



VARZA SCHOOL · THE FOUNDATIONAL 100

Earned Value Management: Planned Value, Earned Value, Actual Cost, and Forecast at Completion

Chapter 77 · Track 8 — Project, Service, Labor, and Contract Finance

THE QUESTION IT ANSWERS

How can project leaders integrate scope, schedule, and cost into one performance model without confusing earned value with revenue or cash?

CONCEPTS DEFINED

Planned value · Earned value · Actual cost in earned value · Cost performance index · Schedule performance index · Estimate at completion · Baseline · Work breakdown structure

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Varza promise: clear enough for a first-time learner, exact enough for a professional conversation, and practical enough to support a real decision.

Why this chapter matters

This track treats projects, services, labor, and contracts as time-based financial systems. Scope, schedule, cost, billing, cash, obligations, and performance must be integrated; otherwise a project can appear successful in one view while failing in another.

Central question: How can project leaders integrate scope, schedule, and cost into one performance model without confusing earned value with revenue or cash?

Earned value uses the approved time-phased budget as a common unit. Planned value describes budgeted work scheduled, earned value describes budgeted work performed, and actual cost records its cost. Cost and schedule indices expose performance and support forecasts when the underlying baseline and progress measurement are credible.

Varza approaches the subject from life to ledger and from ledger to decision. We begin with what actually happened, identify the rights, obligations, resources, timing, and uncertainty, and only then choose the correct term, calculation, document, or account. This order protects the learner from a common error: learning a label without understanding the economic reality that the label is supposed to describe.

Learning outcomes

- Define and distinguish planned value in plain and professional language.
- Define and distinguish earned value in plain and professional language.
- Define and distinguish actual cost in earned value in plain and professional language.
- Define and distinguish cost performance index in plain and professional language.
- Apply the concepts to a numerical case and explain the result rather than only calculate it.
- Identify evidence, workflow, controls, and Varza entities required for reliable use.
- Recognize when jurisdiction-specific or licensed professional advice is required.

The Varza mental model

A financial concept becomes decision-ready when six questions have answers: **what, who, when, how much, based on what evidence**, and **under which assumption or rule**. A seventh question—**what should happen next**—turns knowledge into management.

This chapter uses internationally recognized terminology, but it remains jurisdiction-neutral unless explicitly stated. Accounting standards, tax rules, contract law, consumer protection, labor

requirements, and investment regulation can produce different legal outcomes in different countries. The global foundation gives the learner a stable map; local collections must add the binding rules.

Core concepts

1. Planned value

Working definition. Planned value is the authorized budget assigned to work scheduled to be performed by a measurement date.

Planned value comes from the time-phased performance baseline, not from total project budget divided by elapsed time. This is where operational activity and financial reporting meet.

Simple example. By month six the baseline scheduled work carrying CU 500,000 budget.

Decision test. Who can influence the result, and who only reports it? A reliable answer should state the unit, date or period, scope, evidence, and uncertainty. When one of these is missing, the concept may still be useful for discussion, but it is not yet decision-ready information.

2. Earned value

Working definition. Earned value is the authorized budget value of work actually performed by a measurement date.

Earned value measures physical progress in budget terms. It is not revenue, billing, market value, or cash. In Varza language, the concept becomes useful when it changes a decision.

Simple example. If 80% of a CU 500,000 work package is complete, earned value is CU 400,000 under that measure.

Decision test. Does the item affect cash now, later, or not at all? A reliable answer should state the unit, date or period, scope, evidence, and uncertainty. When one of these is missing, the concept may still be useful for discussion, but it is not yet decision-ready information.

3. Actual cost in earned value

Working definition. Actual cost in earned value is the recorded cost incurred for the work performed by a measurement date.

Cost cut-off and completeness are critical. Missing accruals can make performance look better than reality. The professional term matters because it prevents two different realities from being recorded as though they were the same.

Simple example. Recorded and accrued cost for completed work totals CU 450,000.

