following headings:

Preface Document control information

Management overview A one-page synopsis, including a background summary

Business need The requirement, situation or condition that needs to be addressed

Proposed solution Description of what is being proposed

Justification Why this solution is the most favoured option and why this is the best way of meeting the business need

State who else is supporting this and who wants the solution

Options Descriptions of the alternatives, comparing relative strengths, weaknesses, and costs

Contrast with the implications of doing nothing

Benefits An analysis of the benefits, stating what they are, and their value where this is quantifiable in terms of financial, logistical, tangible, and intangible benefits

Describe the **relative benefits** of the rejected options similarly, to show how they compare

Financial analysis The costs involved in implementing the proposed solution and comparisons with the rejected options

Benefits management How the benefits will be enforced

Measurements and controls

Incorporate into tactical and operational plans

Fixing financial, personnel, logistical, and operational **targets**

Executive ownership and review

Risk Analysis of the identified major (high impact, high probability) risks associated with the proposed solution

Decisions A clear statement of the executive decisions required if the proposal is accepted

2.5.11 Presenting the Business Case

The business case may be presented in a variety of ways. Choosing the one appropriate for a specific project is a question of judgement. Options include the following:

- Distribute the document to the decision makers and wait for a response.
- Distribute the document to the decision makers with a review date agreed.

- Present the contents to the decision makers as a group, using a visual presentation backed up with the full document for them to take away.
Agree a review date with the sponsor and a decision date, if that needs to be separate.
- Review with the sponsor first to identify final amendments and then follow up one of the other options, with the sponsor giving the presentation.

2.5.12 Progress Reviews (Phases 2-4)

Once the business case has been accepted and implemented as a project, it is important to make sure that progress against the business objectives is tracked and measured so as to measure achievement and success.

The form of progress reporting should be agreed in advance.

If it becomes apparent that the project is significantly deviating from the agreed business case, it is important that this is not just ignored. Appropriate actions include:

- Evaluating the cause of the deviation to understand the true cause.
- Recommending corrective action within the project.
- Reassessing the business case to ensure its continued validity or to propose changes to it.
- Briefing the project sponsor and the decision makers, as appropriate, to enable them to make considered business decisions about the continuance of the project.

At the end of the project, achievement against the business objectives should be evaluated and documented, either within the project completion report or separately or both.

For detailed information on tracking and reporting, see the Progress Tracking Guide.

2.5.13 Change Management

Do not assume that a business case will not change during the life of the project.

Unforeseen difficulties, changes in the business environment or new information can all contribute to changing the validity of a business case. It is therefore important that you should understand such possibilities in advance so that the need to re-evaluate a business case once the project is in progress becomes an acceptable option.

Changes to business cases should follow the general principles of change management.

For more information on change management, see the Exceptions Management Guide.



2.6 Business Case Checklist

The following provides a reminder of the key points related to the business case of a project in terms of the project phase.

2.6.1 Identifying and Establishing the Project

Most of the work on the business case is and should be done in phases 1 and 2 of the project.

Ensure you do the following:

1. Does the project sponsor accept ownership of the business case? Is he or she at the right level? Has the project sponsor the right commitment to the success or failure of the project?
2. Is the project sponsor clear about the business reasons for implementing the project?
3. Is the project sponsor clear about how far the benefits can be measured - are they tangible? Can they be quantified?
4. Does a business case already exist? Are the criteria still valid?
5. Is there a business case manager? What are his or her responsibilities?
6. Who is writing the business case? Has it been divided up into manageable pieces of work, with resource allocated, a realistic timescale and reviews of progress? Will it be reviewed for clarity and uniformity of style?
7. Are there expert advisors or contributors who can assist with the business case?
8. What review process is in place? Are the right people involved at the right level?
9. How will the business case be presented?
10. Have you identified any potential objectors and responded to the objections?
11. Have you defined what decisions need to be made in order to gain acceptance of the business case? Have these been communicated to the people who will take the decisions? Are they empowered to make these decisions?
12. Have you established a process and a timescale for acceptance and formal sign-off of the business case?

2.6.2 Elements of the Business Case

1. Why this solution?
 - What is proposed?
 - Why is this the best way of addressing the business needs?
 - Why do you need it now?
 - Are you doing this for competitive reasons - can you remain competitive, hold your market share, avoid a predatory takeover?
 - Are there legal or regulatory requirements that must be implemented?
Changes in working practices?
 - Does this solution contribute to corporate goals and strategies? Does it improve the infrastructure or establish a platform for future plans?
 - Is the purpose of this solution mainly to improve the financial status of this enterprise?
2. Implications of doing nothing



- Could you survive? Would it affect your ability to operate?
 - What penalties would be incurred?
 - Would you lose market share? Would you place yourselves at a serious competitive disadvantage?
 - How soon would you be forced to act anyway?
3. Other solution options
- What other solutions have been considered? What are the relative strengths and weaknesses of these solutions? How have these been considered in relation to the proposed solution?
 - Was there an ideal solution? If so, why was it discounted?
 - Was there an easier solution? If so, why was it discounted?
4. Corporate supporters
- The higher the level at which someone is driving this solution and the greater the concurrence and support in the organization, the greater the chance of success:
- Who is driving for the success of this project? At how high a level are they? Do you understand the objectives?
 - Are the supporters motivated by genuine business needs or by emotional or political impulses?
 - What is the breadth of support across the company?

5. What are the benefits?

The basic input to the financial comparison is a statement of costs and benefits. Identifying, understanding and quantifying the benefits requires imagination, debate and negotiation. The time required for this is often underestimated.

Essentially, the agreed benefits should be classified into at least two categories:

- Tangible or 'above-the-line' benefits, such as:
 - Increase in revenue
 - Direct cost savings.
- Other considerations:
 - Headcount avoidance
 - Space saving.

What is above the line will be determined by the practice of the enterprise concerned. The strength of the financial case will be demonstrated by the degree of independence from 'below-the-line' items.

Ensure you address the following questions:

- Have the benefits been adequately defined?
- How do they compare with alternative solutions?
- Have they been classified appropriately, for example, quantitative (increase in revenue) or qualitative (improved efficiency and morale).

6. Financial analysis

- What are the costs of the project? Have you identified both project costs (one-off) and operational costs (running, maintenance)? Are all supplier costs included?
- How do the alternative solutions compare financially?



- Is there a requirement to produce analysis of
 - Impact on profit and loss
 - Impact on cash flow
 - Impact on balance sheet (assets and liabilities).

