

FINANCIAL MODELS FOR IT INVESTMENTS

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Budgeting and cost management for information technology (IT) investments can get out of hand without careful planning and control. Indeed, many IT projects do experience costs that spin out of control. Inadequate budget formulation, estimating, and cost modeling are often underlying causes.

Weak financial modeling defeats the purpose of Earned Value Management (EVM). After all, you cannot expect satisfactory results on EVM's Cost Performance Index (CPI) or Schedule Performance Index (SPI) if your financial model is based more on guesstimating than estimating.

A compounding problem is that organizations require a project's financial plan and budget to be prepared showing a multitude of perspectives:

- Budget officers must apply a set of cost categories. The top level for Federal agencies tends to be the universal Budget Object Class categories.
- Project Management Office needs costs organized by Work Breakdown Structure (WBS)
- The Enterprise Architects may want to see the costs by Service Oriented Architecture (SOA) and/or technical service categories
- Your information security officer wants to identify costs that are associated with security
- The procurement office wants costs organized by acquisition (and acquisition segment)
- Management needs to know how much you will be spending by fiscal year, quarter, or month
- The Chief Financial Officer may have a few additional requirements.

A financial model that integrates multiple perspectives and supports comprehensive planning can help you do a better job of budgeting and cost control. This is exactly the approach that the P2C2 Group seeks for its clients.

IT Financial Models

An IT financial model is an expression of the quantitative relationship between costs, assumptions, and risks associated with a defined investment in information technology. The model uses a common data structure across all dimensions to enable comparability over time, between alternatives, and among various perspectives. A simple example of the concept of a basic data structure is in Figure 1.

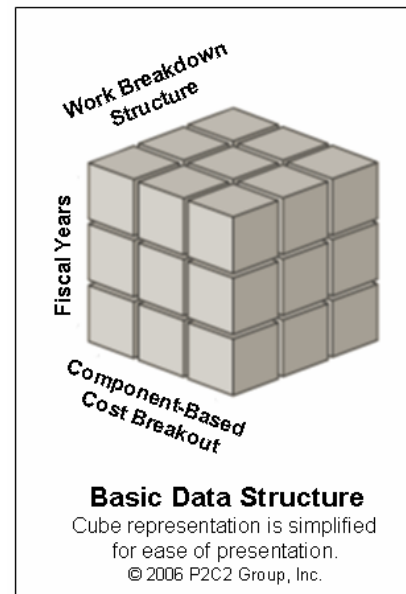


Figure 1

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The basic steps of our model are summarized in the following figure and explained in the accompanying table:

FINANCIAL MODELING PROCESS DIAGRAM

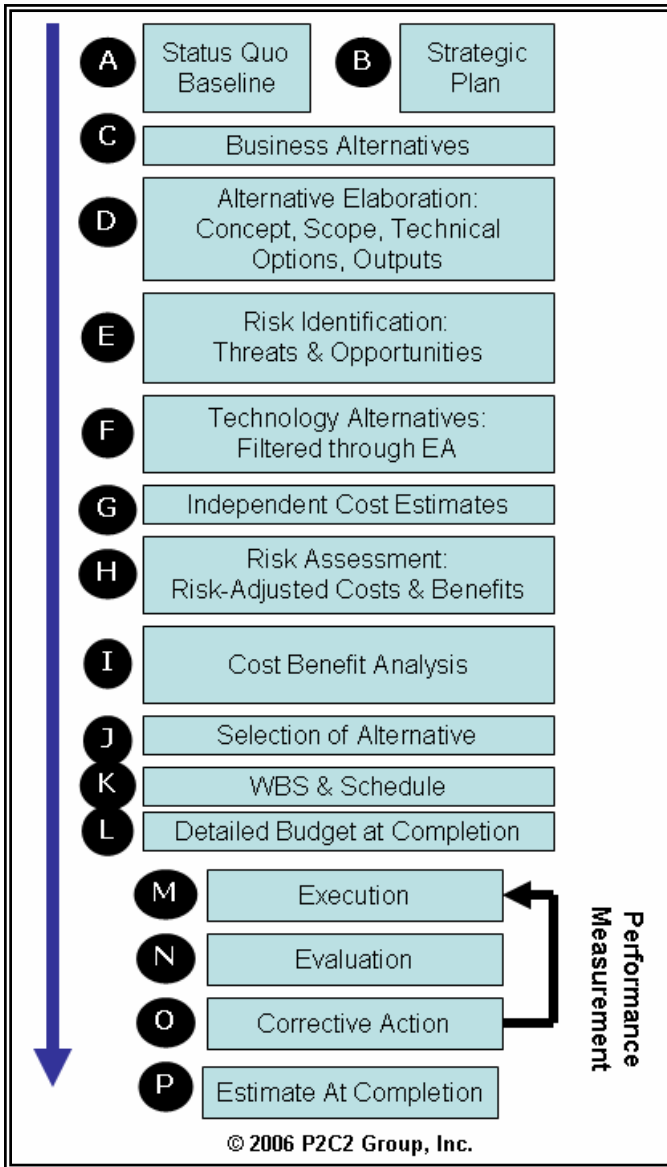


Figure 2

Following is an explanation of the diagram in Figure 2:

PLANNING PHASE

A Status Quo is your baseline of “doing nothing.” Your benchmark can be a legacy system, manual processes, or use of external assets.

B Strategic Plan should define the purpose of any initiative to replace the Status Quo, because all major capital investments should be a strategic priority that seeks business transformation.

C Business Alternatives: Business needs will usually drive your analysis of options. Examples include business process transformation, improved uses of knowledge and human capital, outsourcing, quality of service, security, and agile disaster recovery. Specific technology options should generally not be considered until later in the planning process (see F).

D Alternative Elaboration: You will need to define in some detail the concept, scope, and outputs of each alternative. You should also begin defining technical options within each alternative. Each alternative should identify the deliverable components and scope in sufficient detail to enable risk identification, evaluation of technology options, and independent cost estimates.

E Risk Identification: You need to begin your risk assessment in parallel

with financial modeling because the Excel workbook will need to identify impact and probability, assigning a cost value. Risk analysis includes both threats (negative factors) and opportunities (benefits). Therefore, the analysis includes identifying opportunities—the benefits you expect to derive from each alternative, including the assigned probability of achieving the benefit. For project risk, you may also link the risk spreadsheets to source data from quantitative risk analysis methods such as the Monte Carlo technique.

F Technology Alternatives: There will often be several technology solutions for each business alternative. The most viable technical options should be evaluated in terms of the Enterprise Architecture, risk, and cost.

G Independent Cost Estimate: Each of the Business Alternatives and technology options should be evaluated for cost. We recommend a structured, component-based breakout of cost elements to enable comparisons. In addition, both acquisition and operations/maintenance costs should be distributed by fiscal year over the lifecycle of the system.

H Risk Assessment: Risk-Adjusted Costs and Benefits. The independent cost estimates must interact with risk factors (costs and benefits) to yield risk-adjusted values. This step uses spreadsheet formulas to calculate risk-adjusted costs and benefits.

I Cost Benefit Analysis: Based on the foregoing information, this step produces cost-benefit tables, transforming constant-dollar values into Net Present Value, Return on Investment (ROI), and Internal Rate of Return (IRR). Again, the table must distribute costs and benefits by fiscal year in order to perform the calculations.

J Selection of Alternative: The most appropriate alternative will be selected based on cost, benefits, return on investment, project risk, time constraints, and qualitative factors. This step does not have a section in the spreadsheet, but it is necessary to establish the budget and earned value baseline for the new investment.