Decision test. What is being measured, and what has been left outside the boundary? A reliable answer should state the unit, date or period, scope, evidence, and uncertainty. When one of these is missing, the concept may still be useful for discussion, but it is not yet decision-ready information.

4. Cost performance index

Working definition. Cost performance index is earned value divided by actual cost, indicating cost efficiency under earned-value definitions.

A result below one indicates more cost has been incurred than budget value earned. Investigate cause and forecast impact rather than treating the index as a grade. A non-specialist can understand this by separating the object, the timing, and the consequence.

Simple example. EV of CU 400,000 divided by AC of CU 450,000 gives CPI of 0.89.

Decision test. When did the underlying right, obligation, benefit, or sacrifice arise? A reliable answer should state the unit, date or period, scope, evidence, and uncertainty. When one of these is missing, the concept may still be useful for discussion, but it is not yet decision-ready information.

5. Schedule performance index

Working definition. Schedule performance index is earned value divided by planned value, indicating schedule efficiency in budget-value terms.

SPI does not directly measure calendar delay and tends toward one at project completion. Combine it with critical-path and milestone analysis. The concept should be measured at the smallest level that still supports a real action.

Simple example. EV of CU 400,000 divided by PV of CU 500,000 gives SPI of 0.80.

Decision test. Which document or observation would allow another person to verify it? A reliable answer should state the unit, date or period, scope, evidence, and uncertainty. When one of these is missing, the concept may still be useful for discussion, but it is not yet decision-ready information.

6. Estimate at completion

Working definition. Estimate at completion is the current forecast of total project cost at completion.

Choose the forecasting method that matches the expected persistence of performance, remaining risks, and latest bottom-up knowledge. The number alone is not enough; its definition determines whether comparisons are valid.

Simple example. A simple EAC using budget divided by CPI assumes current cost efficiency continues.

Decision test. How would a different assumption change the result? A reliable answer should state the unit, date or period, scope, evidence, and uncertainty. When one of these is missing, the concept may still be useful for discussion, but it is not yet decision-ready information.

7. Baseline

Working definition. Baseline is the formally approved scope, schedule, cost, or performance plan used as the reference for control.

A baseline is protected history. Forecasts may change as reality changes; baseline changes require governed change control. This is where operational activity and financial reporting meet.

Simple example. The approved project budget and schedule become the basis for variance and earned-value measurement.

Decision test. Who can influence the result, and who only reports it? A reliable answer should state the unit, date or period, scope, evidence, and uncertainty. When one of these is missing, the concept may still be useful for discussion, but it is not yet decision-ready information.

8. Work breakdown structure

Working definition. Work breakdown structure is a hierarchical decomposition of the total project scope into manageable deliverables and work packages.

The WBS should cover one hundred percent of project scope without overlap and provide stable links to schedule, responsibility, estimate, cost, and progress. In Varza language, the concept becomes useful when it changes a decision.

Simple example. A building project decomposes into design, foundation, structure, envelope, systems, and handover.

Decision test. Does the item affect cash now, later, or not at all? A reliable answer should state the unit, date or period, scope, evidence, and uncertainty. When one of these is missing, the concept may still be useful for discussion, but it is not yet decision-ready information.

How the concepts connect

The concepts in this chapter are a system, not a vocabulary list. Planned value, Earned value, Actual cost in earned value, Cost performance index, Schedule performance index, Estimate at completion, Baseline, and Work breakdown structure describe different parts of the same decision. Confusing them usually creates one of three failures: the wrong amount is measured, the right amount is assigned to the wrong period or person, or a correct report is used for a decision it was never designed to support.

A useful analysis therefore preserves both **classification** and **relationship**. Classification tells us what an item is. Relationship tells us what caused it, what it affects, and what could change it. Varza should store both. A report that shows only totals may be suitable for orientation; a controlled decision requires traceability to the underlying relationships.

Formulas and quantitative relationships

Cost variance

$$CV = EV - AC$$

Positive cost variance indicates budget value earned exceeds actual cost under the model.