If so, do you have access to the appropriate financial skills to provide this?

- How sensitive is the case to timescale and assumptions? Do relatively small adjustments of scale have relatively little impact on costs and benefits, or do they radically change the business case? For example, if salaries increase by 5% instead of the assumed 3%, does this make any difference to the benefits - does it eliminate them?
- Can the project be phased to deliver early benefit and/or defer costs?

7. How will the benefits be measured?

Confidence in the business case is considerably increased if it is clear how benefits will be monitored. This may be done as follows:

- Establishing measurements and controls
- Building into tactical or operational plans
- Fixing budgets, headcounts, revenue targets, commission plans and so on.

To achieve this, address the following questions:

- Can they be measured by the project? Does the project sponsor understand and accept whether or not they can be measured?
- Has the 'pay back' period been determined? Will it exceed the life of the project and, if so, how will the benefits be measured after project completion?
- What criteria are being used to judge the success of the project?
- Does the financial management plan for the project include the appropriate cost and benefit tracking so that the benefits are measured?
- Are current systems for corporate data and accounting capable of taking the measurements you require? Have you gained agreement for the appropriate departments to do this?
- Will new systems be required? Can these be created in house or do you need to recruit outside expertise? Have such costs been included in the business case?
- Who will be responsible for these measurements? The financial department? The project office? A separate benefits subproject?
- Do you have a plan to evaluate benefits that cannot be quantified?
- Do operating plans need to be amended to ensure benefits are fully realized?
- What targets have you fixed? Do these cover, for example, budgets, headcount, revenue targets and commission plans?
- How will performance against business case be reviewed?

8. Risk analysis

- Have you included an analysis of the major risks of the project?
- What are the avoidance and containment action costs? Are they included in the project costs? Do they have an impact on the benefits?

9. Decisions required

- Do you have a clear statement of what decisions are required by whom?



2.6.3 Managing the Project

Address the following questions:

1. Are you tracking costs and benefits on a regular basis?
2. Are these figures being used to review performance against business case on a regular basis? Are significant deviations being reported and corrective actions taken?
3. Do you review the continued validity of the business case?
4. Are any changes to the business case subject to the formal project change control procedure?
5. Do changes to the project during its life require separate, additional business cases?

2.6.4 Ending the Project

1. Is there a business case section in the Project Completion Report? Are benefits being used to prove the success of the project? Has all the data to evaluate achievements been assembled?
2. If the benefits are still in the process of being realized, even though the formal project is ending, is there a plan in place to continue benefits measurement? Is ownership of this plan at the right level?



3 Financial Management Interfaces

This topic describes how financial management interfaces with the following MITP techniques:

- Quality management
- Risk management
- Exceptions management:
 - Change management
 - Problem management

Subtopics

- 3.1 Quality Management
- 3.2 Risk Management
- 3.3 Exceptions Management
- 3.4 Interfaces With Business Functions

3.1 Quality Management

Ensure accuracy, consistency, responsiveness and client satisfaction with the financial elements of a project, especially with the following:

- Cost estimating.
- Pricing.
- Budgeting.
- Tracking.
- Analysis.
- Recording and accounting.
- Reporting.
- Invoicing.
- Supplier payment.
- Ensure that the basis for all financial calculations are understood and agreed both internally and with the client, as appropriate.
- Carry out a quality assurance exercise for all programming of all nonstandard spreadsheets or computer-based tools. This should be done before implementation by a suitably qualified project assurance specialist.
- Reconcile financial records at least once during the execution of a project which has a duration greater than 6 months. Conduct reconciliations thereafter at least every six months.

For further details, see the MITP Quality Management Guide.

3.2 Risk Management

Do the following:

- Include financial risk in all risk assessments.
- Ensure impact of financial risks are quantified in terms of value, where appropriate.
- Ensure that the impacts of all risks are individually quantified in terms of value.
- Ensure identified risks are documented together with risk management plans.
- Track financial risks on a regular basis as an integral part of the risk management process.

For further details, see MITP Risk Management Guide.

3.3 Exceptions Management

3.3.1 Change Management

Do the following:

- Implement a process to manage all changes to the financial structure of the project. This should encompass changes to the following:
 - Business case
 - Cost base
 - Contractual terms
 - Budget



- Revenue flow
- Assessment criteria
- Review process
- Reporting requirements
- Ensure that impact of all changes to be assessed and quantified by appropriate reviewers
- Ensure that acceptance of all changes are formally signed off prior to implementation.

3.3.2 Problem Management

Do the following:

- Ensure that there is an identified escalation process for financial problems.
- Ensure that all financial problems have a management-level owner.
- Ensure that all financial problems are fully documented.

For further details, see MITP Exceptions Management Guide.

3.4 Interfaces With Business Functions

Financial management may have interfaces with the following business functions:

- Board of Directors
- Finance Director
- Treasury
- Business Planners
- Legal
- Suppliers

This list may vary, depending on your company organization.

Interfaces with the business functions should be effected:

- Distribution of planning, reference and technical documentation
- Planned participation in meetings
- Distribution of minutes, including appropriate non-attendees
- Formal memoranda and correspondence



4 Inputs To Financial Management

This topic provides a checklist of the typical inputs to the three stages of the financial management technique:

- Financial planning
- Financial performance and management
- Completion

Subtopics

- 4.1 Financial Planning
- 4.2 Financial Performance and Management
- 4.3 Completion



4.1 Financial Planning

- Client business case or cost justification criteria
- Project definition
- Human resource plan
- Timescales
- Expense allocation plan
- Overhead allocation and apportionment plan
- Supplier product prices
- Supplier services prices

4.2 Financial Performance and Management

- Project progress reports
- Revised resource estimates
- Supplier contract changes
- Supplier invoices
- Supplier payment information

4.3 Completion

- Outputs from Financial Performance Management
- Client satisfaction review
- Process quality audit



5 Outputs From Financial Management

This topic provides a checklist of the typical outputs from the three stages of the financial management technique.

Subtopics

- 5.1 Financial Planning
- 5.2 Financial Performance and Management
- 5.3 Completion



5.1 Financial Planning

- Human resource costs
- Cost and benefit analysis
- Input to business case
- Project budget/Financial plan

5.2 Financial Performance and Management

- Revenue against plan reporting
- Cost against plan reporting
- Cost change forecasts
- Budget revisions--input to contract change process
- Earned value analysis
- Financial reconciliation
- Query log

5.3 Completion

- Profitability statement
- Financial section of the Project Completion Report
- End-of-contract financial reconciliation

A Appendix A. Roles and Responsibility

Table 1 shows the financial management elements of a project and their ownership.

