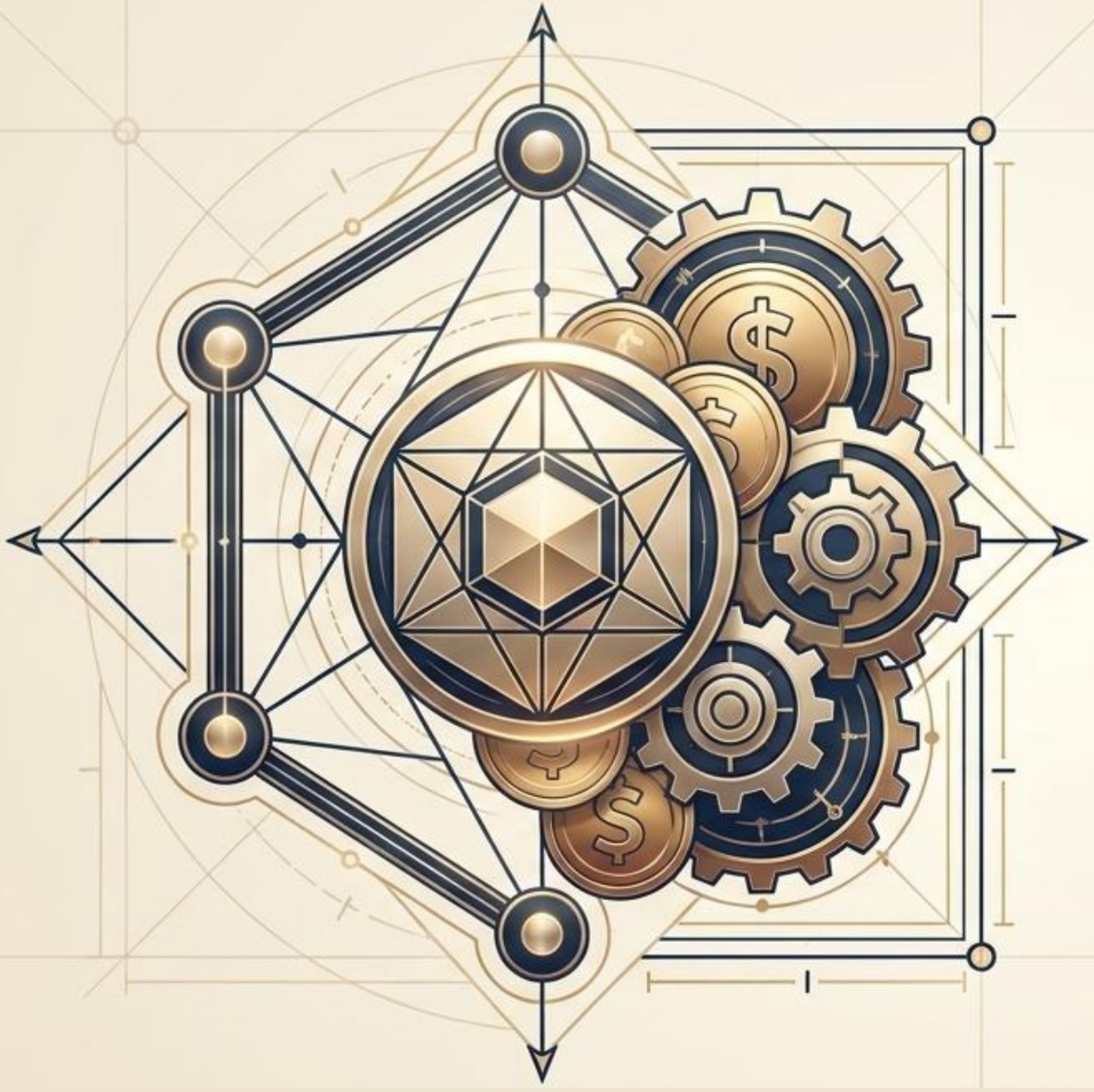

# Project Cost Management: Deep Dive Blueprint

A Strategic Guide to PMBOK Methodologies, Estimation Mechanics, and Earned Value Control.

