Analyzing Cost Estimating and Analysis Organizations within the US Government

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Agenda

- Purpose and Goal
- Background & Introduction
- Research Approach & Framework
- Research Findings
- Case Study
- Results
Purpose

Coverage

- Cost Model
- Cost Framework
- Cost Analysis Case

What Is It About?

- How Cost Organization Design May Cause Your Models and CERs to be Irrelevant
Research Framework

- **Research Focus**
  - Cost Organizational Capabilities and Design
    - US Gov’t, FFRDC, UARC
    - Complex Enterprise Network
    - Cross-functional Departments and Personnel
    - Strategy and Sustainment
Cost Organizational Design

- Literature Review Findings
  - Limited amount of literature
    - Emerging and novel area
  - Lack of collection and analysis from various CE&A organizations in US government

- Criticality and Importance
  - Complex Enterprise Network & Process
  - Cross-functional Departments and Personnel
  - Strategy and Capability Sustainment
    - Large Sum of Organizational Investments
## Research Findings

### Cost Estimating & Analysis Organization

<table>
<thead>
<tr>
<th>Samples of Cost Estimating and Analysis Organizations</th>
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</thead>
<tbody>
<tr>
<td><strong>Mission Area</strong></td>
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<tr>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>A</td>
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<tr>
<td>B</td>
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<tr>
<td>C</td>
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<td>D</td>
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<td>E</td>
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Research Findings (cont’d)

Depiction of a Generalized Cost Estimating and Analysis Organization Structure
## Preliminary Findings – Generalized Attributes and Characteristics of a CE&A Organization

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<tbody>
<tr>
<td>Engineering &amp; Technology</td>
<td>Finance</td>
<td>Inform Financial Decision Making, Improve Credibility, Fidelity, Capability, etc.</td>
<td>Program or System Centric</td>
<td>Likely Matrixed Support</td>
<td>STEM</td>
<td>At Least Medium; Size of 10</td>
<td>Yes</td>
<td>Ave 71% of Technical Work</td>
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Research Findings (cont’d)

- Enterprise Mission
  - Inform and support financial decision makers
- Difficult Dilemma
  - CE&A is integrated and multi-disciplinary
    - Engineering, tech, economics, statistics, math, logistics, science, business and finance, etc.
  - Finance vs Engineering
    - Most cost professionals preferred other areas other than finance for CE&A organization,
      » Engineering operations
    - Frustrated engineers, cost estimators and analysts under Finance Division

- Key to Success for CE&A Organizations
  - Recognize CE&A is Unique in Nature
    - Functionally different than finance, accounting, budgeting, project management
  - Autonomy & Independence
    - Reduction of bias
    - Objectivity and Impartiality
## Case Study

### Case Study Findings – Attributes and Characteristics of a CE&A Organization

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</thead>
<tbody>
<tr>
<td>Energy</td>
<td>Construction Management, Civil Engineering, Environmental Engineering</td>
<td>Business Operations</td>
<td>Identical</td>
<td>Acquisition Programs and Contracts</td>
<td>Matrixed Support</td>
<td>STEM (Math, Civil, Environmental Engineering, Construction)</td>
<td>12</td>
<td>Yes</td>
<td>70% Technical Work</td>
</tr>
<tr>
<td>Prelim- Findings</td>
<td>Engineering &amp; Technology</td>
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</table>
Case Study

General Depiction of a Study Subject’s Cost Estimating and Analysis Organization
Results

- CE&A is unique
  - Multi-disciplinary and highly integrated enterprise
    - Various staff, departments, divisions and departments

- Organizational mission and focus
  - Defined before designing a CE&A organization

- Executive commitment and leadership support
  - Obtain and support throughout the organization establishment effort, particularly in early phase

- Organizational independence is critical
  - Minimize bias & politics
  - Impartiality & objectivity
Backup
References

References (cont’d)

Goal

- Gather Experts and Practitioners Input
  - Facilitate Discussion

- Generate Research Interest
  - Increase Body of Knowledge
Research Background

- **Models, Tools, Methods, Policy**
  - CER/Database
  - NAFCOM
  - Cost Risk
    - NASA Joint Cost/Schedule Risk and Uncertainty Handbook (CSRUH)/JCL
  - IT & SW
    - Early Phase Software Cost & Schedule Estimation Models
    - COCOMO
  - SE
    - COSYSMO

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**Fundamental Elements & Pillars Supporting Cost Organization**

**Governance**
- Policies
- Processes
- Standards
- Procedures
- Guidelines
- Handbooks

**Tools**
- Models
- CER
- Databases
- Templates
- Software tools
- Training

**People**
- Education
- Experience
- Traits & Attributes
- Knowledge
- Skillsets
- Research
Case Study

Control Group → Compile Results

Experimental Group → Compile Results

Observe, Compare and Analyze Test Results → Document and Conclude Experimental Design and Results
Cost Organization Capabilities

Cost Estimating and Analysis Capabilities

**Governance**
- Policies
- Processes
- Standards
- Procedures
- Guidelines
- Handbooks

**Tools**
- Models
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**People**
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- Experience
- Traits & Attributes
- Knowledge
- Skillsets
- Research
Research Limitations

- The availability of literature within this subject matter
  - Extremely rare by FFRDC, UARC, or government funded agencies, facilities and laboratories

- The size of sample set
  - Only 6 samples available and were homogeneous
    - Can have biases in data collection due to a small set of homogeneous samples, which may also cause data interpretation and analyses to be further biased.
  - Limited case study subject
    - 1 organization was studied.
    - Difficult to generalize and interpret finding from a single case study, which more case studies may be required to support preliminary findings and observations

- Samples were collected from government agencies and organizations
  - Results may not pertain to commercial and private sectors due to dissimilar goals, objectives, and missions, as well as differences between organizational cultures.
Future Research

- Compare current findings with other cost estimating and analysis organizations under a non-finance division
  - Further comparative advantages and disadvantages between financial and engineering organizational designs
- Collect data on length of organizational establishment, organizational maturity assessment, organizational accomplishments and milestones, lessons learned, number of employees, number of programs and project, and budget size
  - Compare and analyze correlation between these factors and their impact on efficiency and effectiveness.
- Study divisional expertise
  - Evaluate efficiency and effectiveness on governance (policy, guidelines, process, and procedures), tools and training, methodologies development, research, etc.
- Collect more specific data on staff background (years of experience, level of education, specific skillsets)
- Study and analyze the morale of technical staff members who work under a non-technical structure and team and their career development paths
- Study and analyze organizational evolution and how the transformation is correlated with cost estimating and analysis capabilities and maturity