PRINCIPLES, CHARACTERISTICS, AND METHODOLOGY TO DEVELOP A PROJECT MANAGEMENT ASSESSMENT TOOL AT THE CONSTRUCTION PROJECT LEVEL

Antonio Sanjuan, British Columbia Institute of Technology
Thomas Froese, University of British Columbia
Vancouver, BC, Canada
Motivation

- In the Construction industry, weak PM practices are still common
  - particularly among project owner organizations.
- Estimated cost of poorly managed projects:
  - $150 billion per year in US (Larson & Gray, 2011).
- Project management profession:
  - Management schools preparing well rounded PM professionals
  - PM professional code and standards
Observation

- **Two contributing factors**
  1. Project organizations are unaware of how their PM practices compare with best practices,
  2. Project organizations are unaware and unconvinced about the value offered by various PM practices.
Approach

- **Develop a PM assessment tool that can:**
  - Assess the PM on individual projects to **benchmark** the PM performance relative to PM standards of best practice.
  - Assess the success of construction projects and relate this to the assessed PM performance as a measure of PM **value**.

- **Side Motivation:**
  - *We see this as a starting point for longer-term interests in project assessment issues and tools.*
1. General Approach for Assessing Project Management and Measuring the Value of PM
Project Management Assessment Tools: Literature Review

- Boston Corporate Education Center
- The Atlantic Management Center
- The Business Improvement Architects
- The Enterprise Information
- Harold Kerzner’s P.M. maturity model
- PM/ROI Assessment- Ibbs Consulting

Mostly on-line questionnaire-style assessment tools

These approaches focus on assessing either:

- Practices within a firm
- Practices/expertise of an individual
Project Management Assessment Tools: Approach

- Generally similar approach

- Focus on assessing individual project rather than the company or the individual.
  - Complementary to previous approaches.
Measuring The Value Of P.M.: Literature Review

1. Maturity-Based ROI Metric
2. Balance Scorecard-ROI
3. Resource-Based View
4. Implementation-Context-Fit based
Measuring The Value Of P.M.:

1. Maturity-Based ROI Metric
   (Ibbs, Kwak, Reginato, Pennypacker, Crawford)

- Examined correlation between Assessed PM maturity and cost and time variations from the original baselines

- **Finding 1:** Companies with more mature project management practices have better project performance.
  - Less mature companies may miss their schedule targets by 40% and cost targets by 20%

- **Finding 2:** Project management maturity is strongly correlated with more predictable project management schedule & cost performance.

- **Finding 3:** Good project management companies have lower direct costs than poor project management companies
Measuring The Value Of P.M.:

**Balanced Scorecard** (Kaplan, Norton)

- **Financial Perspective**
  - Goals/Measures

- **Customer Perspective**
  - Goals/Measures

- **Internal Business Perspective**
  - Goals/Measures

- **Innovation & Learning Perspective**
  - Goals/Measures
Measuring The Value Of P.M.:

**Balance Scorecard-ROI**
(Phillips, Bothell)

- **Calculating the Return on Investment**
  - The benefit/cost ratio:
    - BCR = \( \frac{(\text{Project Solution Monetary Benefits/Project Solution Costs})}{\text{Project Solution Costs}} \)
  - The Return on Investment:
    - ROI = \( \frac{(\text{Net Project Solution Monetary Benefits/Project Solution Costs})}{\text{Project Solution Costs}} \times 100\% \)
Measuring The Value Of P.M.:  

**Resource-Base View**  
(Wernefelt, Barney, Grant, Peteraf, Jugdev)

- Emphasizes the impact of superior resources and better organizational competencies in determining the long term, sustainable competitive advantage of firms
- PM relates to a firm’s abilities & specific skills  
  - Is it capable of generating long-term competitive advantage?
Measuring The Value Of P.M.:

**Implementation-Context-Fit Based (Thomas, Mullaly)**

- Identify what each organization is doing and calling project management.
- Identify and documents evidence of all forms of value.
- Identify all relevant quotes from the interviews that commented on the value, then coding and sorting.
  - 0 - not at all,
  - 1 - very little,
  - 2 - to some extent, or
  - 3 - to a very great extent.
Measuring The Value Of P.M.:

Implementation-Context-Fit based (Thomas, Mullaly)

- **Half of the organizations realized tangible values:**
  - cost savings,
  - revenue increases,
  - increase customer share,
  - customer retention,
  - reduce write-offs & rework.

- **Most of the organizations demonstrate intangible values:**
  - attainment of strategic objectives,
  - more effective human resources,
  - staff retention,
  - improved reputation,
  - corporate culture,
  - social good,
  - overall management,
  - quality of life,
  - regulatory compliance.
Measuring the Value of P.M.: Approach

- Measure PM by assessing the degree to which projects are following best practices.
- Measuring project success by assessing a set of success indicators.
  - E.g., on budget, on time, changes, customer satisfaction, etc.
- Explore correlation between assessed PM practices and assessed project success.

