

Exploring the link between complexity and risk

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The Construction View

Outline

- How does complexity impact the construction industry?
- What are the conditions of complexity that affect the construction industry?
- How do these challenge traditional risk mitigation techniques?
- How can we improve the way we operate going forward?
- Questions & Discussion

How does complexity impact construction?

“I think the enormity and complexity of Crossrail in all manners: the stations; the trains; the signaling systems; the software integration; the control systems; the interface with Network Rail; the truth is that the complexity was not fully understood,”

Mark Wild

Crossrail Chief Executive

New Civil Engineer – February 2019 edition

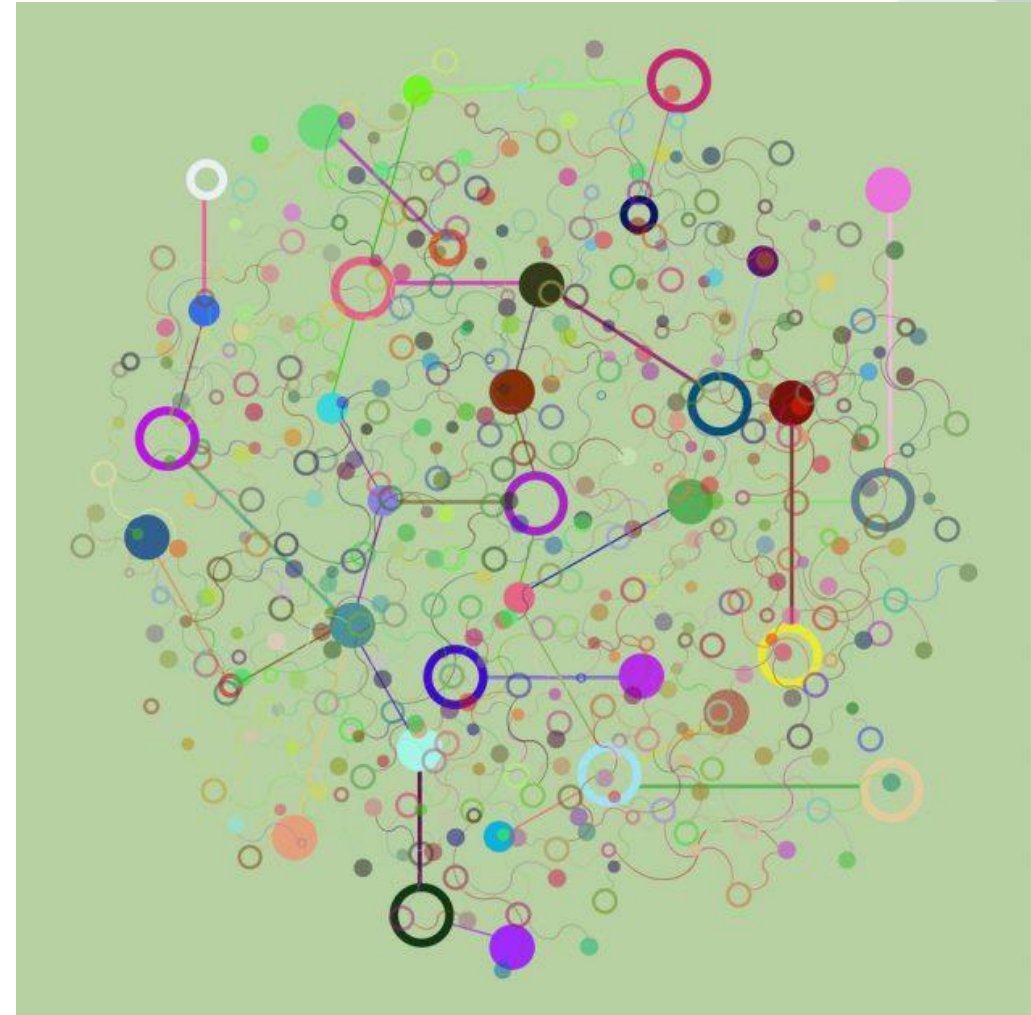


How does complexity impact construction?

- 1 to 3 years delay
- KPMG estimates cost increase of £1.6 billion to £2 billion
- Industry reputation and political damage
 - Tier 1 contractors
 - TFL
 - Network Rail
 - Mayor of London

How does complexity impact construction?

- Complexity compounds the likelihood and impact of risk
 - Increased interfaces often not appreciated
 - Scope and integration requirements often not well understood



How does complexity impact construction?

- Increases the likelihood of change over the lifecycle of the project
 - Increased programme risk
 - Increased commercial and cost risk
- Project benefits may be watered down or impacted
 - cost engineering exercises reducing value/benefits
- Future investments may be delayed

What are the conditions of complexity that affect the construction industry?

