Infrastructure investment in an era of uncertainty
Conference on public investment governance, reform and innovation

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Challenges, Causes, Cures of Major Project Management

Bent Flyvbjerg, University of Oxford

#PERInfraConf, Dublin, 31 January 2020

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Nearly 40% of Ireland’s Economic Activity Takes Place in Projects

Time worked on projects as % of total time worked p.a.

- Construction: 80%
- Professional Services: 60%
- Retail, Logistics, Tourism: 42%
- Manufacturing: 42%
- IT & Communication: 38%
- Financial Services: 23%
- Other Services: 23%
- Public Sector: 18%
- Agriculture: 4%
- Real Estate: 2%

Share in total no. of hours worked p.a.

- IRL: 37%
- GER: 35%
- UK: 34%

Sources: Makroökonomische Vermessung der Projektattività in Deutschland, GMP 2015; OECD Stats; own analysis
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Why Major Projects Are So Appealing

Create employment

Benefit consumers better

Large share of domestic inputs relative to imports

Improve productivity by lowering producer cost

Have potential for improving environment

If planning and delivery are done right!
Dublin’s New Children Hospital

Cost increase from EUR 670m to EUR 1.7bn

Delayed from 2020 opening to 2023
Dublin Port Tunnel (1989-2005)

161% cost overrun in real terms

-2% cost overrun in real terms
The Iron Law of Megaprojects
(A statistical, not a deterministic, law)

Source: Construction and infrastructure projects from Oxford Global Projects Database (July 2019)
© Bent Flyvbjerg

"Over budget, over time, under benefits, over and over again."
How Do We Explain the Iron Law?

Your biggest risk is you!!
Risk Is Internal, Not External

- Conventional wisdom sees causes of risk as mainly external to programs.

- The root cause of risk is internal. It consists in the way leaders systematically misconceive of risk.

Complete change in perspective

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Example: Cost Overrun

- **Cost overrun** is not caused by scope changes, geology, complexity, etc. (external causes)

- Cost overrun is caused by **cost underestimation**, i.e., by not taking into account risks of scope changes, geology, complexity, etc. (internal cause)
Root Causes of Poor Delivery

1. Psychological bias
2. Political bias
1. Identify relevant **reference class** of past, similar projects (minimum 15-25 projects)

2. Establish **probability distribution** for the selected reference class

3. Compare specific project with distribution, in order to establish **most likely outcome**
RCF Example: HK Express Rail Link, XRL

- 26km Hong Kong Section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link
- Fully underground, including largest high-speed rail terminus ever built
- 2000: project outlined in rail development plan
- 2008: planning started
- 2009: alignment authorized
- 2010: construction started, planned opening mid-2015
- 2014-15: reprogramming, planned opening end-2017

A clear case of optimism bias!

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RCF Example: Are XRL’s Cost and Schedule Estimates Realistic?

**Situation XRL, at break**

Irrecoverability of delays acknowledged in 2014

**New timeline, 2014**

- Opening moved from December 2015 to October 2017
- Increase of +54%

**New budget, 2014**

- Increased from HKD 65B to HKD 71.5B (USD 9.2B)
- Increase of +10%

**Reference Class Forecast**

Reference Class (189 projects)
- 39 high-speed rail projects
- 38 tunnelling projects
- 112 urban heavy rail projects

Schedule and cost overruns are common
- Schedule overrun on average +43%, 7 out of 10 projects
- Cost overruns on average +42%, 8 out of 10 of projects

Forecast adjusted to estimate risks of the remainder of the works, from 2014

**Results**

Revised schedule is P70
- Not P90 as planners claimed
- 30% risk that opening date will not be met

Revised budget is P30
- Not P90 as planners claimed
- Remaining contingency funds too low
- Revised budget has a risk of 67% of being insufficient

Optimism still remained in 2014 revised schedule and budget – 2015 development proved 2014 RCF right!
RCF Provides You With A Probabilistic Risk Estimate

The distribution of historical-empirical data in the reference class is transformed into a statistical uplift curve for de-biasing risk.

Deciding what an acceptable risk of cost overrun is, will help determine the required uplift in project budget.

<table>
<thead>
<tr>
<th>Percentage of projects</th>
<th>Acceptable chance of cost overrun</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 80</td>
<td></td>
</tr>
<tr>
<td>P 50</td>
<td></td>
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</tbody>
</table>
Our advice: When making a decision, use all available distributional information about outcomes

Kahneman: “This may be considered the single most important piece of advice regarding how to increase accuracy in forecasting”

— Thinking, Fast and Slow, 2011, p. 251
Our Methods and “Unknown Unknowns”

- Our methods are the only ones we know that take into account “unknown unknowns”

- How? By incorporating in the reference class **ALL** effects on performance, including “unknown unknowns”
Three Steps to Project Success

1. Improve **front-end** to get a realistic starting position
   - Reference Class Forecasting
   - Due diligence
   - Benchmarking
   - Black Swan prevention

2. Improve **execution** to deliver on time, on budget and to benefits
   - Project leadership development
   - Project rescue
   - Postmortems & retrospections

3. Improve **governance** to make high-quality decisions
   - Incentive alignment
   - Quality assurance
   - Early-warning-sign detection
   - Audits and reviews
Thank You!

