

Innovation and Learning in Megaprojects

Lessons from the UK

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The iron law of megaprojects

- Megaproject is an investment in infrastructure \$1bn or more
- Global spending on megaprojects \$6 to \$9 trillion a year
- 90% are late or overbudget (Flyvbjerg, 2014)
- UK's delivery model was broken by early 2000s



Channel Tunnel



Scottish Parliament Building



Wembley Football stadium



National Air Traffic Control Centre

The traditional delivery model

- Transfer risk to contractor (fixed-price contracts)
- Select lowest price bid
- Predefine all requirements (early design freeze)
- Avoid or banish innovation
- Arms-length adversarial relationship

(National Audit Office, Government Reviews, Industry reports, Interviews)



Jubilee Line

Changing the rules of the game

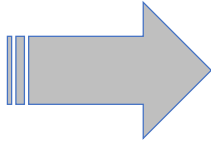
- Heathrow Terminal 5
- Construction 2003-2008
- On time and within budget
- “T5 Agreement”
- New delivery model
 - Client bears the risk
 - Works in integrated project teams



T5 initiates a movement for innovation



Heathrow
Terminal 5



London 2012 Olympics



Thames Tideway Tunnel



High-Speed 2

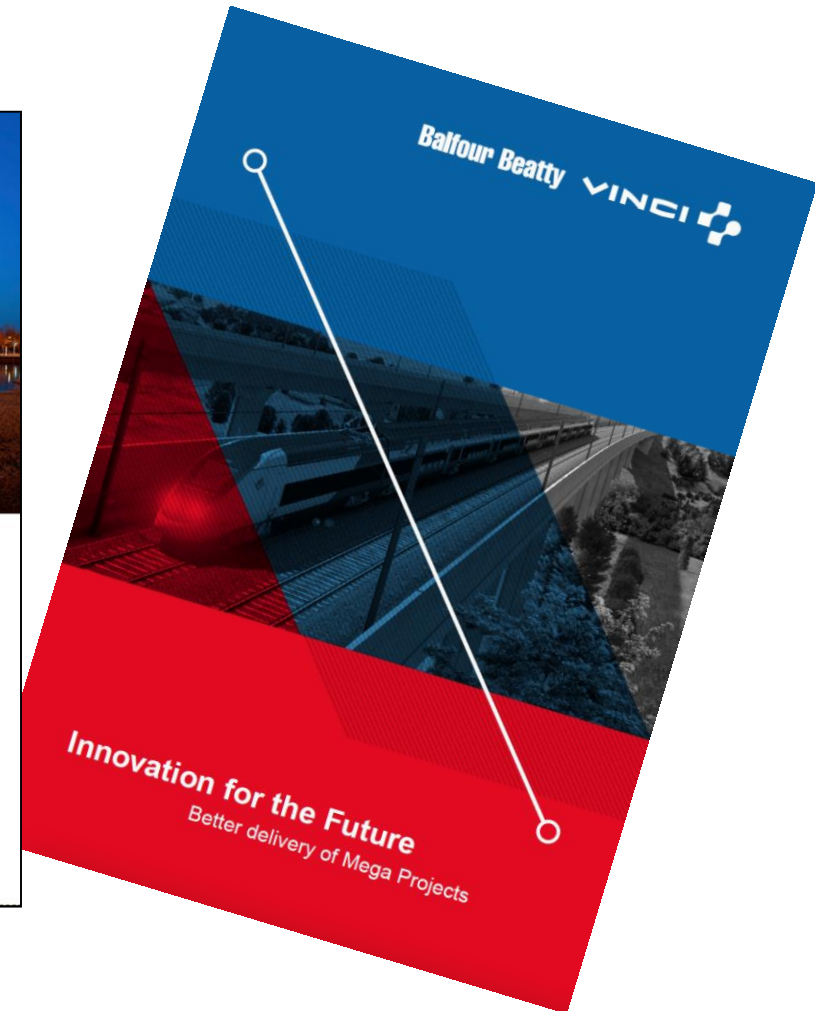
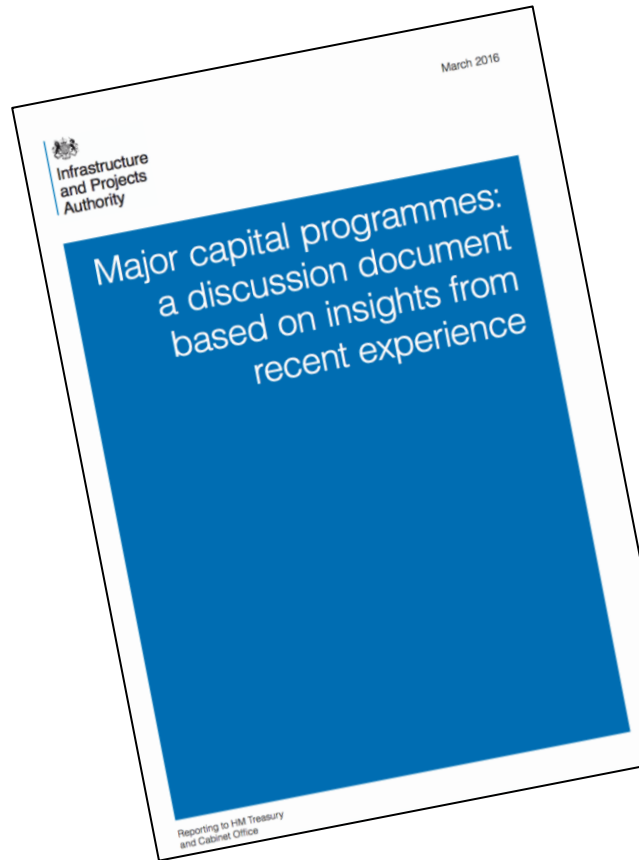