**7204201 Project Management in Information Technology : Paranya Palwisut**

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# The Mastery Pathway

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# The Strategic Imperative of Cost Management

## The Definition

> Project Cost Management is the process of planning, estimating, budgeting, and controlling costs so that the project can be completed within the sacrificing quality or time.

## The 4 Value Pillars

**Financial Risk Reduction**: Preventing budget overruns.

**Resource Optimization**: Maximizing utility of personnel, materials, and time.

**Business Intelligence**: Providing data-driven executive decision support.

**Competitive Advantage**: Building long-term profitability and organizational trust.

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# The Balancing Act: Navigating the Triple Constraint

**Fast-tracking** to reduce **Time** requires injecting resources, inflating **Cost**.

A sudden **Budget Cut** forces a reduction in **Scope** or a sacrifice in **Quality**.

**Key Takeaway:** The Project Manager's primary role is maintaining this delicate equilibrium throughout the project lifecycle.

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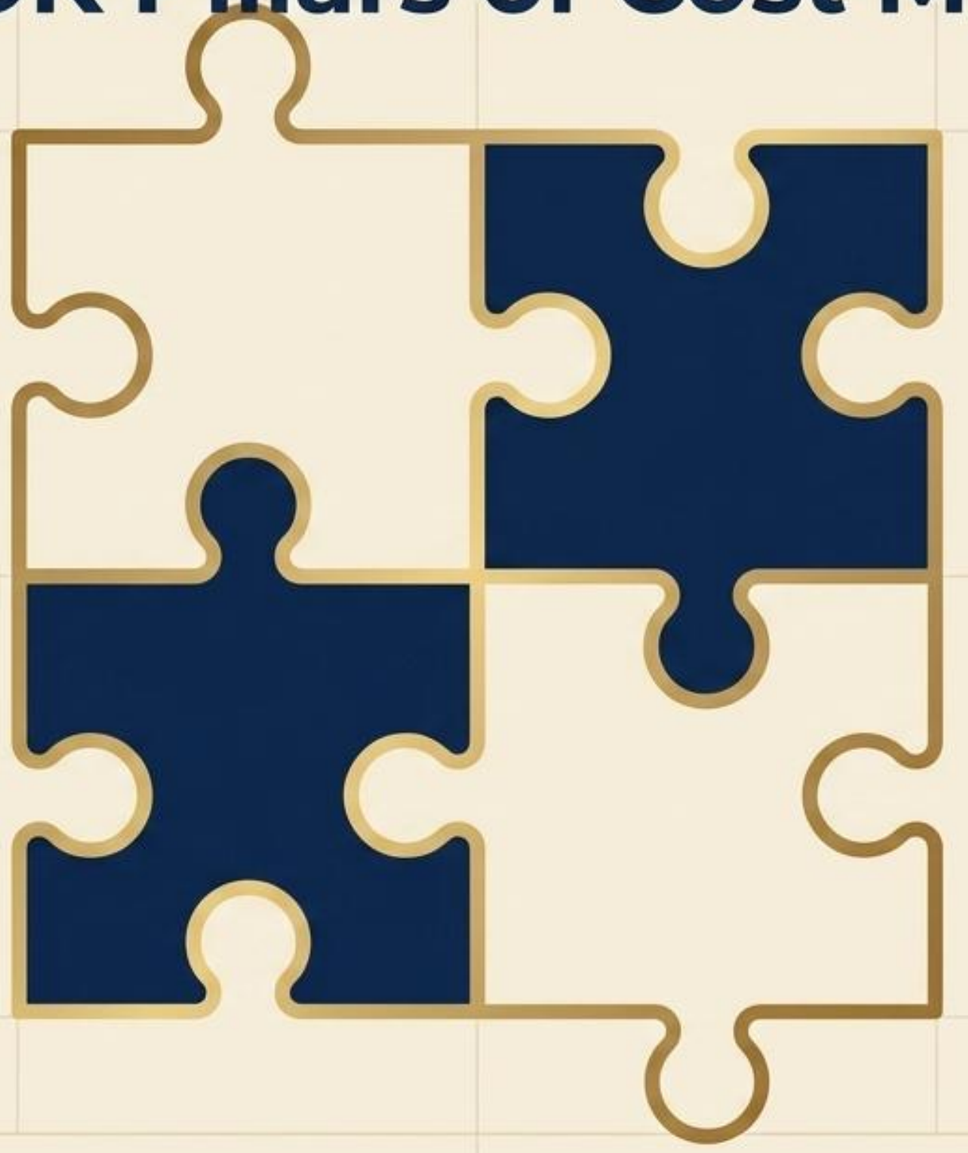
# The 4 PMBOK Pillars of Cost Management

