

ICE response to the Public Administration and Constitutional Affairs Committee inquiry - The Government's management of major projects

Major infrastructure projects are vital to the nation's social, economic and environmental wellbeing both now and in decades to come. This will be driven by the need to cater for a larger population, support and make better use of existing provision and address global challenges such as climate change.

Established in 1818 and with over 93,000 members worldwide, the Institution of Civil Engineers exists to deliver insights on infrastructure for societal benefit, using the professional engineering knowledge of our global membership. In this submission, we have chosen to answer eight of the committee's questions as set out in the terms of reference.

Overview

1. Major projects are complicated, lengthy and imprecise endeavours. They can span years, or decades, involve hundreds, if not thousands, of workers and need co-ordination and co-operation across clients, sponsors, investors, contractors and sub-contractors. Whilst ICE will be responding specifically to some of the questions posed in the PACAC's terms of reference we have recently released a paper exploring how the gap between cost estimates and outturns for major infrastructure projects and programmes can be reduced.¹ We strongly believe this paper will be relevant to the committee's inquiry and will provide useful material for the committee to consider in addition to our evidence below. It recommends that:

- Infrastructure owners should complete scope, design and exploration before commencement of work is allowed, to avoid scope creep or retroactive changes, taking steps to include contractors in design at an early stage.
- The Government and infrastructure owners must move away from capital cost as the most important metric when assessing project benefits, recognising the importance of whole-life economic, social and environmental value.
- Principles set out in the Outsourcing Playbook should be mandatory for Government infrastructure owners, this includes infrastructure owners undertaking should-cost modelling to help inform their expectations and knowledge of appropriate tender prices during the procurement process.
- It should be mandatory for all public infrastructure owners undertaking procurement to award contracts based on a cost estimate range, using a should-cost estimate as a reference point, with an amount of contingency allocated appropriate to the level of project maturity.

How can major public projects be managed to command more respect and public confidence?

2. There is clear demand for more infrastructure. Polling conducted for our State of the Nation 2018: Infrastructure Investment report found that 75% of Adults believe that more money should be spent on improving the UK's core infrastructure networks.² Investment in infrastructure is critical, but it is as important to understand the impact that investment

¹ ICE (2019) [Reducing the gap between cost estimates and outturns for major infrastructure projects](#)

² ICE (2018) [State of the Nation 2018: Infrastructure Investment](#)

has in terms of benefits to service users and businesses.

3. There should be an emphasis on redefining what a good outcome looks like, shifting the narrative on what success constitutes. Polling conducted for our report *Reducing the gap between cost estimates and outturns for major infrastructure projects* found that 30% of the public believe that it is most important that a project regenerates communities, compared to just 3% who believe it is most important that the overall cost of constructing a project is low. Meanwhile 74% of the public say they want to hear more from politicians about the benefits of major infrastructure projects, rather than the costs.³

4. Whilst there is a need for a narrative shift, that is not to say that major projects cannot be managed in a better way or more efficiently. The nature of major projects means that delivery is difficult, however, steps can be taken to improve processes.

5. This should begin with reform of procurement. The recent publication of the Government Commercial Function's *Outsourcing Playbook*⁴ is welcome and makes sound recommendations which should be mandatory for Government owners and sponsors.

6. These recommendations include conducting should-cost modelling. This helps inform expectations and knowledge about appropriate tender prices to avoid the award of contracts to those bidding substantially below what is a realistic price. Further to this, contracts should be awarded on a cost estimate range, using should-cost modelling as a reference point with an amount of contingency held in reserve and allocated appropriate to project maturity. This would help to avoid unrealistically low bids and estimates and avoid overtly prescriptive and constricting price points and delivery dates. These are too often set early before all facts are known, which can feed a mistrust around project costs once true cost is realised later down the line or if a contingency is deployed.

How should the Civil Service and government departments initiate and manage major projects? What represents best practice and how well is best practice understood?