The degree to which various skills may be required will depend on the complexity of the project and the particular budgeting and accounting practices of your company. In some organizations, specialist skills are developed and there is a recognized role of Project Accountant or similar.

Where applicable to any project this is the recommended accountability, although you may choose to assign ownership as you feel appropriate.

Table 1. Financial Management Roles and Responsibilities	
Work Element	Ownership
MITP compliance	Project Manager
Business Case Preparation	Business Manager
Financial Approvals	As Appropriate
Human Resource Plan	Project Manager
Timescale Estimating	Project Manager
Cost Estimating	Project Manager
Expense Allocation	Business Manager
Overhead Allocation	Business Manager
Supplier Price Negotiation	Project Manager
Pricing Input	Business Manager
Client Contract Financial Terms	Business Manager
Supplier Contract Financial Terms	Project Manager
Cost schedule	Project Manager
Cash flow forecasting	Project Manager
Project Budget	Project Manager
Risk Assessment	Project Manager
Financial Performance Against Plan	Project Manager
Financial Analysis and Forecasting	Project Manager
Recording and Accounting	Project Manager
Reviews	Project Manager
Reporting	Project Manager
Client Invoicing	Project Manager
Supplier Invoice Reconciliation	Project Manager/Acceptance
Supplier Payments	Project Manager
Financial Quality Management Process	Project Manager
Financial Auditing	Project Auditor
Financial Problem Management Process	Project Manager
Financial Risk Management Process	Project Manager
Financial Change Management Process	Project Manager

B Appendix B. Sample Financial Management Processes

This appendix provides detailed procedures which might be adopted by a Project Manager to control the finances of a Project.

Subtopics

- B.1 Scope
- B.2 Project Manager Responsibilities
- B.3 Financial Support Groups
- B.4 Financial Planning



B.1 Scope

The scope of this material is to give guidance on how to do the following:

- Create a cost and revenue plan for a project.
- Track costs against the plan.
- Provide reports for use within the project.

B.2 Project Manager Responsibilities

The main responsibilities are:

- Prepare cost, revenue and cash plans.
- Monitor actual costs and cash flows.
- Manage all supplier and internal purchase requirements and agreements
- Prepare monthly cost, cash and revenue reports.
- Quantify cost of risk (not covered by this appendix; see the MITP Risk Management Guide).
- Quantify all Project Change Requests (not covered by this appendix; see the Change Management topic of the MITP Exceptions Management Guide).

B.3 Financial Support Groups

For a large project, a Project Office will be established and will manage the detailed planning, tracking, reporting and filing of financial data. It will also be useful to enlist the services of specialist functions within your organization to assist with the detailed processes, or with specialist knowledge such as accounting and contracts.

B.4 Financial Planning

A Financial Plan is created to:

- Identify all potential costs of the project and when they are expected.
- Track actual costs to and monitor financial progress of the project
- Enable Change Management to be reflected financially
- Establish a proposed Payment Stream
- Establish a Revenue Plan phased over time

A spreadsheet could be made up of:

- The budget
- Your own company resource: hours at the internal charging rate, if applicable
- Supplier resource, broken down into skill level, if appropriate, and costed at current average market Rates. Seek advice from your procurement office for current market rates.
- Hardware, software, and network costs. These would be for equipment to be used by the project members and equipment to be used as part of the project solution.
- General expenses, for example:
 - Travel (mileage, hotels, overseas)

- Other (property refit, stationery, manuals, couriers, pagers, and so on)
- Contingency (consider including a contingency to cover any identified risks.)

These costs can be totalled by month, by category, or by financial year, as appropriate.

As the project proceeds, the spreadsheet should be updated to include, for example:

- Time recording for people
- Forecasted hours to be worked
- Forecasted expenses month by month
- One-time charges
- Changes (subject to change management control).

From the spreadsheet, regular reports can be made, for input to Progress Tracking and Reviewing.



C Appendix C. Earned Value Tracking

This appendix describes the concept of earned value tracking in the following way:

- What is earned value tracking?
- Why track earned value?
- Who tracks earned value?
- How do you track earned value?

Subtopics

- C.1 What Is Earned Value Tracking?
- C.2 Why Track Earned Value?
- C.3 Who Tracks Earned Value
- C.4 How Do You Track Earned Value?
- C.5 Selected References



C.1 What Is Earned Value Tracking?

Most project managers know that severe losses are almost inevitable if a project gets into a crisis. Problems and potential problems must be addressed as early as possible to avoid crises. It follows that project management systems must manage costs and schedules properly and provide early identification of problems and potential problems. Only then can action be taken to reduce the impact of variances from the original plans.

The project planning and control system must provide information that:

- Gives a picture of true work progress.
- Relates cost and schedule performance.
- Identifies potential problems with respect to their sources.
- Provides appropriate information to each level of management with a practical level of summarization.
- Demonstrates milestones are valid, timely and auditable.
- Gives immediate quantitative evaluation of alternative solutions.

Common (non-earned value) project planning and control systems have the following limitations:

- Actual-to-budget comparisons fail to take account of the amount of work performed relative to the costs incurred and therefore lack the predictive power necessary to identify potential problems.
- Schedule and cost assessment are based on different measures (for example, schedule might be measured by milestones completed while costs may be measured in dollars spent) which does not facilitate a single view of project status.
- Measures of performance vary between projects, making it difficult to accumulate objective performance reports for higher management.

The earned-value concept of project performance measurement, originating from the US Department of Defence Minuteman Program around 1963, was developed to overcome these deficiencies. The earned-value approach is an objective methodology for measuring and reporting actual achievement in terms of the way the work was planned to be performed, and is based on the following observations:

- The value of an element of work in terms of the total project, is only earned when it is complete.
- When complete, the value of an element of work to the project is the originally budgeted cost, regardless of what was actually spent.

The following diagrams explain the concept.

C.1.1 BCWS Curve

Using a structured work breakdown approach the component work packages of a project are identified and defined. Costs are estimated and a budget is set for each work package. The flow and precedence of the work packages then determines the project schedule. Accumulating the work package budgets according to the schedule yields a time-based cost budget that typically follows an "S" curve similar to Figure 1. This curve is often called the Budgeted Cost of the Work Scheduled (BCWS).