## 1. Plan Cost Management

Establishing the guidelines, metrics, and reporting formats.



## 2. Estimate Costs

Predicting the specific financial resources needed for every individual activity.

## 3. Determine Budget

Aggregating individual estimates to establish the official Cost Baseline.

## 4. Control Costs

Monitoring active expenditures against the baseline and managing changes.

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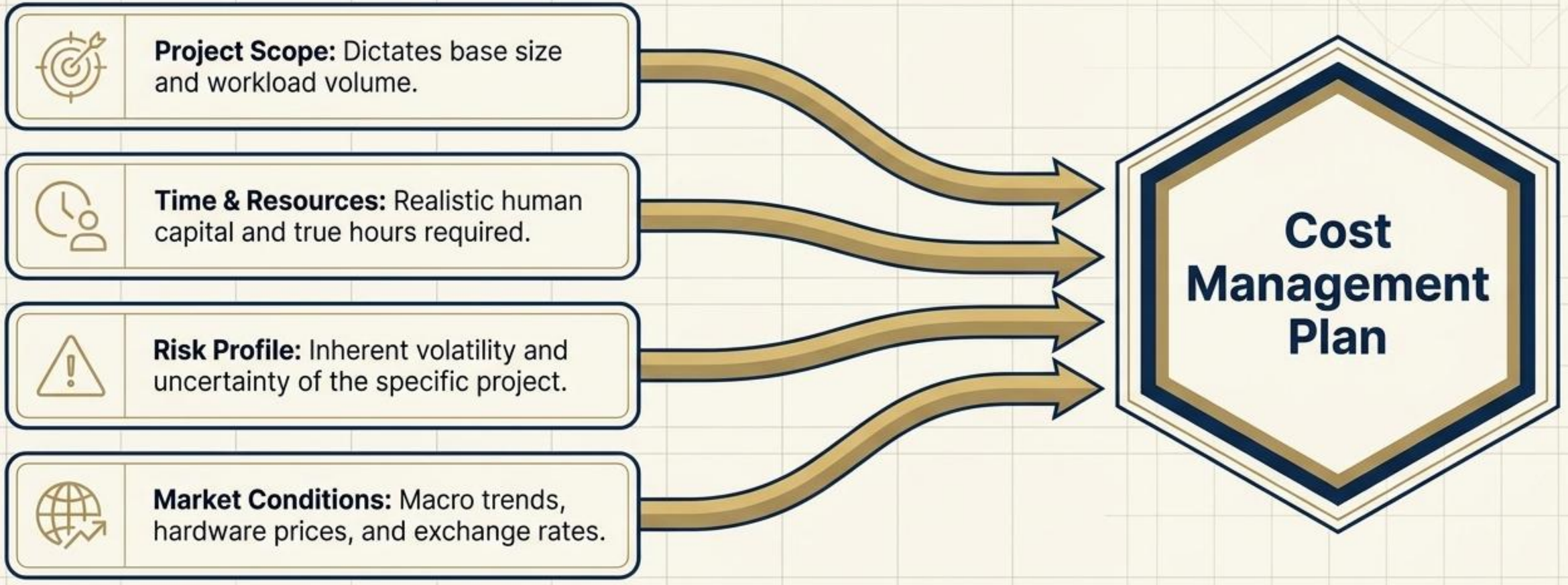
# Pillar 1: Architecting the Cost Management Plan

A robust plan is the project's compass, minimizing deviation and setting strict control standards.