- Construction projects inherently assume a lot of risk
 - Often multidisciplinary
 - Lots of moving parts
 - Increasingly not just ‘construction’
 - Consents, Technology, Environment, Design, Third Party Assets etc
 - No longer just ‘digging holes and filling them with concrete’

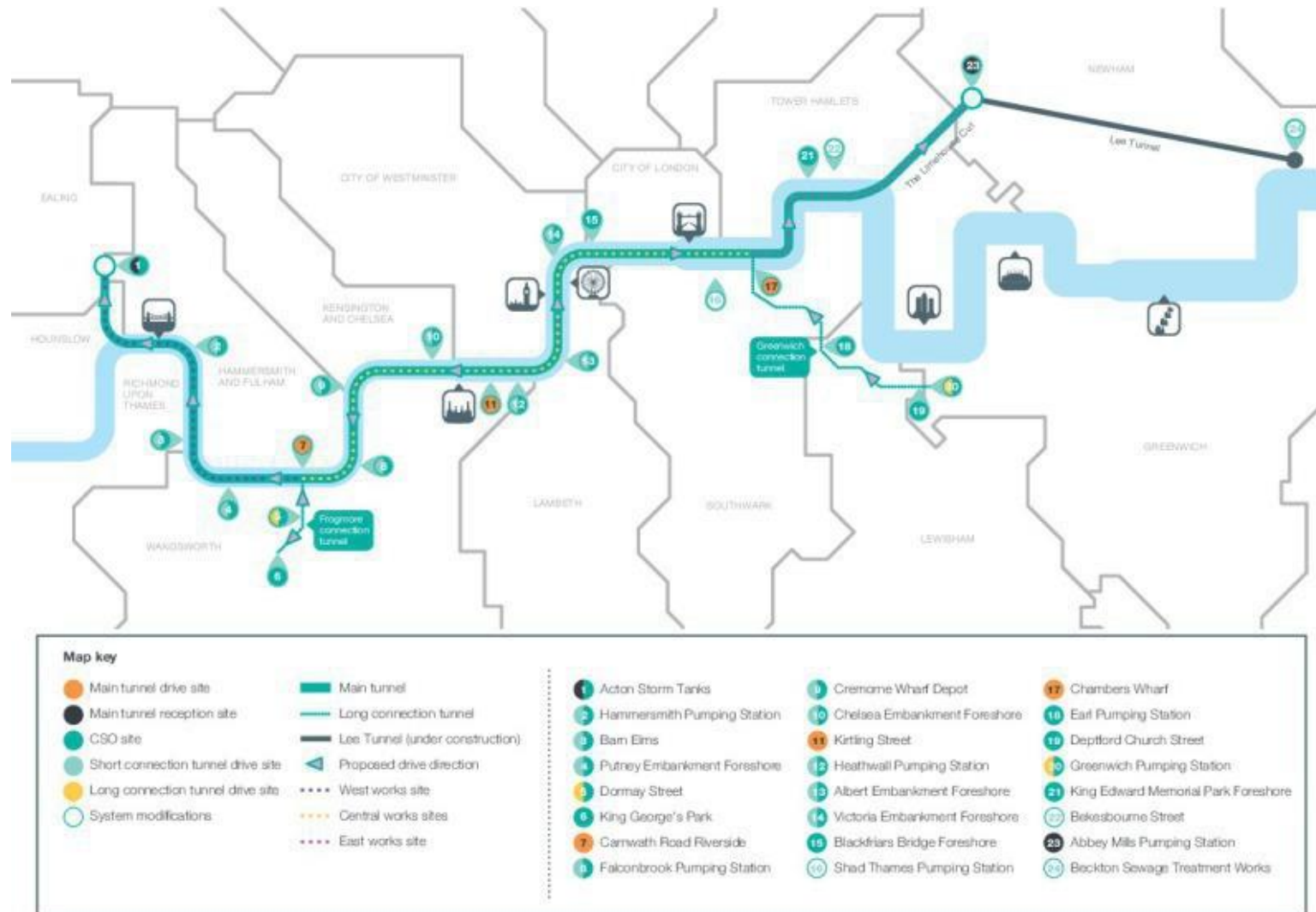
What are the conditions of complexity that affect the construction industry?

- The 'unknown unknowns'
 - Very good at modelling and quantifying above the waterline



What are the conditions of complexity that affect the construction industry?

- Interfaces of project delivery



What are the conditions of complexity that affect the construction industry?

- Logistics of project delivery



What are the conditions of complexity that affect the construction industry?

- The way we deliver projects themselves
 - Joint Ventures(JV) delivery structures,
 - Public Private Partnerships,
 - Matrix based organisation structures
 - Many traditional contract delivery models encourage a confrontational client vs contractor approach
 - Discourages integrated teams despite best intentions of parties involved

What are the conditions of complexity that affect the construction industry?

