Parametric Estimation for ERP Implementations

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Objectives

• Provide conference attendees with a practical method for estimating the project size of ERP implementations that is both easy to learn and apply

• Compare the behavior of ERP implementations to other business IT projects
  - Size vs. Schedule
  - Size vs. Effort
Outline

- Key differentiators between ERP implementations and software development
- Sizing ERP implementations
  - Determining size
  - RICEF objects
  - Configuration items
  - Normalizing to a common metric
- Estimating ERP implementations
Quotations

“Perfection is the enemy of the possible”
- Voltaire (paraphrased)

“Precision is not accuracy”
- William Horton
Key Differentiators

- **Software projects create code**
  - Develop new systems
  - Modify existing systems
  - Are measured (sized) by the functionality they deliver and/or the code they create

- **Software projects *may***
  - Develop interfaces
  - Have hardware, network, telecom components
  - Convert data
  - Have system setup and configuration
Key Differentiators

- ERP Implementations *have*
  - Significant system setup & configuration
  - Hardware, network, & telecom components
- ERP Implementations *may*
  - Develop interfaces
  - Convert data
  - Create additional functionality
  - Modify existing functionality
Determining Size

- Software project size is **not** how much it costs nor how long it takes
- Size measures the functionality a software project delivers
- Parametric estimation (SLIM, COCOMO, etc.) uses size as a key input to determine cost and schedule
  - Lines of code, function points, requirements, use cases are traditional size measures
- What size measures capture the functionality of an ERP implementation?
Sizing ERP Implementations

- ERP Implementation size: two components
  - Configurations
  - Customizations
- Configurations include parameters, properties, rules, values, table setup
- Customizations are principally code
- Proportions vary between projects
- ERP sizing must consider both
Estimate the number of configuration items (by category & complexity)
  - Best case, worst case, most likely scenarios

Alternatively, identify number of high level business processes that must be configured
  - SAP Solution Composer is an example

Normalize them to a common elementary unit (using gearing factors)
Configuration Example: Tables

• Average table has
  ▪ 3 indices to define
  ▪ 20 columns to define
  ▪ 20 data types (one per column)

• Average table (in this example) requires 43 elementary activities (or implementation units) to create
  ▪ Gearing factor of 43
Customizations

• RICEF objects: Reports, Interfaces, Conversions, Enhancements, Forms
• Estimate counts of each item (by complexity)
• Normalize them to a common elementary unit (using gearing factors)
• Add to normalized configuration items count for an estimated project size
### Sample Gearing Factor Table: RI CEF Objects

<table>
<thead>
<tr>
<th>Component</th>
<th>Gearing Factor</th>
<th>Number</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Reports</td>
<td>100</td>
<td>10</td>
<td>1000</td>
</tr>
<tr>
<td>Average Reports</td>
<td>200</td>
<td>5</td>
<td>1000</td>
</tr>
<tr>
<td>Complex Reports</td>
<td>300</td>
<td>20</td>
<td>6000</td>
</tr>
<tr>
<td>Simple Interfaces</td>
<td>320</td>
<td>2</td>
<td>640</td>
</tr>
<tr>
<td>Average Interfaces</td>
<td>620</td>
<td>12</td>
<td>7440</td>
</tr>
<tr>
<td>Complex Interfaces</td>
<td>1520</td>
<td>1</td>
<td>1520</td>
</tr>
<tr>
<td>Simple Conversion</td>
<td>100</td>
<td>2</td>
<td>200</td>
</tr>
<tr>
<td>Average Conversions</td>
<td>200</td>
<td>5</td>
<td>1000</td>
</tr>
<tr>
<td>Complex Conversions</td>
<td>300</td>
<td>2</td>
<td>600</td>
</tr>
<tr>
<td>Simple Enhancements</td>
<td>100</td>
<td>2</td>
<td>200</td>
</tr>
<tr>
<td>Average Enhancements</td>
<td>500</td>
<td>1</td>
<td>500</td>
</tr>
<tr>
<td>Complex Enhancements</td>
<td>1000</td>
<td>3</td>
<td>3000</td>
</tr>
<tr>
<td>Simple Forms</td>
<td>100</td>
<td>2</td>
<td>200</td>
</tr>
<tr>
<td>Average Forms</td>
<td>200</td>
<td>15</td>
<td>3000</td>
</tr>
<tr>
<td>Complex Forms</td>
<td>300</td>
<td>3</td>
<td>900</td>
</tr>
</tbody>
</table>

**Total** 27,200
But, Does it Work?

- Step 1: Size completed ERP implementations using configuration items and RICEF objects
- Step 2: Compare trends for Effort, Schedule, Staffing, and Productivity to trends for Business IT projects (non-ERP)
Schedule

Schedule vs Size

+1σ

Average

-1σ
Blue lines are trends for ERP implementations
Black lines for Business IT projects

Overall, smaller ERP implementations enjoy a slight schedule advantage. Larger ones lack this
Effort vs Size

- Size (thousands)
- Effort (hours)

- All Systems
- Avg Line Style
- 1 Sigma Line Style
Small ERP implementations have a cost/effort advantage while larger ones are almost identical to traditional development.
Average Staff

Average Staff vs Size

Size (thousands) vs Average Staff

Legend:
- All Systems
- Avg Line Style
- 1 Sigma Line Style
ERP implementations use slightly smaller teams for most projects although the trends and the amount of variability are very similar.
Productivity Parameter
ERP Implementations are more productive than Business IT for smaller projects but lose their advantage as size grows.
Conclusions

• ERP Implementations have very similar behavior to other Business IT projects
  ▪ Schedule, effort, staffing, productivity
• Parametric estimation techniques used for Business IT projects are applicable to ERP implementations
• ERP Implementation size can be effectively estimated using Configuration Items and RICEF Objects
  ▪ Widely used by U.S. government for estimation and tracking
Conclusions

• Although smaller ERP implementation projects are slightly more productive than traditional Business IT, the cost of the package should be included in cost estimates if it is being purchased.

• While larger ERP implementations do not enjoy cost or schedule advantages, larger traditional Business IT projects have a higher probability of failure, which must also be considered when choosing an alternative.
Questions?