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# Pillar 2: Cost Anatomy & Classification

## Definitions Sidebar

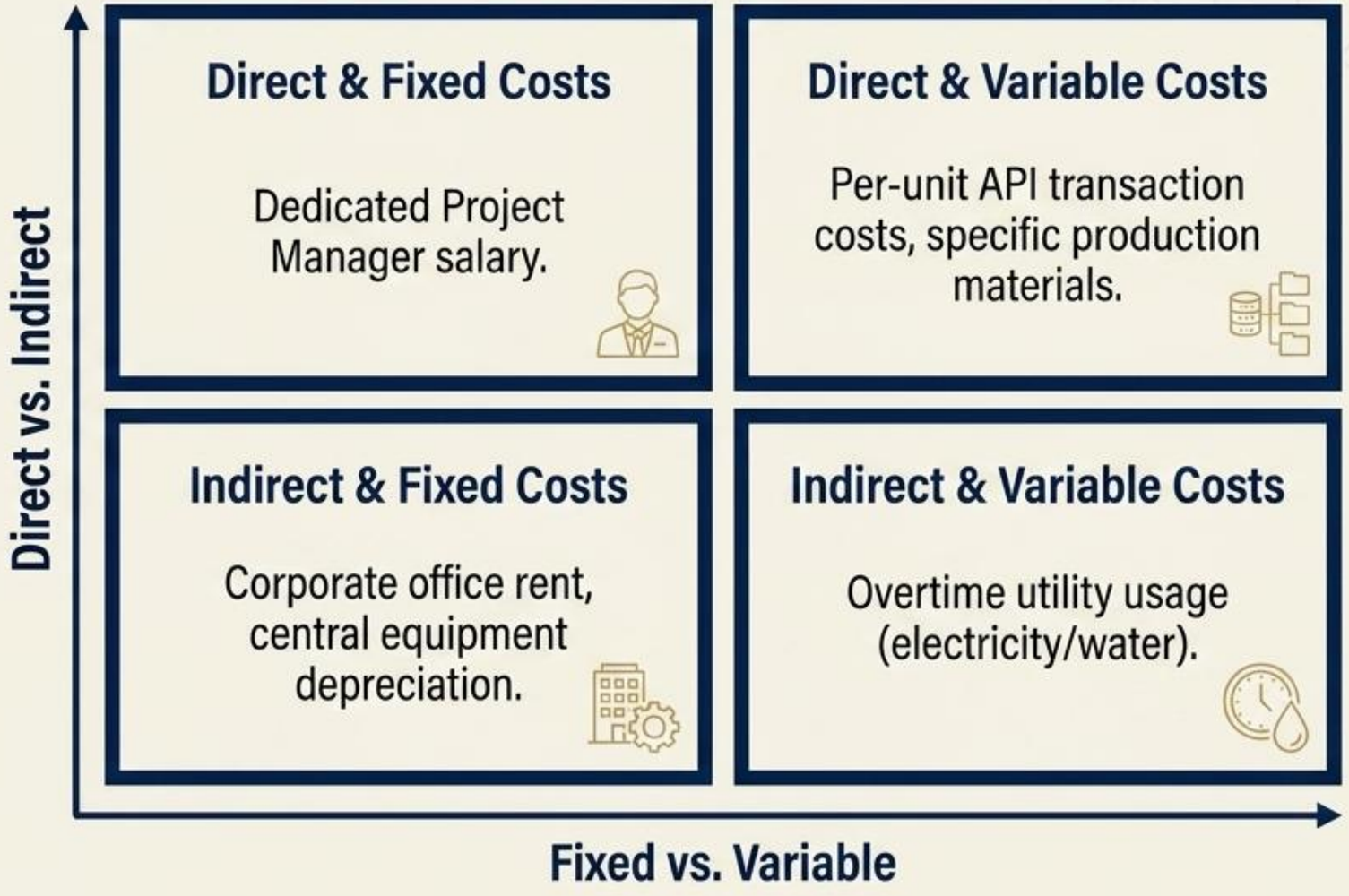
**Direct Costs:** Directly attributable to the project.