Boundary: The result depends on complete AC and valid EV; it is not profit.

Schedule variance

$$SV = EV - PV$$

Positive schedule variance indicates more budgeted work was accomplished than planned by the status date.

Boundary: It is expressed in currency units and does not directly equal days.

Performance indices

$$CPI = EV \div AC; \quad SPI = EV \div PV$$

Indices summarize cost and schedule efficiency.

Boundary: Interpret with work criticality, baseline quality, progress method, and maturity.

Simple EAC

$$EAC = BAC \div CPI$$

This forecast assumes current cost efficiency continues for remaining work.

Boundary: Use only when that assumption is reasonable; compare with bottom-up and risk-based forecasts.

Worked case — Behind schedule and over cost

At month six, a project has budget at completion CU 1,000,000, planned value CU 500,000, earned value CU 400,000, and actual cost CU 450,000.

Item	Amount or observation
PV	CU 500,000
EV	CU 400,000
AC	CU 450,000
CV / CPI	-CU 50,000 / 0.889
SV / SPI	-CU 100,000 / 0.80
Simple EAC	$1,000,000 \div 0.889 \approx \text{CU } 1,125,000$

Calculation and reasoning

1. $CV = 400,000 - 450,000 = \text{negative CU } 50,000$; $CPI \approx 0.889$.
2. $SV = 400,000 - 500,000 = \text{negative CU } 100,000$; $SPI = 0.80$.

3. A simple CPI-based EAC is approximately CU 1.125 million, suggesting CU 125,000 over budget if current cost efficiency persists.
4. Examine work-package causes, critical path, remaining procurement, risk, and whether past inefficiency will continue.
5. Do not interpret EV as revenue or CU 400,000 customer entitlement.

What the result means

The metrics provide an integrated warning, not a substitute for project judgment. A credible recovery plan must explain how future performance will differ from the evidence to date.

The case is deliberately compact. In practice, Varza would preserve the supporting documents, currency, dates, counterparty, project or cost center, approvals, and links to the resulting records. The lesson is not merely to reach a number; it is to make the path to that number reviewable.

Practical workflow

1. **Define the decision, responsible person, economic unit, period, and acceptable uncertainty.** Define the owner, required evidence, status, date, and exception route. Do not allow the next step to erase the record of the previous one.
2. **Establish an authorized, time-phased performance baseline by work package.** Define the owner, required evidence, status, date, and exception route. Do not allow the next step to erase the record of the previous one.
3. **Measure objective physical progress at a consistent status date.** Define the owner, required evidence, status, date, and exception route. Do not allow the next step to erase the record of the previous one.
4. **Complete actual-cost cut-off including accruals.** Define the owner, required evidence, status, date, and exception route. Do not allow the next step to erase the record of the previous one.
5. **Calculate variances and indices, analyze critical work, and update forecast with method appropriate to remaining risk.** Define the owner, required evidence, status, date, and exception route. Do not allow the next step to erase the record of the previous one.
6. **Reconcile the result to source evidence and investigate exceptions rather than forcing agreement.** Define the owner, required evidence, status, date, and exception route. Do not allow the next step to erase the record of the previous one.
7. **Approve the decision or record at the authority level required by value, risk, and legal consequence.** Define the owner, required evidence, status, date, and exception route. Do not allow the next step to erase the record of the previous one.
8. **Monitor the outcome, compare it with the original assumption, and retain the learning for the next cycle.** Define the owner, required evidence, status, date, and exception route. Do not allow the next step to erase the record of the previous one.

How this concept should appear in Varza

The minimum Varza data model for this chapter includes `performance_baseline`, `control_account`, `work_package`, `planned_value`, `progress_measure`, `earned_value`, `actual_cost`, `cost_variance`, `schedule_variance`, `estimate_at_completion`. These names are not merely interface labels. Each entity should have a stable identifier, status history, responsible owner, applicable currency or unit, effective dates, evidence links, and access controls.