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Ireland’s National Roads Programme.
Transport Infrastructure Ireland

©Michael Nolan

31/01/2020
Agenda

- Partnership
- Context
- Evolution of TII Cost Estimation Processes
- De-Risking the Roads Programme.
- Measuring Cost Performance
- Realisation of Benefits
- The value of data
- Enhancing Processes
- Why Bother?
PARTNERSHIP WITH LOCAL AUTHORITIES

- Local authorities are the road authorities for all roads including national roads.
- Generally, TII’s national roads functions discharged through local authorities except for PPP roads and motorway service areas.
- TII supports and works closely with a network of eleven local authority National Roads Offices.
- The delivery of the Roads Programme depends on this partnership.
Evolution of TII Cost Estimation Processes

- Experienced Cost Management expertise
- Outturn Cost Data Captured and Analysed Centrally
- Use of “Benchmarking”
- Centralised Cost Rates Database
- Clear, uncomplicated cost forecasting approach (7 headings, single budget sheet)
De Risking the Roads Programme

- Advance Archaeology Resolution
De Risking the Roads Programme

• Advance works
De Risking the Roads Programme

- IFA Agreement – early access to site
De Risking the Roads Programme

- Design & Build Contract Forms
De Risking the Roads Programme

- Standardisation & Efficiencies
Realisation of Benefits


*Collision figures for recent years are provisional and subject to change.

Note: In 2019 there were 51 fatal road traffic collisions resulting in 53 fatalities on national roads.
Realisation of Benefits

Journey Time Reduction

- N1 M50 - Border
- N4/N6 M50 - Galway
- N7 M50 - Limerick
- N7/N8 M50 - Cork
- N7/N9 M50 - Waterford

1999 vs 2013
Realisation of Benefits

Improved Connections

Impact of road investment on employment accessibility 2006-2013
Enhancing processes

- Update to Cost Management
Enhancing processes

• Implementation of Reference Class Forecasting for National Roads
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The Norwegian scheme for quality assurance of major public investments

© Jonas Toxvig Sørensen, Budget Department

January 2020, Dublin
Challenges with major public investment projects

- Huge cost overruns
- Benefits not realized
- Poor planning and management
Quality assurance scheme introduced in 2000

Solution

- Ministry of Finance takes a strong role
- External reviews by independant consultants
- Final decisions by cabinet, not line ministries
The Norwegian quality assurance scheme

History and coverage
- QA scheme established and managed since 2000 by the Ministry of Finance
- All state investments > 100 million euros

Agreement with seven independent consultancy groups who conduct the QAs
- Reports submitted to Ministry of Finance and line ministries

350 QAs have been carried out since 2000
- Transport-infrastructure projects represent more than half of the projects
The Norwegian QA scheme: a detailed overview

QA 1:
- Review: documents
- Analyze: economic analysis, uncertainty
- Assess: relevance, feasibility, sustainability, timing
- Recomm: ranking, management strategy

QA 2:
- Review: documents
- Analyze: management strategy, success factors and uncertainty
- Recomm.: budget, contract and management strategy

Needs

Pre-project

Project

Effect

Ministry/agency Decision documents to be produced

External quality assurance

Cabinet decision

Parliament decision

• Overall strategy document
• Budget

• Needs analysis
• Strategy document
• Requirement spec.
• Alternatives analysis

• Overall strategy document
• Budget

Overall strategy document

Needs

Effect

External quality assurance

Overall strategy document

Needs

Effect

External quality assurance
Realistic and reasonably cost controll over time

<table>
<thead>
<tr>
<th>Study</th>
<th>Number of projects</th>
<th>Deviation from P50</th>
<th>Deviation from P85</th>
<th>Share below P50</th>
<th>Share below P85</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aas (2013)</td>
<td>40</td>
<td>+2,1 %</td>
<td>-7,6 %</td>
<td>45 %</td>
<td>80 %</td>
</tr>
<tr>
<td>Welde (2014)</td>
<td>51</td>
<td>+6,0 %</td>
<td>-4,4 %</td>
<td>45 %</td>
<td>75 %</td>
</tr>
<tr>
<td>Welde (2015)</td>
<td>66</td>
<td>+2,8 %</td>
<td>-6,9 %</td>
<td>48 %</td>
<td>79 %</td>
</tr>
<tr>
<td>Welde (2017)</td>
<td>78</td>
<td>+2,3 %</td>
<td>-6,9 %</td>
<td>48 %</td>
<td>77 %</td>
</tr>
<tr>
<td>Welde et al. (2019)</td>
<td>85</td>
<td>+3,4 %</td>
<td>-5,6 %</td>
<td>40 %</td>
<td>73 %</td>
</tr>
</tbody>
</table>
The main challenge is that costs increase from QA1 to QA2

- Concept (2016): Costs have increased with 40% in 14 projects from QA1 to QA2
- Menon (2015): Costs increased with 67% in 4 construction projects from QA1 to QA2
- National Transport plan: Cost increased with 42% for roads and 26% for railways
Measures taken to improve management and cost control in the pre-project phase, from QA1 to QA2:

1. Requirement to log changes in the project
   • Line Ministry have to consider the importance of the changes and if it require a new Government decision.
   • The log of changes need to be presented at QA2 to explain how the projects have developed.
2. A budget target equal to P50 at QA1 measuring cost development between QA1 and QA2
3. From September 2019 the QA2 will include an update of the CBA
The Concept research program

- Research programme financed by the Ministry of Finance
- Relevant research, guidelines and information
- Evaluation and research on large public investments
- Research results are published
- International symposium every second year
- More information: http://www.ntnu.no/concept
Cases

- Norway plans an acquisition of up to 52 F-35 fighters - a key procurement for the Norwegian Armed Forces
- QA report estimated the cost to 7 bn euros
- The project is on time and budget

- Tromsø 2018 – application for Norway hosting Winter Olympics
- QA report estimated the cost to 2 bn euros
- The application was not submitted to the IOC

- The European Railway Traffic Management System (ERTMS) is a major industrial project
- The largest ongoing ICT-project in Norway
- The project is on time and budget

- QA1 road in the mountains - Rv 15 Strynefjell
- Planned cost 4 bn kroner
- The project was not prioritized
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Governance matters for quality infrastructure and to increase financing from the private sector

- **Better governance will improve return on public investment but also draw in more private financing for infrastructure**
- Governance failures inhibit the delivery of high-quality infrastructure
- Citizens are concerned that their perspective is not (or not visibly) taken into account
- Investors (particularly long-term investors) expect government to be a competent and reliable partner and to promote a stable business climate for investment as well as a bankable pipeline of projects
Most infrastructure investment is delivered through public procurement.