7. It is encouraging that two agencies, the National Infrastructure Commission (NIC) and the Infrastructure and Projects Authority (IPA), have been established in recent years and that their remit – providing an overview of infrastructure need in the case of the NIC and improving knowledge and expertise on delivery of infrastructure projects, as well as setting out a clear pipeline of work in the case of the IPA - compliments the initiation process for major projects. This process has a number of advantages over the previous decision-making process.

8. The upcoming National Infrastructure Strategy must take on board the expert and impartial advice contained within the NIC's National Infrastructure Assessment and other studies, such as the ICE's National Needs Assessment,⁵ directing investment in a way which meets identifiable need and producing optimum outputs. These projects, once chosen on a sound evidence base, should then be procured, delivered and operated using the enterprise approach set out in Project 13.⁶

9. ICE's recent report *Reducing the gap between cost estimates and outturns for major infrastructure projects*⁷ explores how projects might be better managed by Government (and other) infrastructure owners. ICE has noted that increases in project schedule or budget tend to occur at the contract level, often once work has commenced. Whenever new demands are made after a contract is agreed and underway the result is almost always additional cost and delay. These might be measures which seem to meet short-term objectives, save money in the moment or meet new key performance indicators but when arrived at in this way will likely impact on the overall schedule or contracts later in the process in an unforeseen way.

³ ICE (2019) [Reducing the gap between cost estimates and outturns for major infrastructure projects](#).

⁴ Government Commercial Function (2019) [The Outsourcing Playbook](#)

⁵ ICE (2016) [National Needs Assessment](#)

⁶ Project 13 (2018) [P13 Blueprint](#)

⁷ ICE (2019) [Reducing the gap between cost estimates and outturns for major infrastructure projects](#)

10. Agreeing and completing project scope, culture and design before commencement of work would help to reduce change events which push budget and schedule. This approach has been proven to be beneficial by Istanbul Grand Airport, which has taken a similar philosophy and seen a fall in unforeseen cost overruns by reducing waste on site.⁸

What role does competition play in the market for contractors for major projects? When is competition beneficial and when is it more of a distraction from issues which need to be addressed?

11. The key issue is not competition, but weak collaboration, in a sector where no one company can deliver an entire project. The construction sector in the UK is slow to innovate, does not have adequate knowledge sharing or retention and works in a transactional way which is harmful on a number of levels. The root cause for these problems are endemically low margins, which were an average of -0.9% in 2018 for tier 1 contractors.⁹ This is driven by a procurement process which favours a lowest cost bid process to the detriment of contractor and project health, this is covered elsewhere in this submission.

12. Greater levels of collaboration need to be encouraged. ICE's paper on *improving approaches to risk in the built environment sector*¹⁰ noted a need for shared frameworks, a safe environment for testing, encouraging an enterprise model for major projects (such as the Project 13 model) and evolving industry culture as core ambitions. Government could support this effort through:

- Supporting procurement reform away from a lowest cost mindset
- Supporting industry innovation through establishing a regulatory and fiscal environment which incentivises companies to invest more in new approaches and technologies
- Providing greater vocal support for projects attempting pioneering approaches, fostering a more amenable environment for innovation

What are the strengths and weaknesses in the usual process by which contracts are awarded and managed? What are the lessons to be drawn from particular examples of success or failure?

13. Clients often tender on the basis of a split between cost and technical attributes which would have the potential to support a technical led, rather than cost led, acquisition.

14. Unfortunately, the reality is quite different as, in practice, technical ability is a near constant between any two bidders. Contractors and sub-contractors often work on the same, or similar, major projects, demonstrating manifestly the same experience and technical ability which then contribute to bids for a future contract containing similar examples. This gives cost a disproportionate role in any award which is often decisive, as, if two contractors score broadly the same on a quality metric, cost will be the differential. This subsequently leads to cost inflation, as the true cost materialises as the project matures, or causes companies to become insolvent.