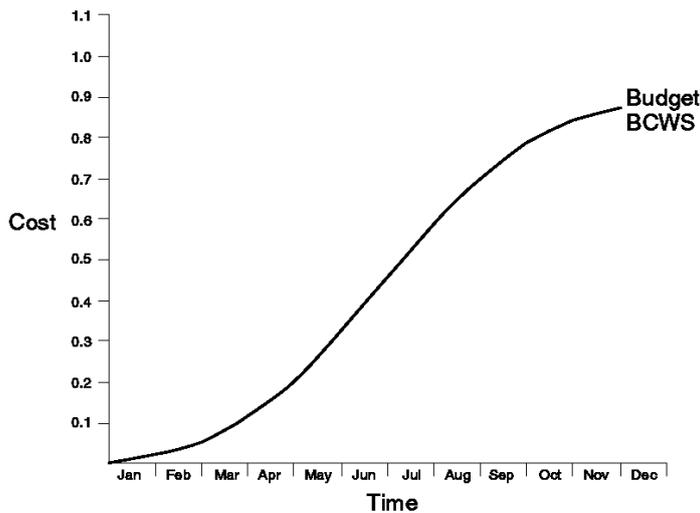


Figure 1. BCWS curve

C.1.2 ACWP Curve

When the project is performed, the actual costs of performing the work packages are collected and accumulated against time. This gives another curve called the Actual Cost of the Work Performed (ACWP) as, for example, in Figure 2.

This is where common cost tracking systems stop. Actual costs can be compared to the budget at a given point in time, but very little useful information is generated from this comparison. Using the diagram as an example, it can be seen that the actual costs are below the budgeted costs. This can be good or bad. It will be good if the rate of progress is above or on par with the planned progress but it may be bad if the rate of progress is below the planned progress.

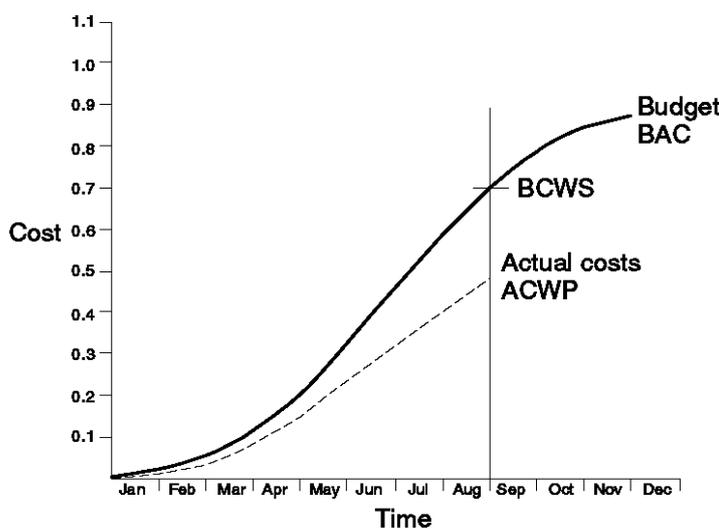


Figure 2. ACWP curve

C.1.3 BCWP Curve

To assess the rate of progress, we need to measure the "earned value" of the work performed. This is generated by assessing the degree of completeness of each work package in relation to the budgeted cost and accumulating the results for the total project. The curve is called the Budgeted Cost of the Work Performed (BCWP). These three curves in Figure 3 give an objective measure of the project status by indicating the variance of the project from the original plans.

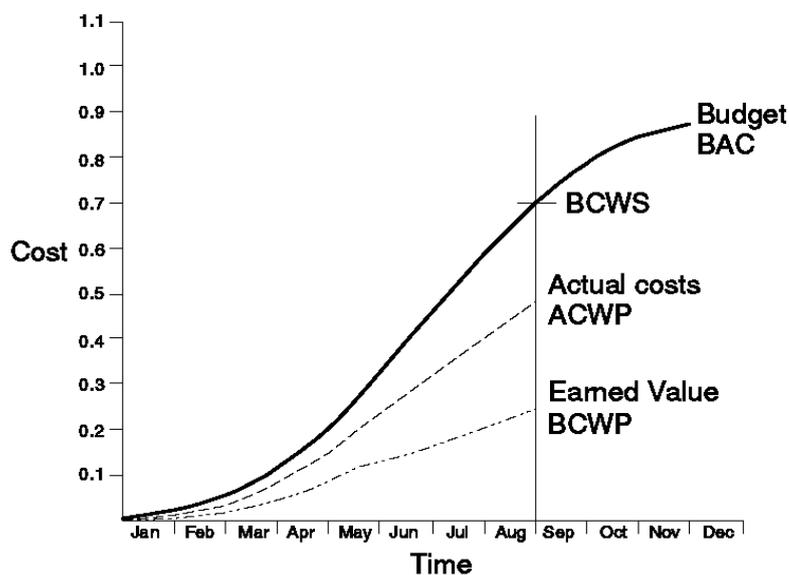


Figure 3. BCWP curve

C.1.4 Cost Variance Measure

Figure 4 shows the Cost Variance measure which is the difference between the earned value (BCWP) and the actual costs (ACWP). The cost variance answers the question: "For a certain degree of project completion, how do the actual costs compare to the planned costs?" The diagram shows a negative cost variance where actual costs exceed the earned value. This indicates trouble with the budget. A positive cost variance indicates that the project is progressing on average more efficiently than planned.