Share of PPPs in total public sector infrastructure investment:

- **0%–5%**
- **>5%–10%**
- **>10%–15%**
- **>20%**
Most infrastructure investment is financed by public funds

Private and total investment in road and rail infrastructure in OECD* countries (millions of USD, 2005 price)

Note: * Due to incomplete data on total investment, Greece was excluded from this overview.

Source: Dealogic Projectware database, OECD/ITF statistics.
OECD Framework for the Governance of Infrastructure: Getting Infrastructure Right

- Ten dimensions or “success factors”
- Policy options to identify an enabling environment
- Building on several OECD instruments

**STRATEGIC VISION AND PLANNING**
- Vision
- Delivery
- Coordination

**ENABLING FRAMEWORK**
- Integrity
- Regulation
- Consultation

**AFFORDABILITY, FINANCING AND VALUE FOR MONEY**
- Affordability and value for money
- Data

**LIFE-CYCLE PERSPECTIVE**
- Performance
- Resilience
Rationale for updating the Framework

- Raises the Framework to a whole-of-government level and increases its impact and relevance
- Includes elements that were missing or not fully highlighted in the Framework
- Takes into account work done by different policy communities, new recommendations and lessons learned
- Ensures synergies with the OECD Horizontal Project on Strategic Policies for Sustainable Infrastructure
- Ensure a strong support its implementation as well as a periodic review to ensure that it remains relevant, including possibly by:
  - Developing and using indicators; and
  - Using the draft Recommendation as a benchmark to support country and regional reform programmes
Elements that were missing or not fully highlighted in the framework

<table>
<thead>
<tr>
<th>Strategic Vision</th>
<th>Efficient and Effective Procurement</th>
<th>Stakeholder Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>• National and subnational perspective</td>
<td>• Competitive, transparent and efficient procurement processes</td>
<td>• Proactive measures to disseminate information</td>
</tr>
<tr>
<td>• Infrastructure needs assessment</td>
<td>• Risk-based approach</td>
<td>• Disciplined, upfront stakeholder mapping</td>
</tr>
<tr>
<td>• Impact of technology</td>
<td>• Contractors’ transparency and accountability</td>
<td>• Collaboration during all phases of the project life-cycle</td>
</tr>
<tr>
<td>• Fiscally sustainable</td>
<td>• Integration into public finance management, capital budgeting and service delivery</td>
<td>• Debate on the main economic, environmental and social impacts</td>
</tr>
<tr>
<td>• Political consensus</td>
<td>• Attractive, merit-based career options for officials</td>
<td></td>
</tr>
<tr>
<td>• Environment, gender equality, sustainable development and growth considerations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Robust institutional framework</td>
<td></td>
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</tbody>
</table>
Elements that were missing or not fully highlighted in the framework

<table>
<thead>
<tr>
<th>Fiscal Sustainability, affordability and VfM</th>
<th>Evidence-informed decision-making</th>
<th>Asset performance throughout its life</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fiscal sustainability</td>
<td>• Institutional responsibility for analysis, dissemination, and learning of data</td>
<td>• Life-cycle costs and asset quality</td>
</tr>
<tr>
<td>• Capital budgeting and MTEF</td>
<td>• Production of data at subnational scale</td>
<td>• Contractors’ accountability</td>
</tr>
<tr>
<td>• Prioritisation and high investment thresholds for project evaluation</td>
<td>• Harnessing digital technologies and data analytics</td>
<td>• Review of asset value and depreciation and impact in accounts</td>
</tr>
<tr>
<td>• Budget transparency and fiscal risks</td>
<td>• Data collection over the entire lifecycle</td>
<td>• End of PPP contracts and transition new arrangements</td>
</tr>
<tr>
<td>• Risk management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Economic, social, environmental and climate costs and benefits</td>
<td></td>
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</tr>
</tbody>
</table>
Timeline

February (2020)
• Public consultation

March (2020)
• Final round of consultation with SBO and other relevant bodies

April (2020)
• Approval of draft Recommendation by PGC

May (2020)
• Ministerial Council Meeting

5th OECD Forum on Governance of Infrastructure
11-12 May 2020, OECD, Paris, France
THANK YOU

Questions:

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Building project delivery capability

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Director, Profession & Standards
Infrastructure and Projects Authority
“Transforming project leadership: The Major Project Leadership Academy (MPLA) will train the senior leaders responsible for major projects.

In future only project leaders who have successfully completed this intensive development programme will be able to lead a major government project.

The MPLA will drive a better understanding of the role of leadership, technical delivery skills and commercial capability in delivery of major projects, building the project and programme management community across Government.” (Civil Service Reform Plan 2011)
Extending the offer…

‘C-suite’ (DGs & CEOs)

Major project leaders (SROs & PDs)

Project leaders (SROs, PDs, PfMs)

Range of targeted programmes for new & aspiring leaders

Federated Academies & other targeted programmes
Building the profession

Standards

Capability framework

Leadership

Cross-Government recruitment

Graduates & apprentices

Talent management
Growing early talent
More support for project leaders
Where are we?