Heathrow Terminal 2

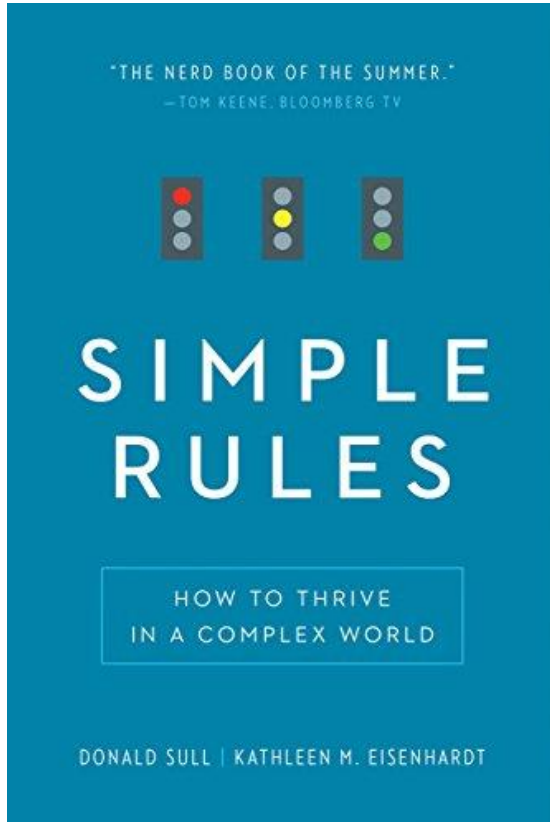


Crossrail

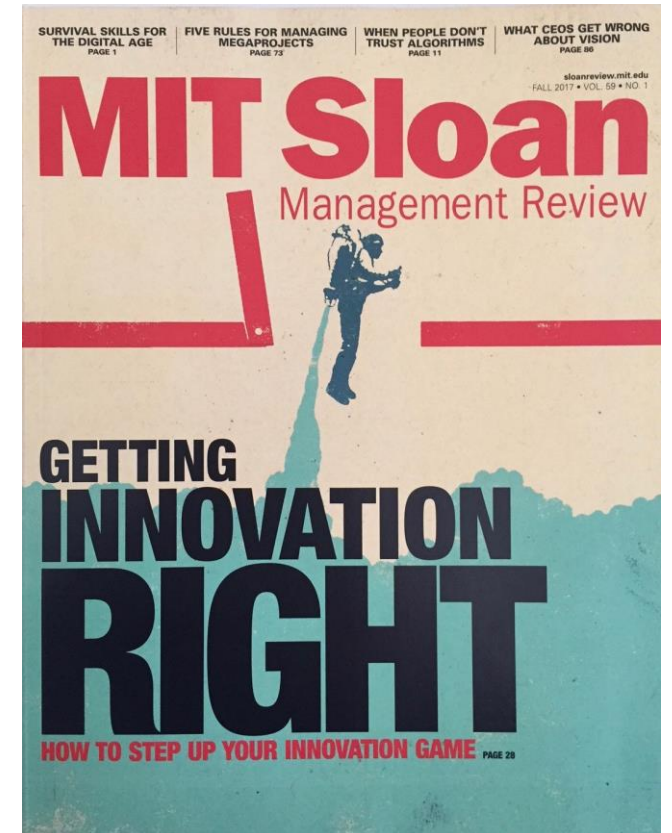
New agenda about innovation in megaprojects



Our research



- Complex projects depend on high-level rules
 - Guide to decision making and leadership in a complex and uncertain environment
 - Balance concrete guidance and freedom to exercise judgement
- 5 rules for innovation in megaprojects



Rule 1: Assess what's worked before

External learning



Internal learning



Traditional approach (fixed price and risk transfer)

T5 would be:

- £1bn over budget
- 1 year late
- 6 deaths

Rule 2: Organise for the unforeseen

- “...**flexibility and adaptability** are key objectives for T5. Conventional processes and solutions are therefore not tenable. It will require **flexibility of approach; flexibility of solutions; latest responsible decision making, etc.**”
- *T5 Delivery Handbook*



making T5 Bang on target.