A useful Varza screen should answer four questions without forcing the user to reconstruct the story manually:

1. **What happened or is expected to happen?** Show the operational event, obligation, or decision in plain language.
2. **What changed financially?** Show cash, asset, liability, equity, income, expense, commitment, or risk effects.
3. **Why should the user trust it?** Show source documents, calculations, approvals, and revision history.
4. **What requires attention now?** Show exceptions, due dates, thresholds, and the next responsible action.

The Varza design principles most relevant here are:

- Turn information into a decision, a control, or a question; otherwise it is only decoration.
- Begin with the real event, not the accounting label.
- Keep value, cash, profit, and ownership distinct until their relationship is proven.

Varza AI may explain, classify, compare, simulate, and prepare a proposed action. It should not silently change a legal record, post a material transaction, close a period, release a payment, or make an investment decision on the user's behalf. Material actions require visible evidence, permissions, validation rules, and an accountable human approval path.

Controls and professional boundaries

1. **No earned value without baseline and objective progress rule.** The control should be proportionate to value and risk, documented clearly, and tested often enough to detect failure before the consequence becomes irreversible.
2. **Status date common across PV, EV, and AC.** The control should be proportionate to value and risk, documented clearly, and tested often enough to detect failure before the consequence becomes irreversible.
3. **Actual-cost completeness review.** The control should be proportionate to value and risk, documented clearly, and tested often enough to detect failure before the consequence becomes irreversible.

4. **Index-based EAC compared with bottom-up forecast rather than accepted automatically.** The control should be proportionate to value and risk, documented clearly, and tested often enough to detect failure before the consequence becomes irreversible.
5. **Stable definitions, versioned assumptions, and consistent units across plans, records, and reports.** The control should be proportionate to value and risk, documented clearly, and tested often enough to detect failure before the consequence becomes irreversible.
6. **Traceability from every material total to evidence, calculation, owner, and change history.** The control should be proportionate to value and risk, documented clearly, and tested often enough to detect failure before the consequence becomes irreversible.
7. **Access and approval rights aligned with responsibility and the possible consequence of error or misuse.** The control should be proportionate to value and risk, documented clearly, and tested often enough to detect failure before the consequence becomes irreversible.

A control is effective only when it operates in practice. A policy that everyone can bypass is a statement of hope, not a control. Likewise, a control that blocks ordinary work without distinguishing low-risk and high-risk cases encourages hidden workarounds.

Common mistakes and better responses

Mistake 1: Calling customer billing earned value

Better response. Reconstruct the underlying event, state the definition being used, obtain the missing evidence, and recalculate before making a decision. Correct the process as well as the current number so the same error does not become routine.

Mistake 2: Earning budget because time elapsed rather than work completed

Better response. Reconstruct the underlying event, state the definition being used, obtain the missing evidence, and recalculate before making a decision. Correct the process as well as the current number so the same error does not become routine.

Mistake 3: Using incomplete actual cost and overstating CPI

Better response. Reconstruct the underlying event, state the definition being used, obtain the missing evidence, and recalculate before making a decision. Correct the process as well as the current number so the same error does not become routine.

Mistake 4: Treating SPI as calendar delay or letting favorable work hide critical-path failure

Better response. Reconstruct the underlying event, state the definition being used, obtain the missing evidence, and recalculate before making a decision. Correct the process as well as the current number so the same error does not become routine.

Mistake 5: Using a technically correct number outside the period, entity, currency, or decision boundary for which it was calculated

Better response. Reconstruct the underlying event, state the definition being used, obtain the missing evidence, and recalculate before making a decision. Correct the process as well as the current number so the same error does not become routine.

Mistake 6: Accepting an automated result without reviewing the evidence, assumptions, exceptions, and required professional judgment

Better response. Reconstruct the underlying event, state the definition being used, obtain the missing evidence, and recalculate before making a decision. Correct the process as well as the current number so the same error does not become routine.