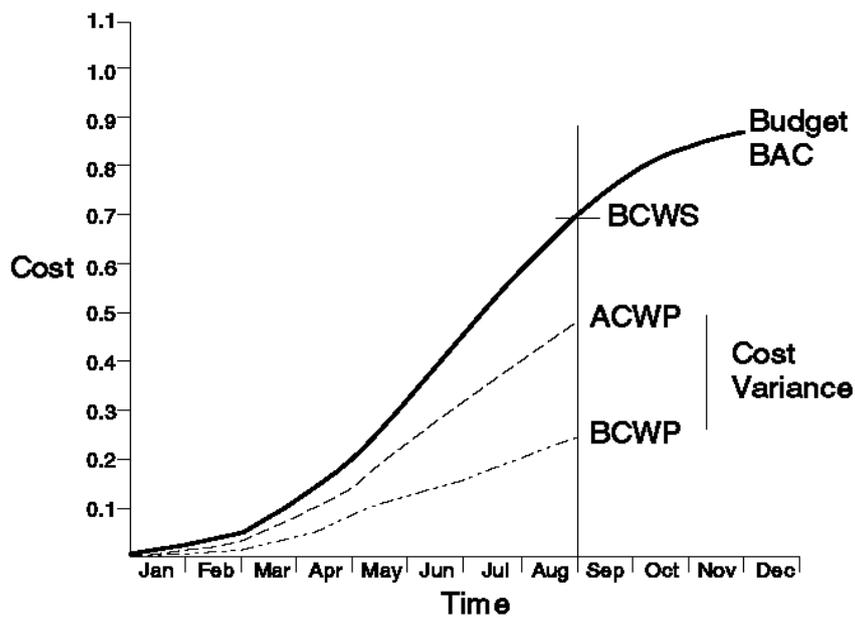


Figure 4. Cost Variance measure

C.1.5 Schedule Variance Measure

Figure 5 shows the Schedule Variance measure which is the difference between the earned value (BCWP) and the budget. The schedule variance answers the question: "At a certain point in time, how does actual progress compare to the planned progress?" The diagram shows a negative schedule variance where the earned value is lower than the budget. This indicates trouble with meeting the schedule.

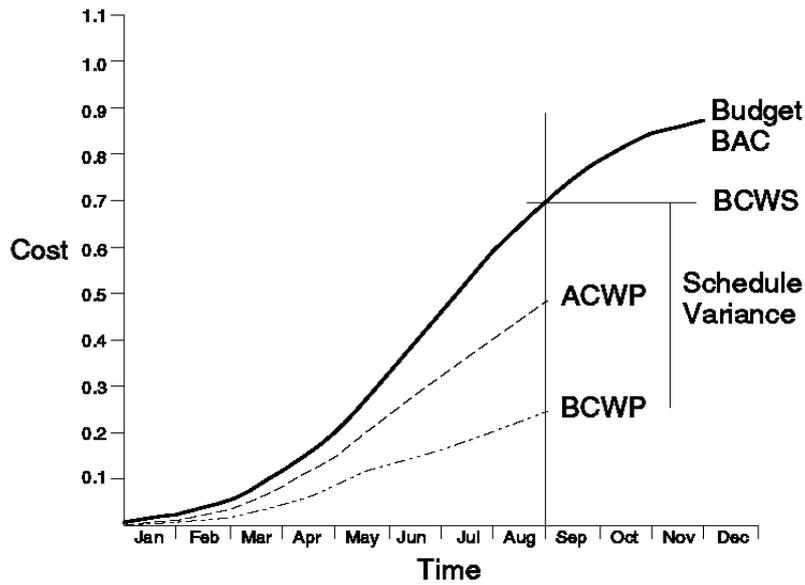


Figure 5. Schedule Variance Measure

C.1.6 Estimate At Completion Curve

Using the variance information there are a variety of ways to extrapolate the revised final outcome of the project (Estimate at Completion or EAC). Figure 6 shows one extrapolation of the EAC. In practice several methods should be used to bound the range of likely outcomes (see below).

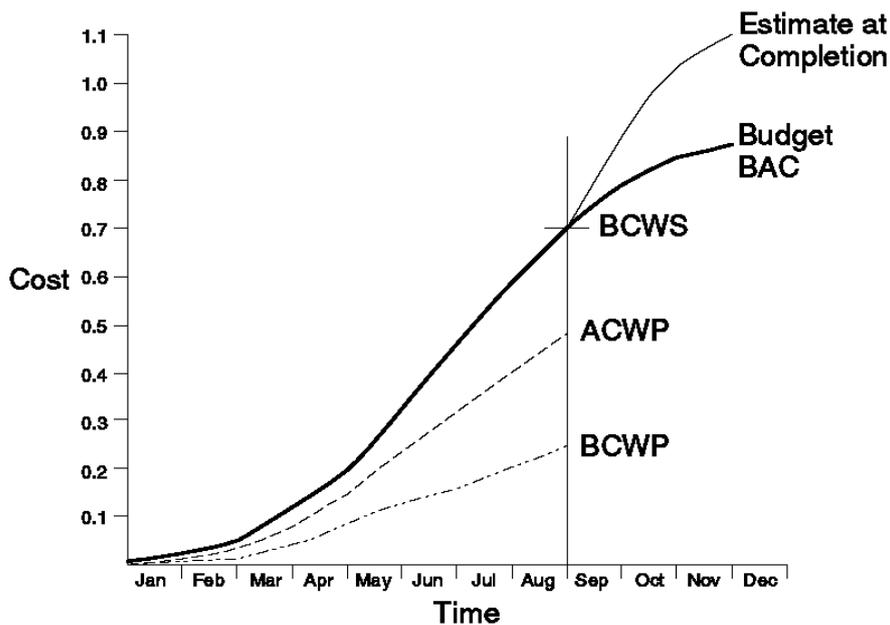


Figure 6. Estimate At Completion curve

C.1.7 Assessment of Variances

The table below shows the assessments gained by combinations of cost and schedule variance.

Budget BCWS	Actual Costs ACWP	Earned Value BCWP	Assessment
8	8	8	Good: progress on budget and project on schedule
8	6	4	Bad: working inefficiently and project behind schedule
8	4	6	Working more efficiently than planned but behind schedule
8	6	6	Working as efficiently as planned but behind schedule
8	8	10	Working more efficiently than planned and ahead of schedule
8	10	10	Working as efficiently as planned and ahead of schedule
8	6	8	Working more efficiently than planned and on schedule
8	10	8	Working inefficiently but on schedule.
8	12	10	Working inefficiently but ahead of schedule.

C.2 Why Track Earned Value?

Earned value performance measurement provides a single comprehensive view of project performance. Both cost and schedule variance are based on a common measure (dollars) which facilitates:

- Objective reporting across projects at all levels of management.
- Management by exception by setting appropriate variance alert thresholds for each level of management.
- Problem analysis by "drilling down" to problem work packages.
- The avoidance of "downstream" surprises by prediction of looming problems by EAC extrapolation.

C.3 Who Tracks Earned Value

C.3.1 General

Earned value performance measurement is suitable for mature, project-orientated service organizations. Effective use of the technique requires:

- Management commitment and understanding of the earned value information.
- Procedures to use the earned-value information to identify and address problems and potential problems.
- Integration of the project planning and control system with other business systems.
- Project teams that understand and accept the need for performance visibility.
- An established systematic approach to project design, estimating, work allocation and authorization and project reporting.

- A scheduling and schedule analysis system that is formal, complete and consistent.
- An established systematic approach to baseline change management and budget control.