- World class development for 2000+ project leaders
- Clear improvements in leadership retention and capability
- 3\textsuperscript{rd} most popular graduate scheme in government
- Surge of interest in project delivery as a profession
More to do…

- Accreditation linked to skills, experience and CPD - at all professional levels
- Core skills development and curriculum refresh
- Extending the focus to wider public sector
- Working with the supply chain
What we’ve learnt

• Building capability takes time
• Make it aspirational
• Look in different places
• Make it matter
• Think about the pipeline
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Ireland: More bang for the buck by strengthening Public Investment Management

INFRASTRUCTURE INVESTMENT IN AN ERA OF UNCERTAINTY

DUBLIN, IRELAND
JANUARY 31, 2020

© Carolina Renteria
Fiscal Affairs Department
Outline of Presentation

• Investment Needs & The Public Investment Management Assessment (PIMA)

• IMF’s Commitment to Infrastructure Governance
  ✓ Regional Networks
  ✓ Infrastructure Governance Facility

• Ireland’s PIMA guiding the reform agenda
  ✓ Main Findings
  ✓ Recommendations

• Some Good Practices for Public Investment
Public investment is an important catalyst for economic growth

Public investment has been falling over the past 25 years, except in LIDCs

Resulting in a fall in public capital stock

General Government Investment (Percent of GDP)

General Government Capital Stock (Percent of GDP)

Source: IMF Staff estimates.
For investment to convert to better outcomes, it needs to be done well

Large public investment efficiency gaps both across and within different income groups

Efficient investors get twice the economic dividend compared to least efficient investors

Profile of output impact of a 1% of GDP increase in public investment by efficiency group

Source. IMF Staff estimates.
Improvements in public investment management (PIM) needed to reap full benefits of scale up of investment

Empirical studies underscore the importance of fiscal institutions for public investment efficiency, hence for growth.

Differences in the efficiency of public investment across countries partly reflect differences in the relative strength of PIM institutions

“Investing in investing”—or strengthening public investment management—will yield an even higher growth “bang” for the investment “buck.
IMF’s Public Investment Management Assessment (PIMA) thoroughly assesses country systems.

**PLANNING**
1. Fiscal Principles or Rules
2. National & Sectoral Plans
3. Coordination Between Entities
4. Project Appraisal
5. Alternative Infrastructure Provision

**IMPLEMENTATION**
11. Procurement
12. Availability of Funding
13. Portfolio Management & Oversight
14. Management of Project Implementation
15. Monitoring of Public Assets

**ALLOCATION**
6. Multi-Year Budgeting
7. Budget Comprehensiveness & Unity
8. Maintenance Funding
9. Budgeting for Investment
10. Project Selection

**CROSS CUTTING ENABLING FACTORS**
- Legal and Institutional Frameworks
- Staff Capacity
- IT Systems
The IMF has a strong commitment to Infrastructure Governance

The IMF has intensified its work on Infrastructure Governance in recent years:

- Two Board Papers (2015 and 2018) to establish and update the PIMA Framework
- Conducting Capacity Development with over 60 PIMA, 20 PFRAM, more than 10 regional workshops and 55 follow up activities (since 2015)
- Contributing to international fora based on these experiences (G20, regional seminars, etc.)
Enabling peer-to-peer exchange of best practices

The European Infrastructure Governance Regional Network was formally proposed in November 2019, with support from 12 member countries.

The Regional Network will enable seamless exchange of best practices in Infrastructure Governance as well as a medium for future collaboration.

Ireland: a leader in the group
Infrastructure Governance will continue to be a strategic priority

The IMF, with support from Japan, has established a Infrastructure Governance Facility

The new Facility seeks to:

- Improve infrastructure governance awareness
- Improve investment efficiency via improved governance
- Be a platform for peer to peer learning
- Promote investment spending in line with debt sustainability
- Mobilize donor support for infrastructure projects
Ireland’s PIMA Main Findings (Summer 2017)

Opportunities to close the gap between de jure (design) and de facto (effectiveness)
Ireland’s PIMA: Main Findings

Planning Phase
• Fiscal rules support public capital formation and PCs are well-regulated with relatively strong PIM practices
• Weaknesses revolve around various sector strategies with low coordination, weak results frameworks and limited cost estimates
• Spending on PPPs should be brought more firmly within the fiscal envelope

Allocation Phase
• Multi-year budgeting implementation has improved allocation of project resources
• Planning process is inadequately linked to funding decisions
• Project appraisal and selection would benefit from improved methodological rigor and learning across sectors

Implementation Phase
• Funding for ongoing projects remains stable under fiscal consolidation; good project management practices
• Need for stronger management of assets (including prioritizing maintenance spending)
<table>
<thead>
<tr>
<th>Ireland’s PIMA: Timely and Practical Recommendations</th>
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</thead>
<tbody>
<tr>
<td><strong>Planning Sustainable Levels of Investment</strong></td>
</tr>
<tr>
<td>• Improve linkages between planning and budgetary decision-making and across planning exercises</td>
</tr>
<tr>
<td>• Management of PPPs</td>
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<tr>
<td><strong>Allocating Investment</strong></td>
</tr>
<tr>
<td>• Appraisal of investment projects</td>
</tr>
<tr>
<td>• Selection of investment projects</td>
</tr>
<tr>
<td>• Monitoring investment projects</td>
</tr>
<tr>
<td>• Budgeting maintenance of public assets</td>
</tr>
<tr>
<td><strong>Implementing Investment</strong></td>
</tr>
<tr>
<td>• Ex-post review of investment projects</td>
</tr>
<tr>
<td>• Monitoring of public assets</td>
</tr>
</tbody>
</table>