**Indirect Costs:** Shared organizational support costs.

**Fixed Costs:** Constant regardless of volume or time.

**Variable Costs:** Fluctuate directly with output or usage.

## The Cost Quadrant

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# Software Estimation Mechanics

$$\left[\text{Software Size}\right] \times \left[\frac{\text{Complexity}}{\text{Team Skill}}\right] = \text{Total Man-Days}$$

*Estimation is both a data-driven science and an experiential art.*

## Advanced IT Models

### COCOMO (Constructive Cost Model)

Estimates based on Source Code lines (LOC). Ideal for massive, Waterfall-style systems (tens of thousands of lines).

### Function Point (FP)

Estimates based on system functionality. Highly versatile because it is completely independent of the underlying programming language used.

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# Estimation Techniques: Top-Down vs. Statistical

## 1. Analogous Estimation (Comparative)

**Mechanism**: Uses historical data from a similar past project (e.g., Past Project A cost $100K, therefore Current Project B will cost $100K).

- ✓ **Strengths:** Extremely fast; lowest cost to perform.
- ⚠ **Caution:** Lowest accuracy (can vary +/- 50%).

## 2. Parametric Estimation

**Mechanism**: Uses statistical relationships between historical data and variables (e.g., 50 APIs × 2 days/API × $400/day = Total Cost).

- ✓ **Strengths:** Medium to High accuracy.
- ⚠ **Caution:** Requires highly reliable historical data; fails entirely on unique or novel projects.

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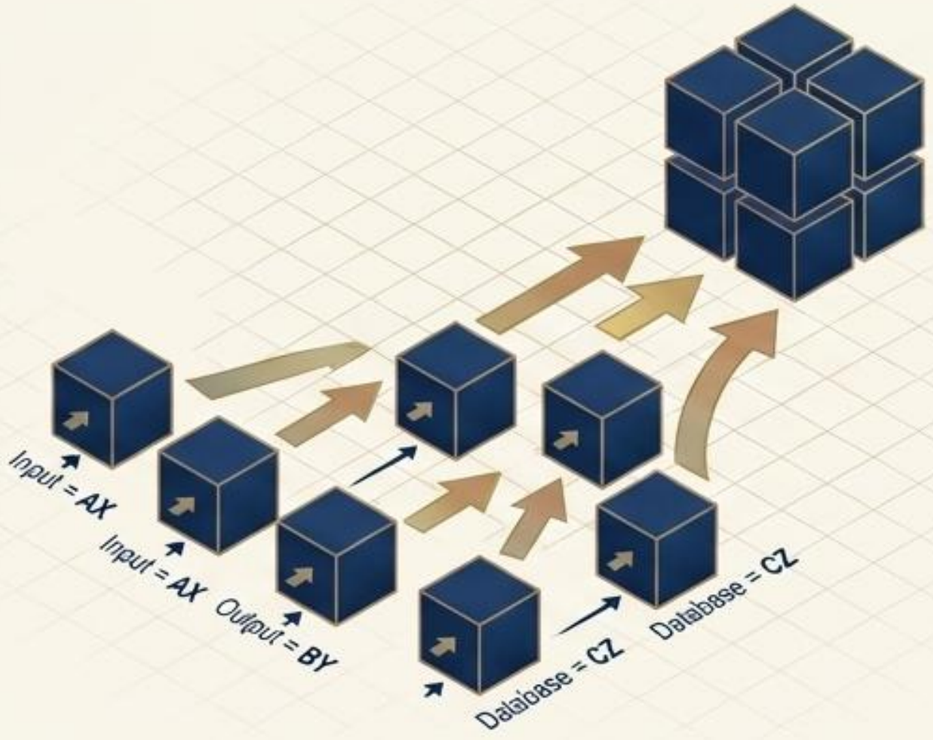
# Estimation Techniques: Granular vs. Risk-Adjusted