Decision checklist

- ☐ Can I explain planned value in plain language and in professional terms?
- ☐ Can I explain earned value in plain language and in professional terms?
- ☐ Can I explain actual cost in earned value in plain language and in professional terms?
- ☐ Can I explain cost performance index in plain language and in professional terms?
- ☐ Have I stated the entity, currency or unit, date or period, and decision boundary?
- ☐ Can another person reproduce the number from retained evidence?
- ☐ Have I separated actuals, estimates, commitments, and scenarios?
- ☐ Have I tested timing, liquidity, risk, and at least one adverse outcome?
- ☐ Is the required approval proportional to the possible loss or legal consequence?
- ☐ Does the final output lead to a specific action, owner, and review date?

Practice lab

1. **Explain it.** Describe Planned value to a person who has never studied finance. Then add the professional definition and identify one boundary your simple explanation omitted.
2. **Classify it.** Create five examples from your household or a small business and classify each using Earned value. State any assumptions.
3. **Calculate it.** Rebuild the worked case with amounts 20% higher. Identify which conclusions change and which remain structurally true.
4. **Challenge it.** Describe a situation in which Actual cost in earned value could be measured correctly but still lead to a poor decision because timing, risk, or incentives were ignored.
5. **Design it.** Sketch a Varza screen or report for this chapter. Include fields, evidence links, status, owner, exceptions, and one AI-assisted action.

Answer guidance

A strong answer uses consistent definitions, reveals assumptions, distinguishes fact from estimate, and connects the result to an action. More than one conclusion may be reasonable when the learner clearly states the decision objective and uncertainty. The worked-case recalculation should preserve the method even when the numbers change.

Varza AI knowledge capsule

This capsule is intentionally explicit so that a retrieval system can distinguish canonical teaching points from examples and commentary.

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    "Actual cost in earned value: the recorded cost incurred for the work performed by a measurement date.",
    "Cost performance index: earned value divided by actual cost, indicating cost efficiency under earned-value definitions.",
    "Schedule performance index: earned value divided by planned value, indicating schedule efficiency in budget-value terms.",
    "Estimate at completion: the current forecast of total project cost at completion.",
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Suggested questions for Varza AI

- Explain this chapter using an example from a household, a shop, and a service business.
- Ask me five diagnostic questions before applying this concept to my situation.
- Show the difference between cash effect, accounting effect, and decision effect.
- Recalculate the worked case using my currency and assumptions, but preserve the original definitions.
- Identify which parts require local accounting, tax, legal, labor, or investment rules.

Sources and standards horizon

This chapter is original Varza educational content. It paraphrases and synthesizes concepts; it does not reproduce a standard or third-party article. The following sources were used to establish terminology, scope, and current professional context:

- **S208 — U.S. Government Accountability Office, *Cost Estimating and Assessment Guide*.** 2020-03-12. Reliable estimating, work breakdown structures, assumptions, risk and estimate updates. Source: <https://www.gao.gov/products/gao-20-195g>
- **S209 — U.S. Department of Energy, *Earned Value Management*.** accessed 2026-08-31. Integrated measurement of scope, schedule and cost. Source: <https://www.energy.gov/projectmanagement/earned-value-management>
- **S210 — U.S. Department of Energy, *EVMS Implementation Guidance*.** accessed 2026-08-31. Implementation of earned value management systems. Source: <https://www.energy.gov/projectmanagement/evms-implementation-guidance>
- **S211 — Project Management Institute, *Work Breakdown Structure—Basic Principles*.** accessed 2026-08-31. Product-oriented decomposition of total project scope. Source: <https://www.pmi.org/learning/library/work-breakdown-structure-basic-principles-4883>

Standards horizon. Reviewed through 2026-08-31. IFRS 18 and the third edition of the IFRS for SMEs Accounting Standard are included as transition knowledge where relevant; both have mandatory

effective dates beginning in 2027, with early application permitted under their respective requirements.

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