2.5 years later: Major reforms implemented and underway!
Many rowing together in the same direction!
<table>
<thead>
<tr>
<th>Institution</th>
<th>Effectiveness Indicators (Examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. National and Sectoral Planning</td>
<td>Quality and realism of plans, use of plans for decision-making, are plans outdated, coordination-complementarity, linkage to budget process.</td>
</tr>
<tr>
<td>4. Project Appraisal</td>
<td>Pipeline of well designed and appraised projects, Quality of appraisals, methodologies, actual use for decision-making, number of exemptions.</td>
</tr>
<tr>
<td>5. Alternative Infrastructure Provision</td>
<td>Market shares private companies, number and volume of realized PPPs, SOE role in public infrastructure.</td>
</tr>
<tr>
<td>13. Portfolio Management and Oversight</td>
<td>Applied? Average cost overrun, average project delays, use of data for analysis, use of ex-post reviews</td>
</tr>
<tr>
<td>14. Management of Project Implementation</td>
<td>Consistency of project management, quality implementation plans, number project audits</td>
</tr>
<tr>
<td>15. Monitoring of Public Assets</td>
<td>Frequency of revaluation, use of asset registers for decision making, realism depreciation</td>
</tr>
</tbody>
</table>
Planning for sustainable levels of public investment

Institution 2: National and sectoral planning

Objective:

To assess whether national and sectoral plans help to ensure that public investment decisions are based on priorities, cost estimates, and clear/realistic goals for each sector

Question

• Are investment allocation decisions based on sectoral and inter-sectoral strategies?
Country Examples – National and Sectoral Plans

Botswana - Botswana has several strong planning institutions—as reflected in the National Development Plan (NDP). The plan is in its 11th iteration and is valid for six years. NDP 11 is based on the government’s 2036 strategic vision, includes six-year estimates per ministry and per project, and provides the basis for the total development budget.

Netherlands – Bureau of Economic Analysis provides independent assessment of all political programs prior to elections and assessment of government coalition program after elections.

Norway – National transport plan updated every four years. Provides estimates for next 20 years, within pre-determined fiscal framework. Detailed specification of planned projects, with initial costing, outputs and outcomes.
Planning for sustainable levels of public investment

Institution 4: Project Appraisal

**Objective:**

To ensure that all major projects are subject to rigorous technical, economic and financial analysis, and can demonstrate value-for-money

**Question**

- Are project proposals subject to systematic project appraisal?
Country Examples – Project Appraisal

Canada: Detailed framework for project appraisals. Threshold is the same for all projects (Can$50 million), except maintenance or improvement of transport infrastructure (Can$100 million).

Chile - All investment initiatives financed by the government, regardless of the amount, are subject to technical and economic appraisal.

Korea: Projects are subject to scrutiny by independent agency. Different thresholds for central government and subnational projects (W50 billion vs. W30 billion).
Allocating Investment

Institution 10: Project Selection

Question

- Are there institutions and procedures in place to guide project selection?

Objective:

To ensure that there is a project selection system in place, which ensures that investment projects:

- are systematically selected on the basis of transparent criteria
- are prioritized and included on a unique pipeline of approved projects
Country Examples – Project Selection

**Colombia** – All projects appraised are included in a dynamic portfolio of projects (IT system), following budget calendar prioritization by sector, strategic and technical validation by National Planning Department, fiscal sustainability checked by MoF, approval of annual investment plan by Cabinet.

**Norway** – External quality assurance of choice of concept (EQ1) and detailed design (EQ2) before projects are select for implementation.

**UK** – Gateway process establishes several milestones were projects are reviewed and assessed before moving to the next stage, and eventually to selection for funding.
Delivering productive and durable public assets

Institution 13: Portfolio management and oversight

Objective:

To ensure that the financing and physical progress of major capital projects are monitored during their implementation, and are subject to ex post review.
Country Examples – Portfolio Oversight

Malaysia - Central project monitoring unit with 23,000 staff under the Prime Minister’s Department has an advanced IT system, SPP II, for monitoring the implementation of capital projects which are financed by budget. Line ministries and agencies update both project costs and physical progresses weekly, feeding into consolidated reports.

UK – Major projects portfolio. Regular delivery confidence assessment (DCA) for major projects, transparently reported on major projects website.
Institution 14: Management of project implementation

Objective:

To ensure that an effective project management system is in place to monitor the execution of capital projects, as well as standardized procedures and guidelines to adjust projects if warranted.

Question:

• Are capital projects well managed and controlled during the execution stage?
**Country Examples – Project Management**

**Estonia** - Responsibilities for project implementation are clearly assigned, and rules are in place for contract adjustments. Project implementation plans are prepared prior to approval, projects are actively managed, and audits focus on high risk projects.

**Slovakia** – All major projects (mainly EU financed) are centrally monitored, funds can be re-allocated between projects, and systematic ex-post review exist for EU financed projects.
Delivering productive and durable public assets

Institution 15: Monitoring of public assets

Objective:

To ensure that assets are properly recorded and reported, and their depreciation is recognized in the government’s financial statements.

Question

- Is the value of public assets properly accounted for and reported in financial statements?
Estonia - Monitoring, valuation and control of assets is robustly implemented, driven by the accrual accounting framework. System for asset management exists, and assets are included in financial statements.

Indonesia – Registration of fixed assets is comprehensive and timely, and data are used in financial statements. Asset management data are reliable and adequate.

Mongolia – Government has established institutions for monitoring public assets, with most nonfinancial assets reported in the balance sheet. Comprehensive asset surveys are regularly conducted every 4 years.
Thank You
The Implementation of PIMA Recommendations in Ireland

© Fionn Jenkinson
Investment Projects and Programmes Office
January 2020
Context: Ireland’s public investment has been historically volatile but the state has consistently delivered major infrastructure.
FINDINGS:

- Ireland has relatively strong infrastructure, with some sectoral weaknesses.