These requirements are sometimes a deterrent to the adoption of earned value techniques, however mature, sophisticated services organizations see these requirements as a prerequisite for performing efficiently and effectively in the marketplace.

When correctly implemented, earned-value measurement is appropriate for:

- Internal project control by the Project Manager.
- Cross-project performance measurement of a program by the Program Manager.
- Cross-project performance measurement of a work group or service organization by management.
- External reporting for clients and all levels of management.

The data required for earned-value measurement will generally be collected by the project office using the labor claiming system and other accounting systems. Generation of the earned-value reports will generally be done by the Project Office on behalf of the Project Manager and by the staff functions supporting higher levels of management. Generation of the reports will generally be on a routine basis linked to the normal project data collection and reporting cycle.

C.3.2 Certain Contracts

Earned value performance measurement and reporting is at the heart of the Cost Schedule Control System Criteria required for certain Defense orientated contracts in several countries.

C.4 How Do You Track Earned Value?

The general steps required for earned value tracking are:

1. Identify and define short tasks using the work breakdown structure approach.
2. Schedule each task with the scheduling system using precedence, dependency, priority and resource levelling considerations.
3. Assign a cost budget to each task.
4. Measure the progress of each task by tracking earned value and actual costs.
5. Report and address problems and potential problems.

C.4.1 Work Breakdown Structure (WBS)

WBS techniques are described elsewhere in MITP (Life cycle: Establishing the Project: WBS). Earned value techniques rely on a WBS approach that is rigorous in breaking down the project into a view of the deliverables. Work packages (the "doing" descriptions) are below the lowest level of the WBS as shown in Figure 7.

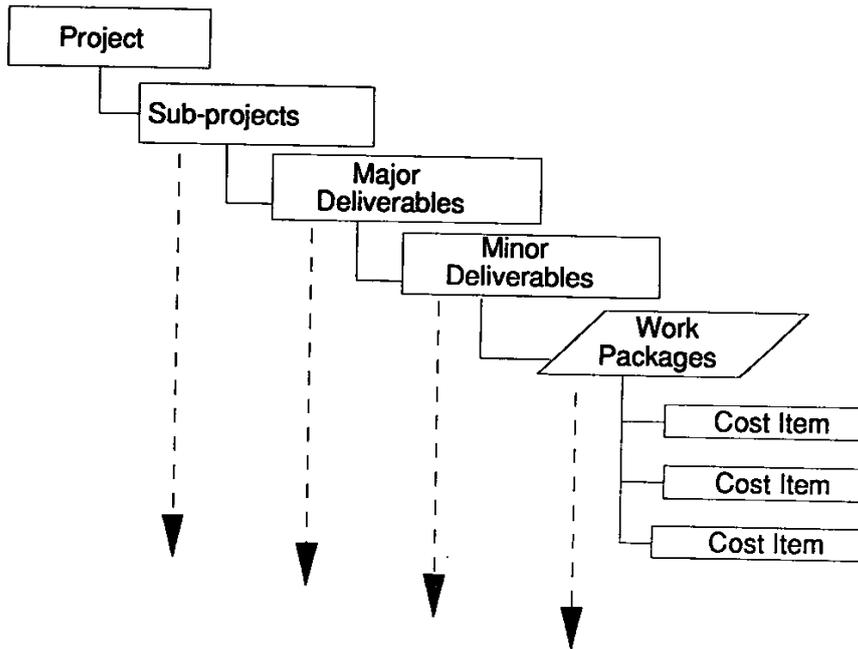


Figure 7. Work Breakdown Structure

The WBS is the primary tool to collect and reflect the scope of the project. The responsibilities associated with the WBS are shown below in the following table.

	WBS Stages	Client Responsible	Project or Contract Responsible
1	Preliminary WBS or de facto WBS in the request for proposal	X	
2	WBS extended and changed in the proposal		X
3	Contract negotiated and WBS amended	X	X
4	Contract awarded and baseline Contract WBS set	X	
5	Contract WBS maintained: a. Change request b. Change Approval	X	X
6	Project WBS maintained		X

C.4.2 Work Breakdown Structure Dictionary

Earned-value reporting requires systematic estimating at the work-package and cost item level. Estimating information such as assumptions, sizing estimates and bases-of-estimate must be recorded for future reference and analysis. A WBS Dictionary is used to store this information. Using the WBS Identifier Number as a key, each work package has a sheet or two of information associated with it.

The WBS dictionary should contain all relevant information from the estimating guides and worksheets and is referred to for:

- Extracting information for the Statements of Work.
- Assessment of contract negotiation agreements.
- Assessment of change requests.
- Analysis of problems and potential problems.
- Revision of estimating guidance for future work.

C.4.3 Organizational Breakdown Structure (OBS)

The OBS is a functionally orientated family tree that shows organizational relationships. The OBS is progressively detailed to the lowest level of management relevant to the project. The OBS is used to relate the project work to the perform responsibility. An example is shown in Figure 8.

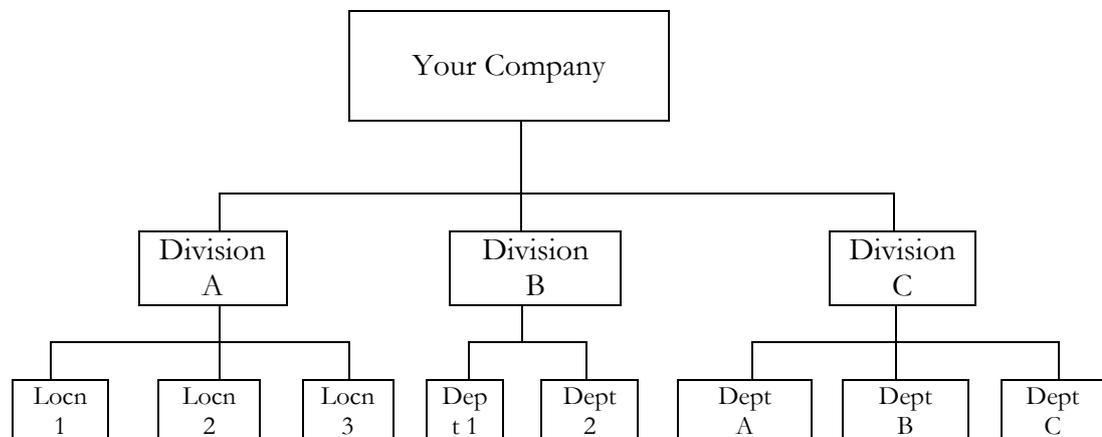


Figure 8. Organizational Breakdown Structure

C.4.4 Cost Accounts and the Responsibility Assignment Matrix (RAM)

A cost account is an element in the WBS that allows the monitoring of the cost and schedule of a managerial significant deliverable. It represents work for which individual responsibility is assigned and therefore can be described at the intersection of the WBS and the OBS, as shown in Figure 9.