15. Increasing the importance of alternative metrics might help to distinguish between two closely matched competitors and allow a procuring body greater leeway in deciding on a broader range of factors. Concepts such as median bids, informed by should-cost modelling¹¹ would encourage more realistic contract prices – better aligning expected final cost with that outturn.

⁸ Interview with Dr Ozan Köseoglu in BIMIreland.ie (2017) [Using BIM on Istanbul Grand Airport](#)

⁹ ICE (2018) [Improving approaches to risk in the built environment sector](#)

¹⁰ Ibid

¹¹ Government Commercial Function (2019) [The Outsourcing Playbook](#)

16. Apportioning risk on an equitable and incentivised payment basis with project partners best placed to manage it, rather than attempting to pass on all risk to private contractors, would also help to manage cost escalations. A focus away from transactional, price led, awarding of bids toward improved supplier relationships through an enterprise partnership is also a core motivator behind Project 13.¹²

How are timescales for delivery decided?

17. Timescales are generally set between the client and contractor. Ideally this will be decided at a mature point in the process, taking advice from designers and the contractor when knowledge about the project and site is well known. Where a sponsor or client is a government client this can be complicated by political pressures, especially where a Minister or, increasingly, a Mayor, commits to a timescale in order to win support for a project or for political advantage before advice is available.

18. Both timescales and cost envelopes are often set too early and are too restrictive for major infrastructure projects. Setting a date for completion or a fixed target cost estimate is increasingly inappropriate the further away from estimated delivery a project is. Being intrinsically large scale, complicated and lengthy endeavours which are often one-off assets or bespoke by nature, forecasts around cost and scheduling is always difficult. Timescales for delivery should be based on a range which narrows as projects progress and become more mature.

19. We support the Department for Transport's recommendation that major projects should use an evidenced range rather than a single target date.¹³ We concur that these dates are often aspirational and set before there is reasonable evidence or advice on their achievability and have the effect of impacting on quality of work undertaken and pushing cost as project management attempt to keep a schedule which was never realistic.

20. The principle is the same for cost. Awarding contracts to a successful bidder which include a cost estimate range using a should-cost model as a reference point, allows some additional flexibility and realism built into the budget. It could also allow scope for incentivisation to push for cost reductions.

How are risks assessed? How are they mitigated and what are the lessons to learn from examples of success and failure of risk management?

21. Risk at an elevated level is an inherent fact of life in infrastructure and construction. Assessing risk itself is generally of least concern; risk managers within the built environment sector are well versed in identification of risk and risks themselves are well understood.

22. Traditional methods of risk management are based on identifying possible risk events and then assessing their likelihood and potential impact before deciding whether it would be worth taking mitigation action. Projects can face reoccurring or repetitive risks which may be readily mitigated through practice and experience.¹⁴

23. There is a prevailing attitude from clients and through the supply chain that risk is something to be passed on, rather than managed collectively or where it is best placed to be managed well. Project 13¹⁵, or more specifically, transitioning from transactional approaches to an enterprise approach, is a potential answer. This approach encourages all project stakeholders to jointly develop an understanding of the risk profile of a project at the outset and incentivises them to manage it collectively.

¹² Project 13 (2018) [P13 Blueprint](#)

¹³ Department for Transport (2019) [Lessons from transport for the sponsorship of major projects](#)

¹⁴ ICE (2017) [New approaches to risk management on major projects](#)

¹⁵ Project 13 (2019) [Website](#)

24. By incentivising management of risk at all levels through financial rewards, instead of risk being passed on or seen as someone else's problem, everyone in the project would instead have a stake in minimising, mitigating and addressing risk.¹⁶ There are now seven early adopters trailing this approach, including Sellafield, Network Rail, Anglian Water, The Environment Agency, Heathrow, Sydney Water and National Grid.¹⁷

25. One cultural shift which might meet better success is moving toward an interventionist risk management approach. Contractors and clients too often record, or assess risk identify mitigation steps but do not always carry these mitigations out.¹⁸ More active audit of project partners managing risk to ensure identified steps are actioned is necessary.