- Management of public investment is generally good, but with scope for improvement.

- Relatively low headline efficiency of public investment.
Coordination and Oversight

PIMA: Integrate the spatial, sectoral and 10-year capital funding plans and integrate planning strategies vertically and horizontally

- Project Ireland 2040 sets out a clear long-term spatial strategy backed by investment of €116 billion over the 10 years to 2027.
- Cascades into RSESs, development plans, and also forthcoming sectoral strategies such as PLUTO, IDA strategy etc.

PIMA: Establish an Infrastructure Projects Unit within DPER

- Investment Projects and Programmes Office
  - Project Ireland 2040 Delivery Board
  - Monitoring investment and capacity
  - Supporting value-for-money
  - Proactive communications
Monitoring Implementation

PIMA: Further develop the Capital Tracker database

- The latest iteration of the Investment Tracker was published on 7th January 2020.
  - Cost range
  - Stage of project lifecycle
  - Estimated commencement and completion dates
- Monitoring of the construction sector also taking place.
Project Selection

PIMA: Introduce a more structured quality-at-entry process, and align critical decision points with the business case

- Updated Public Spending Code published Q4 2019
  - Provides greater clarity on roles and responsibilities;
  - Introduction of formal Decision Gates 0-3
  - IPPO acts as objective reviewer for projects over €100 million
Project Appraisal

PIMA: Harmonize, update and extend appraisal methodologies

- Updated technical parameters published Q3 2019
  - Social Discount Rate, Shadow Price of Public Funds, Shadow Price of Labour, Shadow Price of Carbon

- Updated Public Spending Code published Q4 2019
  - Strengthen the existing guidance to better align with the realities of project delivery
  - Focus on gaining a more developed view of costs, risks and timeframes before committing to proceed with a project
  - Increase transparency through publication of business cases and evaluation reports.

- Additional work required to develop asset register and sharpen the focus in the budget process on the level of spending required to maintain infrastructure.
Infrastructure investment in an era of uncertainty

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Reforming Investment Management in Ireland – What’s Next?

© Ciara Morgan
Investment Projects and Programmes Office
31st January 2020
Public Spending Code

- Alignment of Sector Specific Guidance.

- Support implementation of strengthened guidance
  - awareness raising
  - spot checks
  - lessons learned (library of business cases and ex post evaluations)
Public Spending Code

- Evolving programme of further reform including:
  - Economic Appraisal guidance
  - Financial Appraisal guidance
  - Programme Appraisal Guidance
  - Development of Templates
Governance of Major Projects

- Arrangements for assurance of major projects are in development.
- Informed by international best practice.
- Project and programme assurance including
  - robustness of planned delivery,
  - accuracy of cost forecasts,
  - consideration of risk,
  - appropriateness of procurement strategies.
- Independent external review of projects over €100m at key stages.
- Operational in 2020.
Monitoring the Investment Pipeline

- Investment Projects and Programmes Tracker
  - Plan to move to more regular updates of pipeline
  - Aim for more granular information on project timelines and status
  - Develop a new system for gathering and analysing data, e.g. online portal
What’s Next

- Common analytical framework on estimating demand pressures and infrastructure gaps.
- Investment alignment.
- Alignment with core national policies, in particular the Climate Action Plan.
Rialtas na hÉireann
Government of Ireland
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Modernising Construction
Using Modern Methods of Construction As A Change Agent for A New Industrial Strategy: A UK Case Study

© Mark Farmer
CEO, Cast Consultancy & UK Government MMC Champion

Project Ireland 2040 Conference
Dublin, 31st January 2020
"INFRASTRUCTURE INVESTMENT IN AN AGE OF UNCERTAINTY"

THE CONSTRUCTION INDUSTRY AS A MEANS OF PRODUCTION IS A MAJOR PART OF THAT UNCERTAINTY

WE URGENTLY NEED TO RETHINK HOW WE BUILD
A REMINDER:

WHY THE ‘MODERNISE OR DIE’ CHALLENGE?
We Have Declining Structural Resiliency in UK Construction

Construction Employment as % of Total Employment

[Graph showing the trend of construction employment as a percentage of total employment from June 1978 to March 2018 (r)].
And It’s Clearly Mirrored in Ireland

Chart 1: Employment relative to 2007 Average: Construction and Non-Construction

Chart 3: Construction Employment by Age

Skills shortage forces construction companies to look abroad

Construction firms are increasingly meeting recruitment demands from outside Ireland and beyond the EU, to address skills shortages as the industry continues to grow strongly.

Construction industry targeting transition year students to avert future skills shortages

The construction industry has launched a transition year initiative to facilitate students interested in working in Ireland’s most innovative construction companies. The initiative will see students completing work...
THE BASIC PRODUCTIVITY CONUNDRUM IS NOW COMPOUNDED BY INCREASINGLY POOR PERFORMANCE
Pattern of overspending in major Irish infrastructure projects
Conflict of interest that can lead to underestimating costs lies at core of public projects.