K WBS and Schedule: The financial model will be further developed for the alternative selected. It may be appropriate to maintain the detailed WBS and schedule in a separate project management software application. Many such applications can link to spreadsheets and databases—enabling the financial model to be updated on the basis of any approved changes to scope, cost and schedule.

L Detailed Budget At Completion (BAC): This provides the detail needed for Earned Value Management.

EXECUTION PHASE

M Execution: This is the “Acquisition Phase,” when the IT assets are purchased, implemented, and integrated into a working solution. Execution should conform to the financial model unless there are approved changes.

N Evaluation: Throughout project execution, there is an evaluation function—including cost, schedule, and system performance.

O Corrective Action: Corrective action is taken if costs, schedule, or system performance is off track. Actions and changes should be reflected in the financial model.

P Estimate At Completion (EAC): The financial model should be updated to maintain consistency with EVMS projections.

Assumptions about the Planning Phase

The planning phase is unique in that it includes an analysis of alternatives, including cost, risks, and initial cost benefits analyses. However, over the long-term, the financial model will focus only on the single business alternative that has been recommended for implementation.

We assume that your model for the planning phase will support an alternatives analysis which will compare four options – the Status Quo plus three alternatives. There will need to be an independent cost estimate for each of the four options, as well as a risk assessment. Risk analysis includes both threats and opportunities and therefore applies risk-adjusted dollar values both to threats and opportunities (benefits). Cost Benefits Analysis will use risk adjustments for both costs and benefits, and the estimated cost (and benefits) of a project will be based on risk-adjusted values.

For comparison purposes, all of the options (Status Quo and alternatives) will use a structured approach to costs and benefits—even though some options may have a null (zero) value. For

example, some alternatives may not possess certain components or benefits, but the tables for all options should be structured consistently to ensure comparability.

For practical purposes, the costs and benefits should also be distributed over time—such as by fiscal year or quarter. Ultimately finer detail will be needed to mesh the costs with the WBS.

Getting Started with the Spreadsheet

Generally we recommend beginning with a spreadsheet workbook (such as Excel) during the planning phase and then converting to a database during the ongoing lifecycle. The workbook tabs (sheets) can readily be exported later to a database if well structured as tables, and the Excel format is versatile during the planning phase when frequent refinements are needed for updating table rows, columns, and formulas.

During the planning phase, the financial model must also address alternatives, estimate cost of risk, and provide the framework for a Cost Benefits Analysis. All of these special requirements are handled readily by the Excel workbook format.

Over the longer term, however, a database will be more practical, particularly as you begin incorporating actual cost performance data from other systems and synchronizing the financial modeling information with project management data, budgets with approved changes, actual costs based on the accounting system, etc.

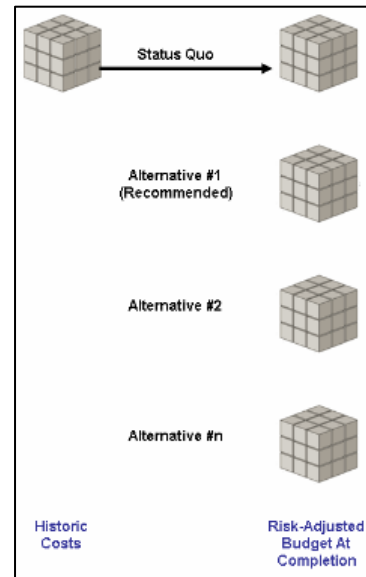


Figure 3

Organizing the Excel Workbook

We prefer using a separate tab for each segment of the financial model. This keeps the data tables structured and easy to export later to a database. Narrative comments are usually added to the right of the table to avoid confusion with table elements. We recommend the following workbook tabs for each option (the status quo and each alternative). For complex projects, it is better to use many consistent tabs rather than to cause confusion by clumping multiple tables on a single worksheet. As examples:

- Independent Cost Estimate – a total of four tables
- Risk Analysis of Costs (Threats) – a total of four tables for threats with estimated values for each
- Risk Analysis of Benefits (Opportunities) – a total of four tables with estimated values for each
- Risk-Adjusted Budget and Benefits At Completion for Each Option, distributed by fiscal year
- Funding Plan by WBS and Fiscal Year – separate tables for each alternative, plus a comparison table
- Cost Benefit Analysis – separate tables for alternatives, plus a comparison table

Independent cost estimates should be based on as much real-world data as practical, and it is often helpful to use industry data sources or the results of Request for Information (RFI) solicitations. Risk analysis of threats should be synchronized with the risk plans (for project risk and information security risk), and the table formulas should take into consideration potential

probability and impact to yield a calculated risk cost. Benefits should include estimates of cost avoidance, cost savings, and quality improvements—both for internal and external stakeholders.

Basic Data Structure for the Model

There are several ways to organize the basic data structure for the financial model. Since it is difficult to depict multiple dimensions directly in a spreadsheet, we usually focus on a component-based cost breakout, distributed by fiscal years over the entire system lifecycle. We also recommend columns for Object Class (Budget) Codes, special assets such as Security support, and categorization of acquisitions (hardware, software, services). @LOOKUP and SUMIF functions in the spreadsheet are a very effective way of adding more perspectives and specialized views of the financial model.

Longitudinal View of the Financial Model

This article has focused primarily upon the Initiation and Planning Phases of the financial modeling process. However, the model should be extended and updated over time. This may result in the following evolution and additional data sets:

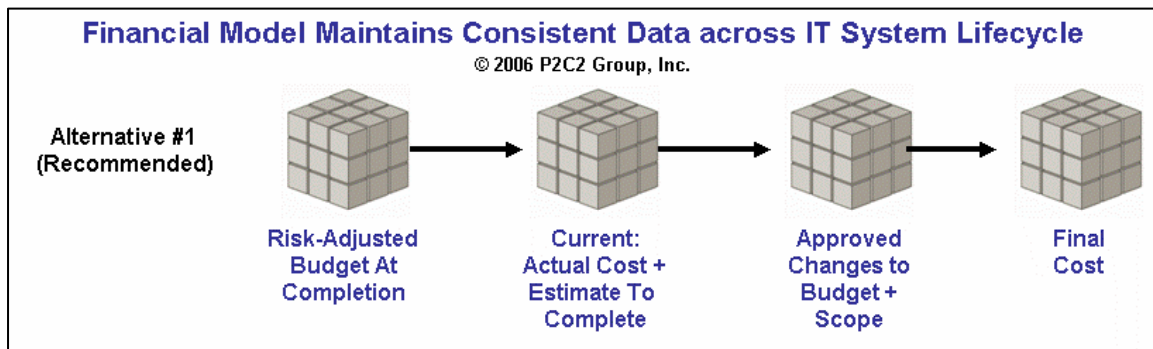


Figure 4

After the initial planning spreadsheet, a database will be more practical, particularly as you begin incorporating actual cost performance data from other systems and synchronizing the financial modeling information with project management software, budgets with approved changes, etc.

Avoid Paralysis and Take Action

Models—quantitative or otherwise—are imperfect representations of the real world. A model should be as accurate as possible within time and cost constraints, but there is always a degree of risk and uncertainty. (Just look at the imperfect efforts to model the stock market or economic trends!)

In the end, management must make decisions based on the best information practicable. A good financial model can help greatly and serve as a tool for better cost-benefit analysis, project management, and cost control. But modeling's value lies in its capacity to serve as an input for management action. This has been ably stated by Christian Litke and Michael Pelletier:

As if there weren't enough factors to investigate when deciding what system to choose, you need to make sure you don't let the process of investigating those factors result in project failure. While there may be dozens of factors to

investigate, companies run the risk of "paralysis by analysis." You need to keep the big picture in mind and not get stymied by the microlevel review.¹

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¹ Litke and Pelletier, see bibliography.