What are the most prevalent reasons for major projects overrunning or exceeding their budget?

26. ICE's report *Reducing the gap between cost estimates and outturns for major infrastructure projects and programmes*¹⁹ identified eight major reasons why forecasts and outturn misalign. These fit into two categories; those which are external to a project and those which are project delivery challenges.

27. Political factors and economic climate are two external factors which the management team of a major project have to cope with in a reactive way. The changing political landscape, including changes of Government or policy priority, the need to engage ministers, particularly for nationally significant infrastructure projects and the Parliamentary cycle often impact on ability to deliver within budget and schedule.

28. Long lead in times and uncertainty around permission to proceed for projects like the third runway at Heathrow, can increase initial estimates as time itself, from re-design and re-scoping to maintaining staff, is an escalator of project costs. Similarly, the decision of the Coalition Government's comprehensive spending review to reduce the funding envelope for Crossrail, removing £1.1bn, in order to lower contractor prices and adjust forecasts in line with the effects of the then economic recession,²⁰ likely undermined that project team's ability to manage costs effectively.

29. The risk of political interference itself can also be considered a risk factor for private capital, which can affect the cost of financing and re-financing. This is clearly demonstrated by the negative outlook Moody's has given the UK water industry owing to 'regulatory, political and public' pressure.²¹

30. Project level delivery challenges are more numerous. Insufficient accounting for optimism bias and benchmarking can undermine the accuracy of estimates. A lack of leadership ability, or the failure to deploy the correct management skills can dramatically impact performance.

31. Poor relationships, poor co-ordination of design and specification, late updates or revisions and inadequate scoping can hamper the ability to deliver once work commences. Poor management of risk, through a failure to work collaboratively and place risk where it can be best managed by those who understand it and have the resources to manage it are perennial problems. Finally, lowest cost procurement often undermines the accuracy of an initial estimate, so that budgets are not so much exceeded, as not accurate from the outset.

¹⁶ Project 13 (2018) [Commercial Handbook](#)

¹⁷ ICE (2018) [ICE Director General meets with first international Project 13 early adopter](#)

¹⁸ ICE (2019) [Reducing the gap between cost estimates and outturns for major infrastructure projects](#)

¹⁹ Ibid

²⁰ National Audit Office (2019) [Completing Crossrail](#)

²¹ Moody's (2018) [Moody's: UK water utilities outlook is negative as regulatory, political and public pressure mounts](#)

What lessons can be learned from examples of projects in other countries or under the control of devolved or local government?

32. One project which has successfully sought to minimise contract level cost increases is Istanbul Grand Airport (IGA), which has used a Building Information Modelling (BIM) led approach to design and aid implementation of that project. This has been achieved through training all partners and the use of mobile tablets and IT on site which has equipped those building the asset with the necessary skills and minute-to-minute knowledge to implement the design as it is updated. This has helped to 'eliminate' unforeseen cost overruns by reducing waste on site.²²

33. Infrastructure owners and sponsoring departments should consider replicating this approach. As owners, they should complete scope, design and exploration before commencing work on site. This would help to minimise costs occurring from change events which are more costly to rectify than at the design phase.

34. Additionally, the US Government Accountability Office, between 1997 and 2005, has attempted to implement a method of standardising approaches to risk management in order to address a lack of useful project cost estimate tools. A standardised approach to estimating costs, providing federal oversight and setting of minimum standards has since been established to ensure greater consistency of approach and allow cross analysis of estimates through regular cost estimate reviews.²³ The IPA are conducting similar work on benchmarking²⁴ which could be valuable in improving the management of all projects, including major projects, especially if this standard, when complete is freely shared and regularly updated.

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²² Interview with Dr Ozan Köseoglu in BIMIreland.ie (2017) [Using BIM on Istanbul Grand Airport](#)

²³ WSP (2018) [Risk Management of Infrastructure Projects in the Development of Capital Cost Estimates](#)

²⁴ IPA (2019) [Best Practice in Benchmarking](#)