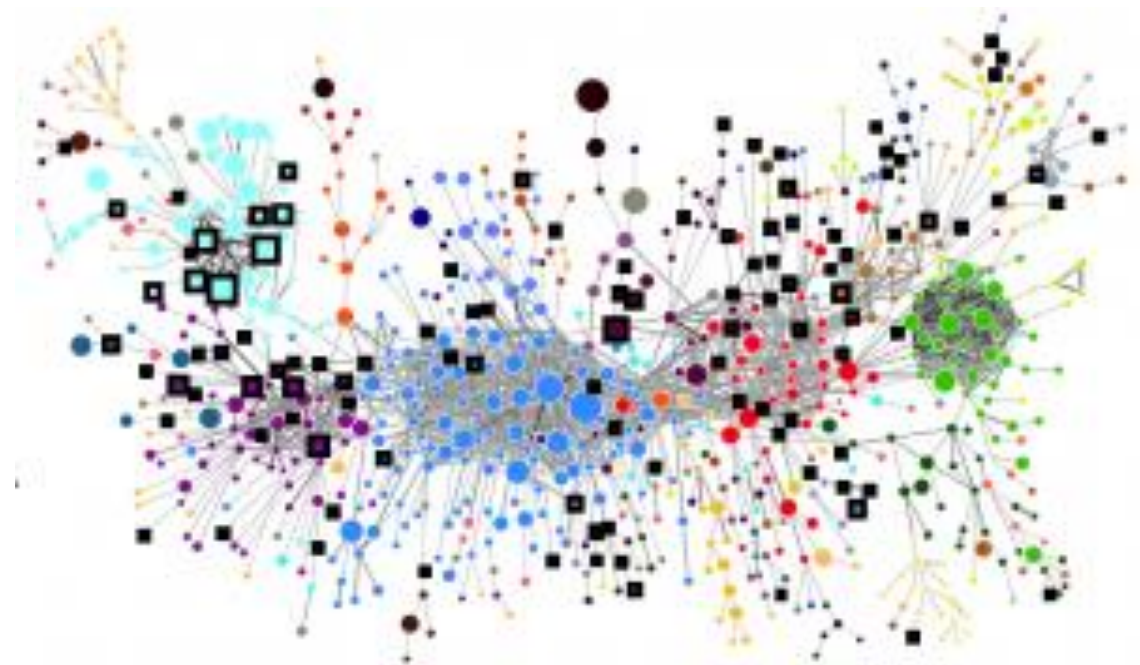
- Underlying challenges in productivity, profitability, performance, labour and sustainability
- Skilled labour shortages – increasing complexity coupled with reduced experience is a risk multiplier
- Small / shrinking margins and a tendency towards ‘short term-ism’ limits ability (and appetite) to invest in critical technology

How do these challenge traditional risk mitigation techniques?

- A number of the traditional risk mitigation techniques actually increase complexity:
 - JV's are designed to reduce or transfer project risk exposure
 - JV's also have:
 - More stakeholders
 - Complicated project structures
 - Politics and differing company cultures
 - Confusion due to unclear reporting lines
 - Multiplies administration requirements
 - Poor accountability as often difficult to ascertain where responsibility sits
 - JV's increase complexity and therefore delivery/managerial risk

How do these challenge traditional risk mitigation techniques?

- Transference of risk down the supply chain is somewhat misleading
 - Ultimately everyone loses (client included!) if costs blow out or delivery is delayed
- Sheer volume of interface risks
- Difficult to identify, manage, quantify and model effectively



How can we improve the way we operate going forward?

- Recognize as an industry that a number of the traditional risk mitigation techniques actually increase complexity
 - Be willing to review and adapt practices
- Properly assess risk avoidance strategies that transfer risk down the supply chain
 - Are we just delaying / avoiding the issue by making it someone else's problem?
 - Is it really a 'best for project approach?'
 - Are delivery / contract structures aligned with desired behaviours

How can we improve the way we operate going forward?

- **Contract delivery structures that incentivize all parties**
 - All share in final project finalization and benefits
 - Encourage more collaboration using the contract itself
 - Reduces contract risk exposure
- **Need to change the embedded industry culture**
 - Business and delivery models often based on more traditional construction risks
 - Highly competitive, low margins (typically 2-5%)
 - Bid low to win the work and use change to deliver margins
 - Ignores contract risk

How can we improve the way we operate going forward?

- Construction companies must join the digital future in order to stay ahead of the competition or they risk being left behind or overtaken by competitors
- Encourage or incentivize construction companies to adapt
 - UK Government Sector Deal
 - BIM legislative framework
- Learn from other Industries
 - These challenges are not unique to the construction sector

Questions & Discussion



