Why do large construction projects always perform badly? The MEGAPROJECT experience

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Aims of the Session

• To place the performance of European nuclear new build megaprojects in the context of other European megaprojects
• To highlight the megaprojects characteristics that are associated with megaproject performance
• To understand the implications for Nuclear Megaprojects
What is a Megaproject?

Megaprojects are extremely large-scale investment projects typically costing more than €0.5 billion. Megaprojects include powerplant (conventional, nuclear or renewable), oil and gas extraction and processing projects and transport projects such as highways and tunnels, bridges, railways, seaports and even cultural events such as the Olympics. Megaprojects are united by their extreme complexity (both in technical and human terms) and by a long record of poor delivery.
The MEGAPROJECT Portfolio

The Meta Cross Case Analysis

- Capture MEGAPROJECT cases in a standard template
  - Project Stakeholders
  - Project Management
  - Project Performance
  - Project Environment
  - Project Timeline
- Look across cases to see how performance relates to key features of the MEGAPROJECT Case
# European MEGAPROJECT Performance Comparisons

<table>
<thead>
<tr>
<th>Transport Megaprojects</th>
<th>Energy Megaprojects</th>
<th>Nuclear Megaprojects</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ 19 yr</td>
<td>~ 10 yr</td>
<td>Mochovce</td>
</tr>
<tr>
<td>~ 40%</td>
<td>~ 80%</td>
<td>Hinkley Point</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flamanville</td>
</tr>
<tr>
<td></td>
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<td>Olkiluoto</td>
</tr>
</tbody>
</table>

## MEGAPROJECT Characteristics

- **megaproject characteristics**
- **megaproject performance**

- independent variables
- dependent variables
Relating megaproject characteristics and meagproject performance

Protocol
1. Delineation of ~50 megaproject characteristics (independent variables binary in nature)
2. Simple expression of megaproject performance against time and cost (dependant variables in binary nature)
3. Capture both of the above in an excel matrix
4. Perform statistical analysis (Fisher exact test)
5. Analyse the results.
A word about measuring relationship strength .................

Whole megaproject population findings ............

- Very few characteristics have statistically significant relationships
- Energy megaprojects have a completely different pattern of relationships than transport megaprojects apart from:
  - The effect of using SPEs in governance
  - Modularity (plant level and site level)
Characteristics that are not statistically significant for energy megaprojects

First of a kind (FOAK)
- FOAK-megaprojects tend to be over budget and delayed because technology is difficult to predict or control

Project under government control
- Government interferes in the project and causes problems

Strong FEED and usage of PM techniques
- High usage of PM tools and techniques makes the project perform better

Project has clear strategic imperative
- Clear strategic organisational intent helps the project

Is FOAK really that strange?

Project Governance and stakeholders management
- NRC role
- Request from utilities (not standardisation)
- Project delivery chain
- French state - EDF

![Graph showing cost over time for FOAK projects under different governance]
Characteristics that are statistically significant for energy megaprojects

<table>
<thead>
<tr>
<th>Category</th>
<th>Independent Variables</th>
<th>Correlating with</th>
<th>strength of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Modularity</td>
<td>Project is modular</td>
<td>delay in planning on budget on-time construction</td>
<td>90% 89% 89%</td>
</tr>
<tr>
<td>2. Regulatory Environment</td>
<td>Project has a strong regulatory environment</td>
<td>on-time planning over budget delay in construction</td>
<td>83% 80% 80%</td>
</tr>
<tr>
<td>3. External Stakeholder</td>
<td>No protest at a local level</td>
<td>delay in construction over budget</td>
<td>86% 86% 86%</td>
</tr>
<tr>
<td>4. Governance</td>
<td>The project uses an SPE structure</td>
<td>delay in planning on-time construction</td>
<td>90% 88% 88%</td>
</tr>
</tbody>
</table>
Characteristics that could help nuclear megaproject performance (in the long run)
- SPEs
- Modularity

Characteristics that could hinder megaproject performance (in the long run)
- strong regulatory environments: "learn how to build what it has been designed"

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Diary Date
WHERE: Brussels
WHEN: 2/04/14
WHAT: Learning Across Megaprojects

Bringing together the rich experience of over 50 megaproject cases to understand what works in megaproject management.