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This complimentary eResource is provided assist users of the Working Guides to Estimating and Forecasting in recreating the tables and figures provided in the published books (printed or electronic). It is supplementary to, and is not intended to replace the material in the published books. The files are available to download in their original colour format.

The material provided is either as interactive spreadsheet files complete with original calculation formulae, or as static images where the reader may prefer to view the examples provided in full colour.
Estimate Creation is just a small part of the Estimating System

Example 1

Customer Requirement & Estimate Initiation → Estimate Initiation → Estimate Planning → Estimate Creation → Estimate Validation, Challenge & Clearance → Performance Monitoring

Example 2


Historical Performance (Data and Context)

Figure 2-1
Automotive Car

- Body
  - Frames
  - Panels
  - Seats & Furnishings
  - Bumpers

- Chassis

- Powertrain
  - Engine
  - Gearbox
  - Drivetrain

- Systems
  - Steering
  - Electrics
  - Exhaust System
  - Fuel System
  - Brakes
  - Airbags

Drill down from the top level to an appropriate level at which to estimate

Figure 2-2
Roll up from the lower levels to create the overall top level estimate.
Cost Driver

“True” underlying Cost Estimating Relationship

Confidence Interval around underlying Cost Estimating Relationship

Linear Analogy is an acceptable approximation to the true Cost Estimating Relationship

Figure 2-6
Obtain Historical Data

Normalise the Data

Analyse the Normalised Data

Create a 3-Point Estimate

Select an Estimating Approach

Select an Estimating Method

Select an Analytical Technique

Analyse the Normalised Data

Validate the Estimate

Document the Basis of Estimate

Submit the Estimate for Clearance

Figure 2-10
Differences in Interpretation of Scope

Cost Variance

Confidence Booster?

Bottom-Up Summation

Cost Reference Point

Top-down Analogy

Low Level Analogies, Parametrics or Trusted Source

Confidence Shaker?

Bottom-Up Summation

Cost Reference Point

Top-down Analogy

Low Level Analogies, Parametrics or Trusted Source

Figure 2-11
Choice of Estimating Approach for a Chosen Estimating Element

- **Are we creating or validating an estimate?**
  - **Creating**
    - **How well defined is the task to be estimated?**
      - **Good definition**
        - **How quickly is the estimate required?**
          - **Very quickly**
            - **How accurate is the estimate required to be?**
              - **As accurately as possible**
        - **In a reasonable timescale**
          - **“Immediately”**
            - **Very little definition**
  - **Incomplete definition**
    - **Consider a Top-down Approach**
      - **Consider a Bottom-Up Approach**
        - **Consider an Ethereal Approach**

- **Validating**
  - **Consider an alternative approach to the one used to create the estimate to be validated**

**Figure 2-12**

Which Estimating Approach are we taking?
Top-down or Bottom-Up

Do we know what the Estimate Drivers are?

Are there any relevant metrics or norms?
Three or More
One or Two
None

How many historical data points do we have?

Is there a pattern to the data when it is plotted?

Consider a Parametric Method

Consider an Analogical Method

Consider a Trusted Source Method
Choice of Estimating Technique with an Analogical Method

What do we believe is the nature of the underlying Estimating Relationship?

- **Linear**
  - Consider both a Linear and a Power Relationship
    - Consider Linear Factors Rates or Ratios
      - Can we use a second analogical reference point or relationship to create a simple range estimate?
        - Yes: Consider the Arithmetic or Geometric Mean of the two Analogies supported by a Sensitivity Analysis to create a 3-Point Range Estimate
        - No: Consider a Sensitivity Analysis of relevant Factors Rates Ratios to create a simple 3-Point Range Estimate
  - Power
    - Consider Linear Factors Rates or Ratios on the Transformed Data

- **Non-Linear**
  - Consider a Standard Linear Transformation (Exponential, Logarithmic or Power)

- **Unknown**
  - Consider Analogical Simulation (Figure 2.17)

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Figure 2-14
Choice of Estimating Technique with a Parametric Method

Is the task a Research and Development Activity?

- Yes: Consider a Norden-Rayleigh Curve
- No or Don’t Know: Consider Nonlinear Curve Fitting

Does the trend over time appear to be exponential?

- Yes: Consider Function Type of each additional driver
- No: Consider Simple Linear Regression on the Transformed Data

What is the nature of the trend or pattern over time?

- Increasing or Decreasing Trend:
  - Yes: Consider Simple Linear Regression Analysis
  - No: Consider Moving Average or Moving Median

- Repeating Pattern:
  - Yes: Consider Time Series Analysis
  - No: Consider Simple Linear Regression Analysis

Does the data vary as a function of the date/time?

- Yes: Consider Time Series Analysis
- No: Consider Simple Linear Regression Analysis
Choice of Estimating Technique with a Parametric Method

1. Is there a natural sequence to the data?
   - Yes: Is the sequential trend appear to be linear?
     - Yes: Consider Simple Linear Regression Analysis
     - No: Consider Moving Average or Moving Median
   - No: Does the data vary as a function of the date/time?
     - Yes: Consider Simple Linear Regression on the Transformed Data
     - No or Don't Know: Consider Variation around a Norm or Metric

2. Does there an element of recurring work?
   - Yes: Consider a Learning Curve
   - No: Do we think there could be additional drivers?
     - Yes: Consider Function Type of each additional driver
     - No or Don't Know: Consider a Standard Linear Transformation (Exponential, Logarithmic or Power)

3. What kind relationship does a Scatter Plot show?
   - Simple Curve with few data points: Consider Nonlinear Curve Fitting
   - Scatter around a Line or Curve with several data points: Consider Stepwise Multilinear Regression
   - General Scatter: Consider Simple Linear Regression on the Transformed Data

Figure 2-16
Choosing When to Use a Simulation Technique

**Are we considering a single work element or a group of work elements?**
- Large Group
- Single or Small Group

**Is the work element small?**
- Yes
- No

**Do we have a clear understanding of the work content and sequence?**
- Yes
- No

**Are we able to mimic the method steps in the work sequence?**
- Yes
- No

**Consider an Analogical Simulation (Mime)**

**Do we have a view on the optimistic and pessimistic range of values for each element of work?**
- Yes
- No

**Return to Figure 2.14 or 2.15 or 2.16**

**Do we want to model the impact of multiple Risks and Opportunities?**
- Yes
- No

**Consider Monte Carlo Simulation**

**Consider Other Discrete Event Simulation**

**Do we want to model system queues, buffer stock or response times?**
- Yes
- No

*Figure 2-17*