For great success, we need great people delivering quality work, safely, within budget and bang on target. T5 team can certainly lay claim to this. As one of the longest serving teams at T5, they completed work on the T5 project and a massive £5 million under budget – a remarkable achievement in the face of some extraordinary challenges. All of them will be proud to look back and say 'I built T5'.



Rule 3: Rehearse first

- **Heathrow Terminal 5**
 - Roof constructed first in off-site trial
- **London 2012 Olympics**
 - Complete construction one year early
- **Heathrow Terminal 2**
 - Prepare for “soft opening”



Rule 4: Calibrate and apportion risks appropriately



- **Foreseen risk**
- Standardized venues
- Fixed price contract
- Transfer risks



- **Unforeseen uncertainty**
- Iconic venues
- Flexible contract
- Share risks

Rule 5: Harness innovation from start to finish



About

Launched in **October 2016**, the Infrastructure Industry Innovation Platform (**i3P**) is an independent innovation community governed by representatives from its member organisations. Membership is open to clients (currently major infrastructure projects and construction programmes) and their supply chains (Tier 1 contractors and consultants) across the infrastructure industry.

As a **primary driver for innovation** in the UK infrastructure industry, i3P will help transform **ideas into opportunities** and practical solutions, providing a mechanism for strategically directing innovation to address the major challenges facing the infrastructure industry.

By fostering a truly **collaborative culture** of innovation across both infrastructure clients and their supply chains, i3P will create a 'safe space' to identify areas for potential industry improvement, share ideas, and enable members to partner in projects that **drive increased value** across the infrastructure industry.

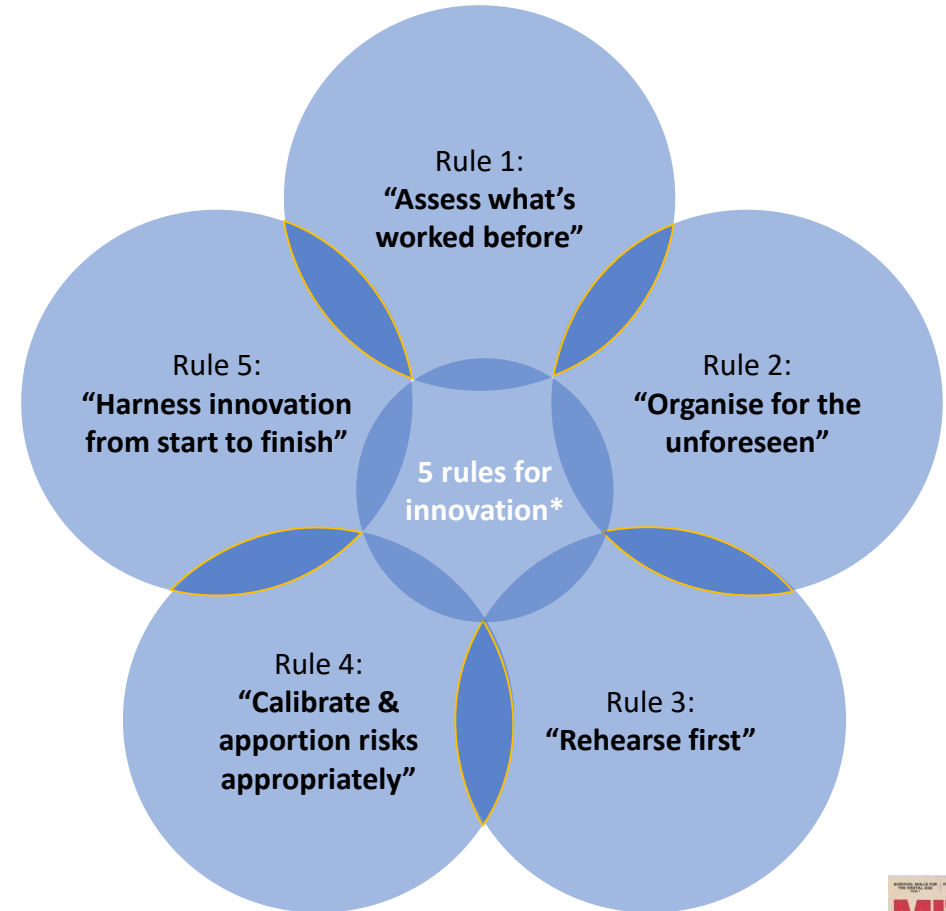
- How it works
- The i3P team
- History of i3P
- Site updates



<https://www.i3p.org.uk>

Conclusion

- Innovation now pervades London's megaproject ecology
- Learning and ideas transferred by people, teams, organizations and epistemic communities (e.g. i3P)
- Can something similar be replicated elsewhere?



*'Five Rules for Managing Large, Complex Projects', *MIT Sloan Management Review*, Fall 2017, Andrew Davies, Mark Dodgson, David M. Gann, and Samuel C. MacAulay