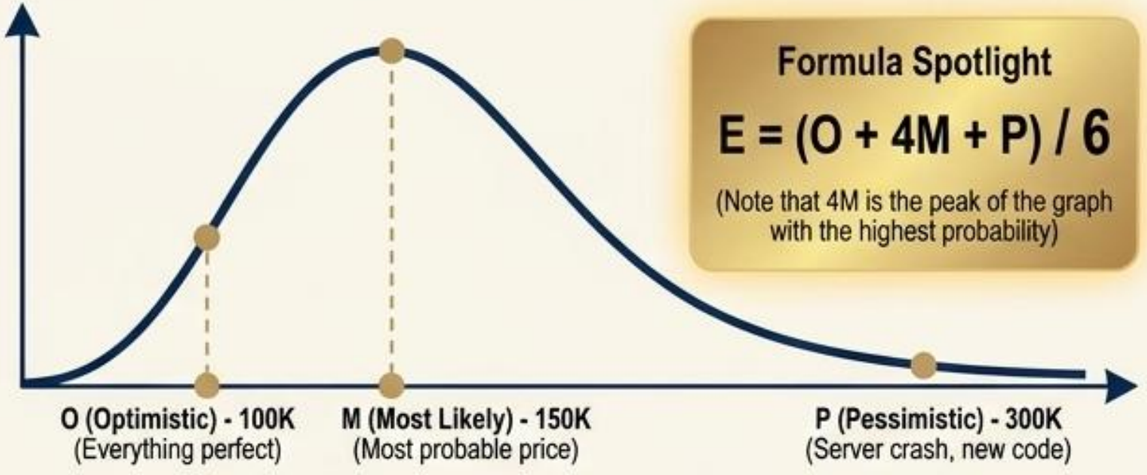

| Mechanism & Strengths | Caution |
|---|---|
| **Mechanism:** Decomposes work into a WBS, estimates each micro-component, and aggregates the total.<br><br>**Strengths:** Maximum accuracy; creates deep team ownership. | **Caution:** Extremely slow and resource-intensive. |

## 3. Bottom-Up Estimation

Total Cost = AX + BY + CZ

| Mechanism & Strengths | Caution |
|---|---|
| **Mechanism:** Decomposes work into a WBS, estimates each micro-component, and aggregates the total.<br>**Strengths:** Maximum accuracy; creates deep team ownership. | **Caution:** Extremely slow and resource-intensive. |

## 4. Three-Point Estimation (PERT / Beta Distribution)




**Mechanism:** Manages uncertainty by factoring Optimistic, Most Likely, and Pessimistic scenarios. Excellent for mitigating optimism bias and calculating required Contingency Reserves.

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# The Synthesis Matrix: Choosing the Right Technique

There is no single perfect technique. The choice depends entirely on the project phase and the volume of data available.

| Technique | Accuracy | Time Required | Best Project Phase |
|---|---|---|---|
| Analogous | Low | Fast | Week 1 (Project Charter) |
| Parametric | Med-High | Moderate | Week 4 (Architecture Design) |
| Bottom-Up | Maximum | Slow | Week 6 (Detailed Budgeting) |
| Three-Point (PERT) | Risk-Adjusted | Slow | Week 12 (Risk Management) |