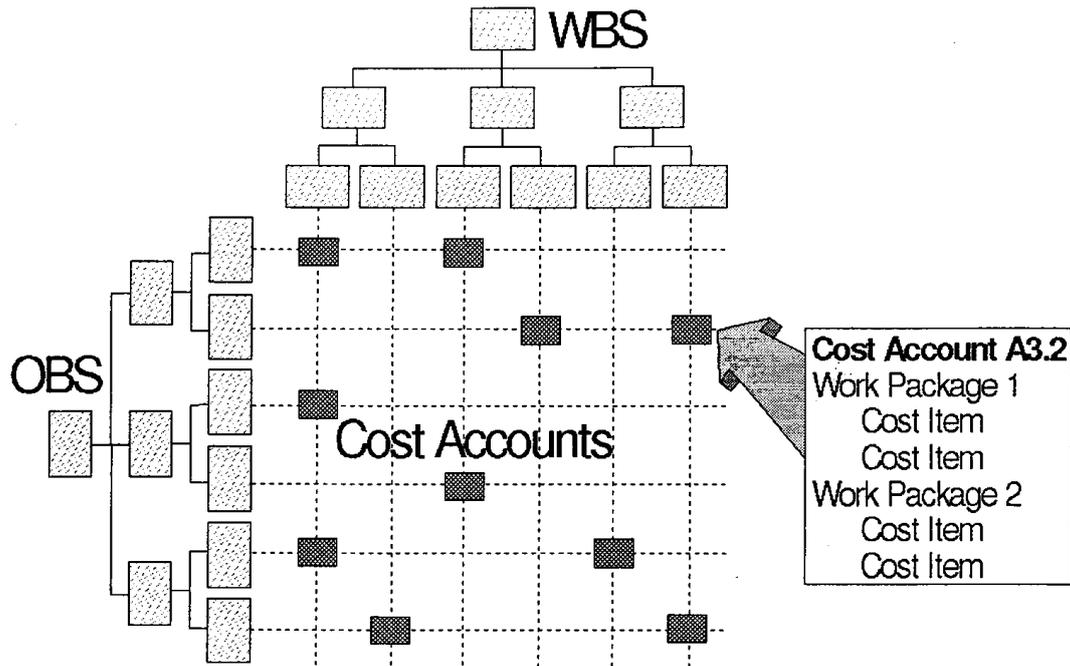


Figure 9. Cost Accounts and the Responsibility Assignment Matrix

A matrix that maps the cost accounts to responsible managers is called a Responsibility Assignment Matrix (RAM). In conjunction with variance threshold alerts the RAM can be a useful tool to indicate the source of problems and potential problems.

As a guide, a number of 20 to 30 cost accounts is a good number for reporting purposes.

C.4.5 Work Packages and Cost Items

Work packages are the short-span tasks or material items needed to accomplish a certain deliverables. Work packages must:

- Be clearly distinguished from each other.
- Be assignable to a single perform group on the OBS.
- Have scheduled start and end dates tied to physical accomplishment.
- Have a cost budget assigned.
- Be of a short enough duration to facilitate objective measurement of work performed.

Work packages will generally be of the following types:

Discrete Cost Work Package. This is the normal case where specific costs can be budgeted.

Level-of Effort Work Package. Work such as supervision and coordination is budgeted in terms of the rate of resource consumption over time.

Apportioned Work Package. This is where the budget based on the accomplishment of another work package.

Planning Package. These are used when far term work has been identified but not fully defined or budgeted. They are used to give early guidance of time phasing and future

costs but are not part of the current measurement baseline. Planning Packages are used with the "Rolling Wave" concept of progressively refining budgets in a phased approach.

C.4.5.1 Work Package Duration

The longer the duration of a work package the harder it is to determine the actual status of the work. Also, the longer the duration of work packages, the more will be in progress at any given point in time. If a negative variance is reported, this make the identification of offending work packages difficult.

The guidance for the length of work packages is no longer than two reporting periods. The general reporting period is monthly meaning no work package should be more than two months duration.

C.4.5.2 Earned Value Accrual Methods

The way earned value is accrued will vary according to the type of work package:

- Percent Complete. The owners of the work package can be prompted to estimate the % value that has been earned.
- Budget - Estimate-to-Complete (EAC). Sometimes it is easier to get the work package owner to estimate the actual cost to complete the work package and deduce the earned value by relating it to the budget cost.
- O/100 No value is earned until the work package is complete. This is usually only used for work packages of short duration.
- Milestones (Inchstones). Within a work package of long duration, minor milestones can be identified and an earned value can be assigned to each. These are sometimes called "inch stones" to distinguish them from the major milestones reflected in the client contract that the client has the right to scrutinize and accept or reject.
- Equivalent Units. For work packages that result in many similar items (such as a factory production), the earned value can be deduced by comparing completed items with the final output.
- Cost Formulae (80/20). For long duration work packages this is a variation of the percent complete method where 80% of the budget can be accounted for by estimating the percent complete but the remaining 20% is only accounted for when the final acceptance is given. This avoid the well known 99% complete syndrome.
- Level of Effort. Certain work packages such as supervision and management are based on the passage of time. The earned value is based on the time expended compared to the total scheduled time.
- Apportioned Effort. Some special work packages are related to the progress of others. For example quality inspection might be related to the production effort. Earned value can be based on a percentage apportionment of the earned value of the relate package.

C.4.5.3 Cost Items

Cost items classify the types of cost involved with a work package. They typically fall into the following categories:

- Direct labour.
- Direct material.
- Other direct costs such as travel.



- Indirect costs.

Cost items can be broken down in a tree structure and are used to provide other perspectives on the project. For example, a cost items breakdown can provide the information to support Activity Based Costing (ABC) analysis.

