Comparison of Module Usage of Project Management Information System and Success Rate of Construction Projects: Case Study

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Outline

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- Results
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Specific Aim: Does the maximum utilization of digital tools, such as Prolog Manager, lead to tangible benefits of lower construction cost and maximum efficient construction?

- Researched data to find scholarly evaluation about Prolog Manager use in construction.
- Does a correlation exist between higher module usage and greater project success?
- Module Usage is defined as #of modules used/total # of modules available.
- Success is defined as projected project cost/actual project cost.
Methodology

- **Multiple Sources of Evidence**
  - Searched for qualitative literary reviews in journals and articles.
  - Conducted semi-structured interviews with the distributors of Prolog Manager and the IT Manager of a “Company X”.
  - Gathered quantitative module values and project budgets from Company X: 10 Projects using Prolog Manager.
  - When interpreting the findings and drawing conclusions my participant observation offered past observational assessments from using the Prolog Manager on previous projects.
Library Review Analysis

- **Prolog Manager qualitative findings:**
  - Scientific journals describing the complex database logic system interface of Prolog Manager
  - Legal journals wrote about issues surrounding propriety software licensing
  - Propaganda/PR newswires from past company clients
  - Proper Prolog Manager documentation and processes consists of core and supplementary modules.
  - IT Manager parallel amount of module usage and amount of structure at the company
  - Company X IT Manager created a weighted module system reflective the values placed on each module
Company X Analysis

- Modules of Prolog Manager Analyzed
  - Prolog Manager has 5 modules: Purchasing, Cost Control, Doc Control, Field Admin, and Admin.
  - Research of Company X utilized 3 modules: Cost Control, Doc Control, and Field Admin.
  - The IT manager at Company X created values for each module
    - Cost Ratio=$\frac{\text{Projected Budget}}{\text{Total Cost}} < 0$ for 10 weighted projects.
    - Module Ratio=$\frac{\# \text{ of modules used}}{\# \text{ of modules}} = 1.0$
  - Analyzed projects at both the project level and organizational level
    - Project Level: The 10 projects analyzed together
    - Organizational Level: The 10 projects grouped by specific project type
## Company X Analysis: Prolog Manager

### Table of Project Modules

<table>
<thead>
<tr>
<th>Prolog Modules</th>
<th>Cost Module</th>
<th>Docs Module</th>
<th>Field Admin</th>
<th>Reports</th>
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<tbody>
<tr>
<td></td>
<td>Project 1</td>
<td>Project 2</td>
<td>Project 3</td>
<td>Project 4</td>
</tr>
<tr>
<td>Original Budget</td>
<td>$931,820.00</td>
<td>$32,736,483.00</td>
<td>$13,387,992.00</td>
<td>$23,093,077.00</td>
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<td>Projected Budget</td>
<td>$931,820.00</td>
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<td>$13,387,992.00</td>
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### Prolog Modules

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<tr>
<th>Cost Module</th>
<th>Project 1</th>
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<th>Project 4</th>
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### Computation

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<th>0.52173913</th>
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</table>

### Notes
- Actual Cost/Projected ≥ 1.0 indicates actual cost exceeds projected cost by 100%.
- The modules used/total # of modules ratio indicates efficient use of available modules.
Company X Analysis: Analytical Graph for Prolog Manager Table of Project Modules

Module Usage = Module Used / # Module
Success = Projected Cost / Total Cost
Company X Analysis: Analytical Graph for Prolog Manager Table of Project Modules

**Typical (University) Projects 1-4**

- **Military College**
- **State University**
- **Student Activities Center**
- **University of WA**

**Unique (Assorted) Projects 5-10**

- **Research Center**
- **Large Office**
- **Surgical Suite**
- **Museum**
- **Office Building**
- **Student Dormitory**

- **ModuleUsage = Module Used / # Module**
- **Success = Projected Cost/Total Cost**
Results

- Significant correlations between project success and module usage can be drawn.
  - Project level was looking at all 10 projects success individually on the table.
  - Organizational level was grouping projects based on successful vs. unsuccessful projects to analyze.
  - Organizational level was clustering projects based on project type and analyzing. Standard and Unique Company X projects grouped together.
  - Correlations were found at the organizational level with a identified outlier.
Conclusion/Summary

- **Objective**
  - Did the maximum utilization of digital tools, such as Prolog Manager, lead to tangible benefits of lower construction cost and maximum efficient construction?

- **Results**
  - Data at the project level does not correlate to higher success rate. It is at the organizational level where correlations of module usage and project success.

- **Conclusions**
  - Some questions about the data submitted are still unanswered.
    - Committed costs on the table had unknown values different from the projected budget and uncommitted costs.
    - Pilot project using all the prolog modules is recommended for further study.
    - Larger samples of projects are recommended for future study.