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# Pillar 3: The Budget Stacking Diagram

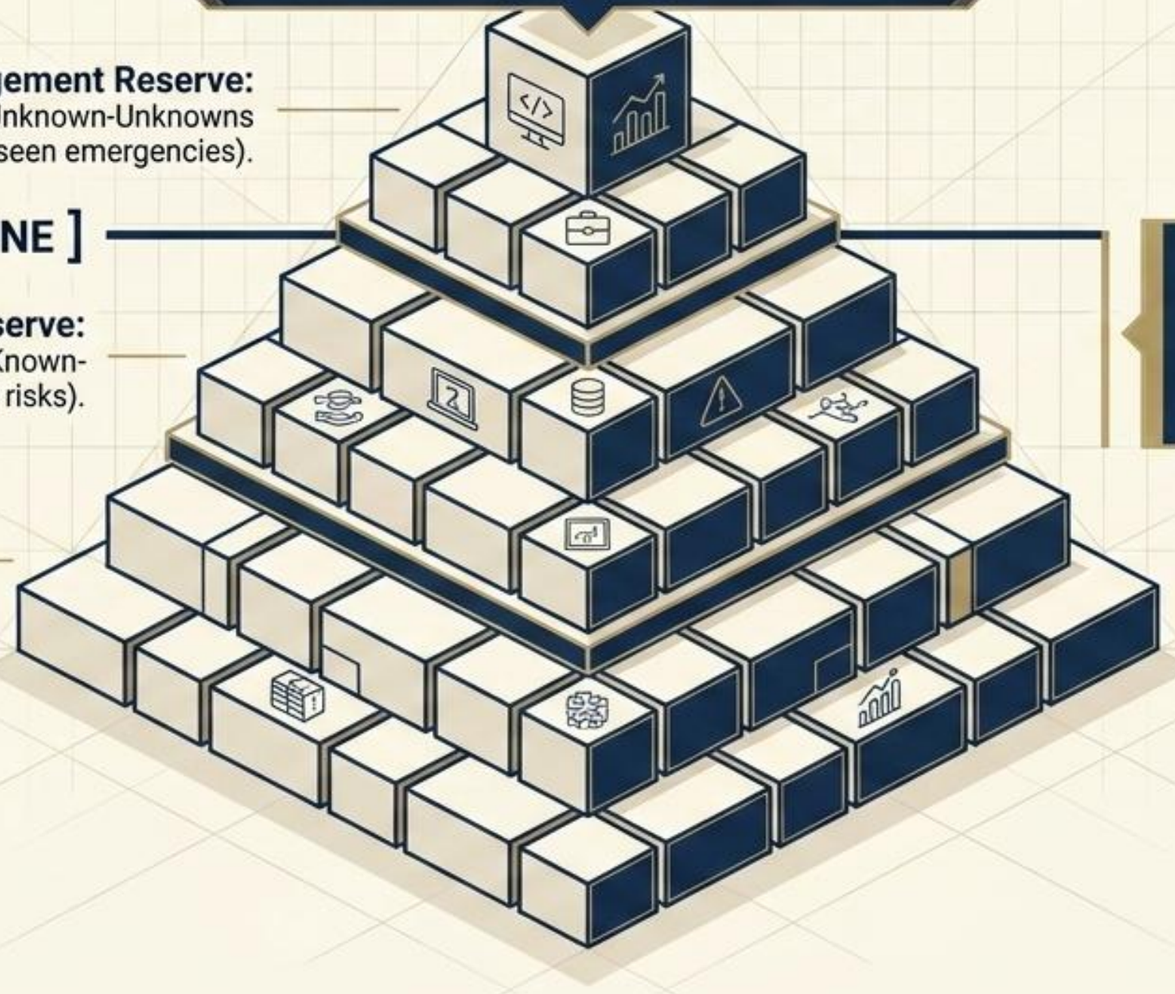
**Total Project Budget:**
The ultimate financial boundary of the project.