C.4.6 Baseline and Budget Management

Formal and rigorous change management is required for earned-value reporting. Formally accepted contract changes are reflected in changes to the BCWS and BAC and must be distinguished from the occurrence of unexpected costs which alter ACWP and the BCWP. To ensure this happens, all budgets must be traceable through a change log which includes:

- Distributed budget
- Management Reserve
- Undistributed Budget
- Contract Changes

C.4.7 Variances

C.4.7.1 General

The project management literature shows that poor project performance is very difficult to rectify. In fact, once a project is 15% complete, performance rarely exceeds the average performance to date. (Kemp 1992 p65) Although extrapolations are made from historical performance, this means earned value variances are usually very good indicators of the future of the project.

C.4.7.2 Cost Variance

The cost variance information can be expressed in a number of ways:

$$CV = BCWP - ACWP$$

$$\text{Cost variance percentage} = CVP = CV/BCWP$$

$$\text{The Cost Performance Index} = CPI = BCWP/ACWP$$

A CPI of 0.85 means for every dollar spent, only 85 cents of work was done (related to the budget). The cost variance is an unambiguous indicator of project performance.

C.4.7.3 Schedule Variance

The schedule variance information can be expressed in a number of ways:

$$SV = BCWP - BCWS$$

$$\text{Schedule variance percentage} = SVP = SV/BCWS$$

$$\text{Schedule Performance Index} = SPI = BCWP/BCWS.$$

A SPI of 0.85 means for every dollar scheduled, only 85 cents of progress was made.

The schedule variance is expressed in dollars making it useful in conjunction with the cost variance, to present a single comprehensive view of the project. However by itself,



the schedule variance cannot ascertain a precise schedule position because it does not reveal "critical path" type information. The schedule variance must be used in conjunction with Gantt charts, networks and so forth.

By itself the schedule variance has limitations:

- It may be misleading in that unfavorable accomplishment in one area may be obscured by favourable accomplishment in another area.
- By setting the budget for earned value purposes a work package is fixed in time whilst in reality it may not be on the project critical path. It may have a "float" that allows it to be performed anywhere within a time bracket without affecting the final outcome of the total project.
- It is based on an assumption of average work efficiency.

Project managers and higher management must be aware of these limitations but all said, the schedule variance is still an important performance indicator and long-term negative schedule variance is still one of the most reliable indicators of a long-term trend in the project.

C.4.8 Estimates at Completion (EAC)

The ultimate aim of project management is to achieve the best possible completion of the project. It follows that progressive tracking of the EAC provides useful information, particularly for higher management not involved with the day-to-day running of the project. Because the EAC involves judgement is it best to express it as a range of possible outcomes, by using different methods of calculation:

C.4.8.1 Optimistic EAC

An optimistic EAC assumes that future work packages will be performed as originally planned, regardless of the performance to date. It is called the optimistic EAC because if the project has suffered negative variances to date, this method assumes an improved performance for the rest of the project: this rarely happens. The optimistic EAC is calculated as follows:

$$\text{Opt EAC} = (\text{BAC} - \text{BCWP}) + \text{ACWP}$$

The optimistic EAC assumes that the cost variance at completion is the same as the cost variance today. For example if the current cost variance is -10 and the BAC is 120 the EAC will be 130.

C.4.8.2 Cost Performance Index EAC

As stated, it is rare for a project to improve its average performance to date. A better EAC can be derived by a linear extrapolation of cost performance to date. In other words, it assumes that if a project is overrun by 10% now then it will be 10% overrun at completion.

$$\text{EAC}[\text{CPI}] = \text{BAC}/\text{CPI}$$

If, for example, the ACWP is 50 and the BCWP is 45 the CPI is 0.90. If the BAC is 100 the EAC is 110. A project manager should always be asked to justify an EAC less than the EAC[CPI].

C.4.8.3 Composite Performance Index EAC

If a project is not only over-running costs but also falling behind schedule there are additional costs not captured by the EAC based solely on the CPI. Another approach is to multiply the CPI by the SPI to get a composite index that is applied to the BAC.

$$EAC[Comp] = BAC / (CPI \times SPI)$$

If, for example, the BCWS is 55, the ACWP is 50 and the BCWP is 45 the CPI is 0.90 and the SPI is 0.82. The composite index will be 0.74 and if the BAC is 100 the EAC is 135. This provides one estimate of the additional costs to accelerate the effort or the additional costs of a schedule slippage.

C.4.8.4 Analytical Override

The mathematical EACs should not be used as a basis for contractual agreements. They should be used as a "sanity" check on EACs done by other analytical means such as "bottom-up" engineering estimates and tempered by management judgement. For example, the performance index of a more recent period might provide a better EAC or there could be contractual penalties associated with schedule slippage to be reflected in the EAC.

C.4.8.5 Out-of-Tolerance Alerts

Effective management relies on the presentation of appropriate information often achieved by "management by exception". Earned value variances are suitable for setting tolerances which trigger various levels of scrutiny within an organization. For example, variances of less than 10% might be flagged for resolution by the Project Manager. Variances greater than 10% might be flagged for resolution by the Program Manager. The setting of tolerances may be dependent on factors such as:

- The phase of the project life cycle
- The duration of the project
- The type of estimate used
- The accuracy of the estimate.
- The level of management the report is targeting.

Out of tolerance alerts are easily displayed on earned value reports and problems areas can be readily identified by "drilling-down" the WBS and OBS to the cost account and work-package level.

C.4.9 Relationship with Cost/Schedule Control System Specifications

C.4.9.1 General

In 1967 the US DOD established the Cost/Schedule Control Systems specifications to provide objective visibility of the progress of projects. Other US Government departments and agencies, and several other national governments have adopted similar

criteria. To perform contracts for these organizations, the contractor must conform to the specifications. For large contracts, rigorous application and demonstration of compliance to the Cost/Schedule Control System Criteria (C/SCSC) is called up.

The C/SCSC contains 35 criteria that the contractor's management system are required to meet, covering:

- Organization
- Planning and budgeting
- Accounting
- Analysis
- Revisions and Data Access

Formal compliance with the Criteria can be very daunting and expensive.

C.4.9.2 Relationship Between Earned Value and C/SCSC

Earned-value techniques are at the core of the C/SCSC. Cost and schedule variance analysis is called up as is the estimation of the EAC. C/SCSC, however, covers many other areas that ensure a contractor's management system effectively supports and uses the earned-value techniques.

Although C/SCSC mandates earned value techniques, the converse is not true. The use of earned value techniques does NOT imply the expense of C/SCSC compliance.

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Readers Comments

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- 2 Satisfied
- 3 Neutral
- 4 Dissatisfied
- 5 Very dissatisfied

	1	2	3	4	5
Overall satisfaction					

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