The Relationship between Customer Collaboration and Software Project Overruns

Kjetil Moløkken-Østvold
Kristian Marius Furulund

August 2007
Agenda

• Software project overruns
• Development processes and collaboration
• Study results
• Summary
• Q&A
Software Project Overruns

• About 70-80% of all projects encounter effort (cost) overruns

• The average magnitude of effort overruns is 30-40%

• Similar results for schedule overruns

• No apparent change the past 30-40 years
Development processes and overruns

• Corse-grained definition (adapted from¹)
  – Flexible (agile, evolutionary, incremental etc.)
  – Sequential (waterfall)

• A previous study found significant differences in effort overruns based on development process²
  – Projects using sequential processes: Median= 60% (Mean=55%)
  – Projects using flexible processes: Median=1% (Mean=24%)
  – Interviews found that flexible development processes fostered good collaboration with the customer

Development processes and collaboration

• “Customer collaboration over contract negotiation” (www.agilemanifesto.org)

• “Customer collaboration is valued over contract negotiation because agile teams would like all parties to the project to be working towards the same set of goals”
  - Mike Cohn, Agile estimating and Planning, 2005

• Collaboration also highlighted in previous influential work, e.g. from the seventies

• Research has found collaboration and customers to be important in preventing and facilitating overruns
Study design

- Good collaboration is subjective, and not precisely defined
- This paper (and presentation) highlights these collaboration issues
  – Communication
  – Contracts
  – Customer capability
- In-depth analysis of 18 projects conducted by a contractor
  – Follow up of the large-scale study in 18 different organizations
  – Personal interviews
- Overrun measure = \[ BREbias = \frac{(actual - estimate)}{\min(actual, estimate)} \]
Communication

• Previous studies have found communication to be important for project success

• Frequent communication can be used to prioritize features, set focus on bug-fixing or include more functionality (Beck and Fowler, *Planning Extreme Programming*, 2001)

• Motivated in part by Cockburn¹, we explore the frequency of communication between the contractor and the customer

Contact frequency and overruns

- A Kruskal-Wallis test for difference results in $p=0.023$
- The corresponding size of effect is $d=1.25$, indicating a large size of effect

<table>
<thead>
<tr>
<th>Level</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>0.09</td>
<td>0.19</td>
</tr>
<tr>
<td>Not Daily</td>
<td>0.58</td>
<td>0.35</td>
</tr>
</tbody>
</table>
Contracts

• Contracts are important since they often regulate collaboration (directly or indirectly)

• Common contract types
  – Time and material
  – Fixed price
  – Target price
    • Mutual sharing of cost overruns (and vice versa)
    • Floors and ceilings for cost sharing
Contract form and overruns

<table>
<thead>
<tr>
<th>Contract form</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>By the hour</td>
<td>4</td>
<td>0.55</td>
<td>0.37</td>
</tr>
<tr>
<td>Fixed price</td>
<td>5</td>
<td>0.33</td>
<td>0.19</td>
</tr>
<tr>
<td>Target price</td>
<td>7</td>
<td>0.10</td>
<td>0.21</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>0.13</td>
<td>0.13</td>
</tr>
</tbody>
</table>
Customer capability

• "Immature customer" is a frequently cited reason (excuse?) for cost overruns
• Difficult to measure and study
• Lack of empirical research
Customer capability and overruns

- Customer capability score comprised of
  - Collaboration skill
  - IT-competence
  - Decision making ability
  - Clarity of goals

- There was no apparent, large difference in overruns when comparing projects based on the total customer capability score
Summary

• Frequent communication might help foster a good collaboration and reduce cost overruns

• Contracts with mutual incentives, facilitating collaboration, might help reduce overruns

• Customer capability may be less important for overruns than frequently claimed
Questions?

• More information
  – [www.simula.no/kjetilmo](http://www.simula.no/kjetilmo)
  – [www.projecteconomics.no](http://www.projecteconomics.no)

• Contact
  – [kjetilmo@simula.no](mailto:kjetilmo@simula.no)
  – [kjetil@projecteconomics.no](mailto:kjetil@projecteconomics.no)
  – [kristf@ifi.uio.no](mailto:kristf@ifi.uio.no)