In 2016, then minister for health Leo Varadkar said the children’s hospital would be completed by 2020, “short of an asteroid hitting the planet”. The estimated cost was €670 million at that time.
State to provide €750m in loans to small builders

More than 7,500 homes expected under Home Building Finance Ireland scheme

Leading To Growing Industry Fragility & Concern From Those That Fund It...
Discontent from the Public at Large - Mainstream & Social Media Attention is Creating Unprecedented Reputational & Brand Risks for Developers & Housing Associations

THE IRISH TIMES

Up to 92,000 boom-era apartments may have defects, committee hears

Construction Defects Alliance says 'hear no evil, see no evil approach' cannot continue

© Thu, Nov 7, 2019, 14:19 | Updated: Thu, Nov 7, 2019, 14:55

Jack Horgan-Jones

Ireland’s defective buildings: Not just a Celtic Tiger problem

Niamh Towey • Sep 7, 2019 • 13 min read • 1

DEFECTS IN NEW BUILDINGS – ESPECIALLY COMMON DURING THE LAST BOOM – CAN LEAVE OWNERS IN HUGE DEBT, WITH LITTLE LEGAL RECOURSE. AND THEY DIDN'T STOP WHEN THE CELTIC TIGER DIED, AN IRISH TIMES INVESTIGATION REVEALS

Cast
Persimmon report shows capitalism at its worst

The housebuilding industry needs to rediscover its sense of purpose

Builder Persimmon lacks minimum house standards, report finds

© 17 December 2019
The Grenfell Tower Tragedy Has Rightly Taken This Debate To A New Level

Developer lobbies against ‘onerous’ apartment fire-safety standards

Hines claims new regulations could add €11,000 to construction cost of each flat

© Mon, Nov 4, 2019, 02:23

Jack Horgan-Jones, Niamh Towery

Ireland has not learned from Grenfell and Berkeley tragedies, says top architect

By Vivienne Clarke

Wednesday, July 03, 2019 - 11:06 AM

A major property developer has lobbied against the introduction of new fire-safety standards, arguing they are “overly onerous” and will “have a negative
Quantity and Quality Have Rarely Coincided in Homebuilding – Societally Led Change Is Now Forcing UK Politicians To Do Things Differently

The case of Larkfield House exposed current building rules as little better than u 
Michael Clifford

Housing the dominant issue in seven-way general election debate
SF leader McDonald critical of FG, FF and Labour for rating cut coalition with her party
© Mon, Jan 27, 2020, 22:08 | Updated: Tue, Jan 28, 2020, 09:21

Tough new energy ratings expected to increase construction cost of residential properties by up to 4pc
Car sales fall in UK with industry's worst September since financial crisis

Consumer uncertain lead to 20% fall, says

Toyota to build prototype city of the future in Japan

Jane Lanhee Lee, David Shepardson

LAS VEGAS (Reuters) - Toyota Motor Corp (7203.T) said on Monday it planned to build a prototype “city of the future” at the base of Japan’s Mt. Fuji, powered by hydrogen fuel cells and functioning as a laboratory for autonomous cars, “smart homes,” artificial intelligence and other technologies.
SO WHAT IS UK GOVERNMENT DOING & WHY IS CENTRAL & REGIONAL GOVERNMENT POLICY SO IMPORTANT?
UK Government Has Finally Recognised The Importance of Construction In Achieving Its Political Ambitions & A Move Towards MMC Is Central To That

Ireland to unveil bold plan to tackle climate emergency

Varadkar reveals ideas to curb greenhouse gases and move towards net-zero carbon emissions by 2050

A European Green Deal

Striving to be the first climate-neutral continent
We Need To Get Our Definitions & Terminology Consistent - UK Government Has Formally Defined ‘MMC’
Significant Government R&D Funding Is Now Flowing
Building Evidence & Data - Traditional v MMC
Government Support To Build Market Confidence Via Homes England

Press release

Homes England supports local authority deliver pilot MMC scheme

Homes England recognises the important role that modern methods of construction (MMC) have to play in delivering the homes that England needs.

Published 27 December 2018
From: Homes England

Homes England is encouraging partners to develop and use MMC through a range of initiatives and the provision of development finance.

One local authority is exploring the use of MMC to deliver homes for affordable rent through an innovative pilot scheme. Nuneaton and Bedworth Council (NBBBC) has just completed its first modular build having securing £120,000 worth of funding from Homes England.

INVITATION TO TENDER

CREATING A SUSTAINABLE HOUSING MARKET IN ENGLAND – USE OF MODERN METHODS OF CONSTRUCTION

ITT 1674

CONTRACT FOR

HOMES ENGLAND

OFFICIAL
The UK’s Cities & Devolved Authorities Are Now Also Identifying MMC As A Lever Of Local Industrial Strategy

Dublin City Council issues €1bn tender for factory-built homes in effort to reduce social housing list

The council has plans to construct around 1,000 rapid-build homes at different locations throughout the city.

Targeting more local homes - higher quality, lower carbon with new high productivity & technology led skills and associated inward investment
THE LAST 12 MONTHS HAS SEEN AN UNPRECEDENTED SHIFT IN UK ACTIVITY IN INDUSTRIALISED CONSTRUCTION
New International Players, New Capital, New Partnerships in MMC

21.01.2020
Elements Europe Joins Forces with GS E&C, Leading South Korean Construction Firm
London, 21st January 2020 – One of the UK’s top off-site manufacturers and constructors, Elements Europe, has joined forces with a leading global construction company based in South Korea, GS Engineering & Construction (GS E&C), who has acquired a...

Homes England awards councils £38m for 2,000 MMC homes
NEWS 24/10/19 1:00 PM BY MARK SMULIAN
Homes England has awarded £38.2m to six councils to help build 2,072 homes using modern methods of construction (MMC).

Government backs Ilke Homes with £30m loan
True 21st Century Disruption Is Already Finally At The Door of The Mainstream UK Housebuilding & Contractor Sector – Strategic Shifts to Integrated Manufacturing

Countryside to open two more modular homes factories

Weston Logistics’ new distribution & build-off-site centre is one of the most advanced in the UK construction industry

Barratt sets new MMC target after beating 2020 aims

Kier predicts contractors will employ ‘offsite managers’
Why Are UK Developers Engaging With MMC?