PM assessment adds value as a best practices benchmarking approach even if no significant correlation can be shown.
2. Assessment Targets
Assessment Targets: Assumptions

- In order to assess PM quality and best practices, we must determine what PM best practices are.
- This is a substantial, open-ended issue that is beyond the scope of this work.
- We take established PM standards to be reasonable, consensus-based identifications of PM Best Practices.
# Assessment Targets
Top Ten Critical Success Factors in Construction

<table>
<thead>
<tr>
<th>Critical Success Factor Identified in Construction Projects</th>
<th>No. of Citations</th>
<th>Case Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Multidisciplinary/competent project team</td>
<td>10</td>
<td>661</td>
</tr>
<tr>
<td>2 Clear objectives and scope</td>
<td>9</td>
<td>542</td>
</tr>
<tr>
<td>3 Time performance (project schedule/plans)</td>
<td>8</td>
<td>860</td>
</tr>
<tr>
<td>4 Formal &amp; Structured Selection of subcontractors</td>
<td>8</td>
<td>648</td>
</tr>
<tr>
<td>5 Competent project manager</td>
<td>7</td>
<td>565</td>
</tr>
<tr>
<td>6 Clear information and communications channels</td>
<td>6</td>
<td>619</td>
</tr>
<tr>
<td>7 Project team commitment</td>
<td>6</td>
<td>454</td>
</tr>
<tr>
<td>8 Power and Politics</td>
<td>5</td>
<td>932</td>
</tr>
<tr>
<td>9 Client's competencies</td>
<td>5</td>
<td>539</td>
</tr>
<tr>
<td>10 Continuous involvement of stakeholders in the project</td>
<td>5</td>
<td>528</td>
</tr>
</tbody>
</table>
Assessment Targets

Approach

- PMBOK- PMI
- IAPM-COMPETENCE BASELINE
- PRINCE2
- ISO 9000
PM Integrated Framework

PM Knowledge Areas:
- Scope Mgt.,
- Time Mgt.,
- Cost Mgt.,
- etc.

PM Process Groups:
- Initiating
- Planning
- Executing
- Monitoring
- Closing

Specific PM Practices from PMBOK, ICB, PRINCE2, etc.
- e.g., Develop Communication Strategy Plan
# PM Integrated Framework for HR Management Area

## MANAGEMENT AREAS

<table>
<thead>
<tr>
<th>MANAGEMENT AREAS</th>
<th>PROJECT MANAGEMENT PROCESS GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INITIATING / START UP (ICB3)/ STARTING UP &amp; INITIATING (PRINCE2)</td>
</tr>
<tr>
<td></td>
<td>PROJECT HUMAN RESOURCES MANAGEMENT / RESOURCES (ICB) / ORGANIZATION (PRINCE2)</td>
</tr>
</tbody>
</table>
3. Survey Questions
<table>
<thead>
<tr>
<th>Question #</th>
<th>Question</th>
<th>&quot;Latent Variable &quot;</th>
<th>PM Implementation</th>
<th>Standard</th>
<th>Characteristic</th>
<th>How Well/ Quality</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>HR plan: identified roles/responsibilities/skills, reporting relationships, staffing management plan?</td>
<td>Implementation</td>
<td>Technical</td>
<td>YES</td>
<td>9.1 to 9.4</td>
<td>1.06, 1.07, 1.09, 1.12</td>
<td>7.2.6, 5.3.2</td>
</tr>
<tr>
<td>56</td>
<td>PM of client experience in years?</td>
<td>Implementation</td>
<td>Technical</td>
<td>YES</td>
<td>9.1.3.1</td>
<td>1.2</td>
<td>2.2</td>
</tr>
<tr>
<td>57</td>
<td>Developer/owner organization experience?</td>
<td>Implementation</td>
<td>Technical</td>
<td>YES</td>
<td>9.1.3.1</td>
<td>1.2</td>
<td>2.2</td>
</tr>
<tr>
<td>58</td>
<td>Constructor organization experience?</td>
<td>Implementation</td>
<td>Technical</td>
<td>YES</td>
<td>9.1.3.1</td>
<td>1.2</td>
<td>2.2</td>
</tr>
<tr>
<td>59</td>
<td>PM of constructor experience in years?</td>
<td>Implementation</td>
<td>Technical</td>
<td>YES</td>
<td>9.1.3.1</td>
<td>1.2</td>
<td>2.2</td>
</tr>
<tr>
<td>60</td>
<td>PM highest level of education?</td>
<td>Implementation</td>
<td>Technical</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Scoring Criteria Based on Critical Success Factors

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>HUMAN</th>
<th>RESOURCE MANAGEMENT &amp; BEHAVIOURAL COMPETENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identified &amp; Documented:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roles &amp; Responsibilities</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Required skills</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Reporting relationships</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Staffing management plan</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Exploded into anger during the project life cycle</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Requested input before changes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Spent time thinking about improvement</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Would you hire your brother?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### Preference for Energy:
- Extroverted: 1
- Introverted: 1

### Preference for Information Gathering:
- Sensing: 1
- Intuitive: 1

### Preference for Decision Making:
- Thinking: 1
- Feeling: 1

### Preference for Lifestyle:
- Judging: 1
- Perceiving: 1

### Average Hours of Work per Day: 5

### Managing More than One Project: 1

### If Yes, How Many Projects? 1

### Acquire the Necessary Project Team: 10

### Recognition & Reward System: 1

### Number of Project Managers for this Specific Project: 3

### Performance Assessment: 132

---

UBC

A place of mind

THE UNIVERSITY OF BRITISH COLUMBIA
Overall PM Score

- Scores of individual PM Practices combined into an overall PM score
- **Weighting Criteria:**
  - Initially one point was assigned to each question.
  - Weighting adjusted based on evidence from success-factor literature sources.
  - We expect to explore further refinements to this weighting system.
4. Pilot Survey and Case Studies
18 Case Studies

RESOURCE MANAGEMENT IMPLEMENTATION vs. PROJECT RESULTS

$y = 0.4254x + 116.32$

$R^2 = 0.07852$
18 Case Studies

PM Implementation vs. PM Results

PM Results

PM Implementation

96

136

157

173

145

147

151

144

147

149

184

180

171

171

210

199

170

150

130

110

90

70

50

250

300

350

400

450

500
Conclusions

- Developing a project management assessment tool at the project level.
- Exploring the relationship between assessed PM practices and assessed project outcomes.
- Developing an integrated framework of PM standards and critical success factors in construction.
- Benchmarking PM best practices in the construction industry.