**Management Reserve:**
Executive funds held for Unknown-Unknowns (unforeseen emergencies).

**[ THE COST BASELINE ]**

**Contingency Reserve:**
Funds allocated for Known-Unknowns (identified risks).

**Activity Costs:**
The raw, baseline cost of all ground-level operational tasks and resources.



**Insight:**
This is the approved budget and official project metric. Breaching this requires formal Change Requests.

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# Pillar 4: Control Costs via Earned Value Management (EVM)

EVM is the ultimate Health Monitor of the project. It answers the vital question: **Are we getting value for the money spent today?**

**PV (Planned Value)**
The authorized budget assigned to scheduled work.
(What we planned to do by today)

**EV (Earned Value)**
The measure of work performed, expressed in terms of the budget authorized.
(What we actually achieved)

**AC (Actual Cost)**
The realized cost incurred for the work performed.
(What we actually paid to get here)

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# EVM Diagnostics: Variances & Indices

## Variance Analysis (The Gap)

### CV (Cost Variance) = EV - AC

- >0 = Under Budget
- <0 = Over Budget

### SV (Schedule Variance) = EV - PV

- >0 = Ahead of Schedule
- <0 = Behind Schedule

## Performance Indices (The Ratio) & Diagnosis

CPI (Cost Performance Index) = EV / AC

SPI (Schedule Performance Index) = EV / PV

| Project Health Diagnosis | |
|---|---|
| | CPI > 1 & SPI > 1 : Optimal Health (Under budget, Ahead of schedule). |
| | CPI < 1 & SPI > 1 : Buying Time (Over budget, Ahead of schedule). |
| | CPI > 1 & SPI < 1 : Frugal but Slow (Under budget, Behind schedule). |
| | CPI < 1 & SPI < 1 : Critical Crisis (Over budget, Behind schedule). |

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# Execution Reality: Pitfalls & Pragmatic Solutions

| 5 Classic Cost Management Problems | |
|---|---|
| | **Poor Estimation**: Rampant Optimism Bias. |
| | **Scope Creep**: Uncontrolled requirement changes inflating costs. |
| | **Poor Tracking**: Lack of real-time EVM dashboards. |
| | **External Risks**: Sudden inflation or vendor pricing shifts. |
| | **Siloed Communication**: Misaligned stakeholder expectations. |

## IT Project Case Study

**The Setup**:
8-month IT project, 2,000,000 Baht Total Budget.

**The Issue**: Scope creep suddenly increased development costs development costs by 250,000 Baht.

**The Resolution**: The PM successfully analyzed the impact and reallocated funds directly from the established 400,000 Baht Contingency Reserve.

**The Result**: The project continued without breaching the Cost Baseline or requiring new executive funds. The power of a structurally sound budget.

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# The Future: Cost Management in the Digital Era

## Artificial Intelligence (AI)

Proactive analysis of historical cost data to predict budget overruns before they happen.

## Big Data Analytics

Processing massive industry datasets to drastically elevate the accuracy and granularity of Parametric estimation models.

## Automation & ERP Systems

Seamlessly pulling real-time financial data across departments to eliminate human error in actual cost (AC) data entry.

## Cloud Computing & Real-time BI

Shifting Capex fixed costs to variable Opex, and powering real-time, automated EVM dashboards for split-second executive visibility.

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# The Project Manager: The Orchestrator of Value

**Insight:** Modern project managers are not just bookkeepers recording expenses; they are conductors orchestrating value.

**The Planner:** Architecting a rigorous, highly accurate budget foundation using precise estimation matrices.

**The Analyst:** Utilizing EVM metrics to diagnose dangerous financial anomalies before they become critical crises.

**The Communicator:** Translating complex variance mathematics into clear, actionable narratives for executive alignment.

**Final Takeaway:** **Great cost management is never about spending the least amount of money—it is about maximizing the return on investment and delivering sustainable organizational value with absolute precision.**

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