Infrastructure Decision Making and Cost Containment

Matti Siemiatycki
Geography and Planning
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Union Station reno tab increases $80 million
The city needs to do a better job on renovation planning after the Union Station
makeover rose by $80 million, a budget committee member says.

Laval's Place Bell arena to cost $50M more in overruns
Mayor Marc Demers accused former mayor Gilles Vaillancourt for hiding true costs from taxpayers

PUBLIC FUNDS
Energy minister apologizes for cost overruns and delays of BC Hydro IT update

Bombardier Investors Losing Faith After Jet Delays

Cost Overruns and Delays:
A Problem that Unites the Nation
Cost Overruns and delays are a Global Challenge

Delayed projects and cost overruns

Feasibility studies and acquisition of land hold the key; political factors complicate the projects' schedule.

“There has to be a timetable in place for land acquisition, handing over possession of land, payment of costs and completion of various phases of the project.”

HITS ROADBLOCK: A view of the outer peripheral road connecting Mysore Road and Kandalaguda Road, being constructed by Nandi Infrastructure Corridor Enterprise Limited (NICE) as part of Bangalore-Mysore Infrastructure Corridor (BMIC) project.

Why do costs over-run?

Analysis

By Brian Wheeler
Political reporter, BBC News

The 2012 Olympics is the latest big government project whose budget has soared higher than originally forecast.

So why do ministers appear to keep getting their sums wrong? Are they trying to pull the wool over taxpayers’ eyes with unrealistically low estimates, as their opponents claim? Or is there something in the DNA of big infrastructure projects which means costs always get out of hand?

The Dome became a test of political viability.

In Finland, Nuclear Renaissance Runs Into Trouble

By JAMES KANTER
Published: May 28, 2009

OLKILUOTO, Finland — As the Obama administration tries to steer America toward cleaner sources of energy, it would do well to consider the cautionary tale of this new-generation nuclear reactor site.

The massive power plant under construction on muddy terrain on this Finnish island was supposed to be the showpiece of a nuclear renaissance. The most powerful reactor ever built, its modular design was supposed to make it faster and cheaper to build. And it was supposed to be safer, too.

But things have not gone as planned.
Why are overruns an important policy topic?

- Waste of money and can put project viability at risk
- Embarrassing and costly for all involved
- At a time of immense interest in spending on infrastructure, persistent overruns risk losing public support for this initiative
The Persistence of Cost Overruns: Transport Sector Example

Cost Overrun by the numbers

- 9/10 projects experience a cost overrun
- Average size of cost overrun for all project types is 28%
- Average overrun for transit projects is 45%
- Average overrun for bridges or tunnel fixed links are 34%
- Average overruns of roads is 20%
- Pattern unchanged for 70 years that data is available

Source: Mega-Projects and Risk, Flyvbjerg, Bruzelius and Rothengatter,
When do Overruns Occur in the Planning Process?

COST OVER-RUNS BY STAGES AND MILESTONES

Original approval  Final budget  Contractual commitment  Actual final

FULL PERIOD
STAGE 1
STAGE 2
STAGE 3

Source: ACG/University of Melbourne
Why do Overruns Occur?

• **Technical difficulties** forecasting uncertain futures, scope changes or delivering complex projects
  • Likely not only explanation because we would expect prevalence of overruns to decline over time as project managers become more skilled

• **Social-Psychological forces** lead individuals and organizations to accentuate the positive when forecasting the future
  • Optimism biases – once identified can devise strategies to account for

• **Political-economic forces** where few parties have an interest in avoiding unrealistic expectations
  – Public sector to get projects approved in context of competition for scarce funding
  – Private sector low bid to win job, then search for change orders
Academics and Auditors

Current Strategies to Reduce Cost Overruns

• Reference Class Forecasting (Flyvbjerg, 2007; Lovallo and Khanneman, 2003)
• Optimism Uplifts (Flyvbjerg, 2004)
  – Technical approaches to achieve more accurate forecasts if problem is a technical one

• Develop new models of partnership, which transfers responsibility for design, construction, financing and operation of public services to the private sector;
  – Seek to transfer risk to private sector, who have a financial incentive to be more realistic in their forecasts

What is needed is to create institutional cultures that reward accurate forecasting and construction management, while de-legitimizing the practice of being overly optimistic to get projects started
Favoured Strategy to Control Infrastructure Cost Overruns in Canada: PPPs On-time and On-Budget

- **Ontario**: A study commissioned by Infrastructure Ontario found that of 30 projects delivered since 2007 by the agency, 29 were completed below budget and 22 were conducted on time.