Decision Making Factors in using MMC

- Better Quality: 86%
- Improved Efficiency: 81%
- Accelerate Delivery: 75%
- Increased Productivity: 72%
- Sustainability: 67%
- Increased Control: 53%
- Design Standardisation: 47%
- Want to Modernise: 42%
- Reduce Operational Cost: 39%
- Reduce Capital Cost: 33%
- Need to Modernise: 31%
- Other: 28%
What do developers identify as barriers?

Concerns (a) architectural design and standardisation (b) programme delays (“volumetric”) Concern that the workforce is no different to that used in the traditional market (“volumetric”)
In response to market concern the MHCLG set up a:

- Joint working group with lenders, valuers and the industry
- To ensure mortgages & building insurance are more readily available through a move to gradually better aligned assessment and accreditation
- MoU being finalised between major warranty providers
Press release

**Housing Minister unveils £30m boost for ‘Construction Corridor’**

Government developing a construction industry which will deliver zero carbon homes, an industry worth £40 billion a year and create 80,000 new jobs.

Published 3 November 2019
From: Ministry of Housing, Communities & Local Government and The Rt Hon Esther McVey MP
Post Election Ministerial Interest in MMC is High
WE CAN DELIVER A NEW AGE OF HOMEBUILDING IN UK AND IN IRELAND TOO, BUT.....

IT NEEDS STRONG & LONG TERM LEADERSHIP BY POLICY MAKERS & INDUSTRY COMBINED

THANK YOU FOR LISTENING
Infrastructure investment in an era of uncertainty

Conference on public investment governance, reform and innovation

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Kathryn Meghen

CEO, Royal Institute of Architects

https://youtu.be/hVSt6BOnwyw
Modernising Construction

Investment Projects and Programmes Office
January 2020
Context: Growing demand, falling employment, stagnant productivity

Investment in Building and Construction
(€billion)

Construction Employment (‘000s)

Labour Productivity Index
(2010 = 100)

- Public Sector
- Private Sector

*All Data from CSO. Investment measured as total GFCF.*
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Perceptions of the sector

Celtic Tiger building defects ‘widespread’, says housing expert

Many apartment residents ‘living with leaks, damp, structural and fire safety defects’

Jack Horgan-Jones
Perceptions of the sector

The Irish construction sector has experienced a few busy years now, with no immediate sign of let up. New projects and developments are visible all around Dublin, and in other areas of Ireland. The high level of construction activity, however, is now leading to disputes, as projects commenced in 2015 and later are now being completed. Notably, adjudication, which has applied to construction contracts and appointments entered into after 25 July 2016, is on the rise!

Irish Building, 25 March 2019
Perceptions of the sector

17 schools found to have structural defects that warrant works

Updated / Thursday, 1 Nov 2018 06:23
Perceptions of the sector

Sammon sub-contractors call for State to intervene in payments row

Updated / Tuesday, 24 Jul 2018 21:32

By Cesar Hunt
Reporter

The collapse of Carillion leads to the liquidation of the Sammon construction firm.
Perceptions of the sector
Client’s experience of the construction process

Irish Water disputes €3.6m bill over construction delay

State agency claims 90-day delay to works on drainage project should cost only €180,000

© Tue, Nov 5, 2019, 15:51
Client’s experience of the construction process

Kevin Street Garda station construction costs spark dispute

Office of Public Works at loggerheads with builder JJ Rhatigan over €3m extra charge

© Thu, Oct 10, 2019, 02:40

Jack Horgan-Jones
Industry’s perception of the public sector client

Public building contracts ‘unattractive’ to architects

RIAblames State bureaucracy, time frames, risk shifting and poor procurement skills

Fri, Apr 12, 2019, 00:00

Jack Horgan-Jones
Industry’s perception of the public sector client

The other key issue is the nature of public works contracts, which see the vast majority of risk carried by the party least able to manage it, namely the contractor.

Construction Magazine
Industry’s perception of the public sector client

the “allocation of uncontrollable risks”. He said the largest of the construction companies in Europe “cannot and will not take these risks”. It was, he said, “the main issue facing the Irish Government from a procurement point of view and it must be addressed”.

Irish Times, 19 July 2019
Summary

- Uncertain outcomes
- Difficult and complex processes
- Uncertain investment environment
- Unrealistic expectations
- Poor payment
- Questionable employment practices
- Poor understanding between the many actors of their various requirements
- Wasted resources
What steps can public sector clients take?

- Better understanding of the process
- Emphasis on risk management rather than simply transfer
- Greater engagement in the day to day management of projects
  - Setting minimum standards for information
  - Demanding high standards of performance
  - Greater collaboration
  - Insisting on BIM
What does a ‘modern’ industry mean to a client

Why should we care?

Potential to ensure State assets are:
• Better built
• Quicker delivery
• Greater certainty

and to deliver…

better working conditions, more diverse workforce, long term career stability with better opportunities
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Project Ireland 2040
Modernising Construction:
Skills

© Dr. Róisín Murphy

Department of Public Expenditure and Reform Conference
Central Bank of Ireland
31st January 2020
Current (Q3 2019) vs Peak (Q2 2007)

- Male: 138,100
- Female: 11,800
- Total: 209,860

- Male: 230,700
- Female: 10,600
- Total: 337,820

*Estimate of indirect employment (40%) [Accessed 29-01-20]
Shortage of Construction Workers

- **86%** Not sufficient skills
- **81%** Employ tradespeople
- **71%** Do not engage apprentices

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Dr. Roisin Murphy


Labour Market Challenges

- Direct employment
- Apprentice engagement
- Wage inflation
- Investment in training & development
- Senior personnel
- Staff retention
Life long learning
Training and development

Skills for the future

TRADITIONAL SKILLS / CRAFTS
DISCIPLINE SPECIFIC SKILLS
DIGITAL SKILLS
SOFT SKILLS
Thank you
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