- **British Columbia**: “All B.C. public private partnerships (PPPs) to date have been delivered on time and on budget.”
  
  (CEO Partnerships BC, 2009)
## On-Time and On-Budget?

<table>
<thead>
<tr>
<th>Project</th>
<th>Decision Point budget</th>
<th>PPP Final Contracted Price</th>
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<tbody>
<tr>
<td>Abbotsford Hospital and Cancer Centre</td>
<td>$211,000,000</td>
<td>$355,000,000</td>
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<tr>
<td>Canada Line</td>
<td>$1,550,000,000</td>
<td>$2,000,000,000</td>
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<tr>
<td>Golden Ears Bridge</td>
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<td>$808,000,000</td>
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<td>Sea-to-Sky Highway Project</td>
<td>$600,000,000</td>
<td>$789,000,000</td>
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<tr>
<td>William Bennett Bridge</td>
<td>$100,000,000</td>
<td>$144,000,000</td>
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Edwards et al. (2004), concluded that in the UK, the Highways Agency paid a 25% premium on construction cost on its first four PPP road projects. This was to ensure that they were built “on time and to budget.”

“While projects managed by the private sector for the most part were delivered on time and cost about the same as their contracts specified, according to Infrastructure Ontario’s estimates, the tangible costs are still almost $8 billion higher than if the public sector had been able to contract out the projects to the private sector and oversee their successful delivery.”

Auditor
Infrastructure Procurement Analytics?

• Estimated and actual construction cost per unit
• Penalties for non-performance
• Change orders
• Post-construction performance
• Asset class performance
• Performance variations by firms and project managers
An Idea whose time has come?

Benchmarking and the Bottom Line: A proposal to improve infrastructure value for money in Britain

A submission to IPPR’s Britain’s Got Brains competition

by Matti Siemiatycki
October 2008
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2008 Institute for Public Policy Research - Britain’s Got Brains Competition Winner

• In this context, can overruns be reduced through the development of benchmarks based on post project reviews,
  - Level of construction/Delivery cost overrun
  - Punctuality of project completion
  - Ongoing quality of building

• Benchmarked data linked with procurement systems that make it easier for companies with good records to obtain future contracts, while encouraging others to improve their performance

• Develop predictive models to understand factors that elevate risk of overruns
Overruns on Danish Construction projects by year

Average CONQUAS Score

<table>
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<tr>
<th>FY</th>
<th>Score</th>
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<tbody>
<tr>
<td>2008</td>
<td>81.4</td>
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<tr>
<td>2007</td>
<td>81.1</td>
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<tr>
<td>2006</td>
<td>80.6</td>
</tr>
<tr>
<td>2005</td>
<td>80.6</td>
</tr>
<tr>
<td>2004</td>
<td>79.9</td>
</tr>
</tbody>
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Distribution Chart of Conquas Scores From 1986 To 2009

Calculate Scores from FY: 1986 To FY: 2009
Why is analytics not happening more in Canadian Infrastructure Procurement?

• Lack of data availability and sharing
• Concerns about accuracy and reliability of the measures – will it actually improve performance?
• Reputational risk - fear of being made to look bad with actual data on past performance
• Pushback from contractors
• Cost of system
Conclusions

• Use data to measure and improve performance by tying it to future procurement

• Become an intelligent buyer of infrastructure
  – Contracting support and skill building
  – Measure cost per unit, not just cost overruns

• PPPs – focus on construction risk, but recognize that risk transfer comes at a cost