

Realising the opportunity in infrastructure projects:

A view from our leaders of the future

Infrastructure is the backbone of our economy and society – it enables businesses and communities to be connected, services to be provided, and quality of life to be improved. The government has signaled an intention to significantly increase investment in its March 2020 budget. The National Infrastructure Commission has released an updated National Infrastructure Pipeline (NIP), with an FY20/21 procurement profile to provide visibility and confidence to the sector.

Yet too many of our infrastructure projects are delivered late or overspent. There also appears to be a repeating pattern of 'optimism bias' in these projects, which erodes public trust and confidence. It also causes disappointment and frustration when the benefits from late projects are delayed.

Arcadis has taken a fresh approach. We know conventional thinking needs to be challenged, so we asked our Gen Z community (those born between 1995-2012) to research infrastructure projects and suggest how things could be done differently. We also asked them to compare their views with our current generation of leaders to give an overall view. This paper shares our findings.

What is optimism bias?

Optimism bias for infrastructure is our tendency to be overly optimistic about how much projects will cost, how long they will take to complete, and what the resulting benefit profile will be. Inaccuracy and unpredictability of costs have led to many well publicised challenges such as:

- Crossrail had an initial budget of £14.8bn but is now expected to be c.£18bn and 2.5 years late
- National Smart Metering roll-out cost increased by £2.5bn with completion delayed by 4 years
- HS2 had a preliminary estimate of £30bn but is now projected to cost more than £100bn and run 5 years late

What are the implications?

The recently published Committee of Public Accounts report on HS2 sets out very clearly the implications of this sort of cost or schedule overrun - it erodes public trust, and trust between the different organisations and bodies which need to work together to deliver the project successfully.

When trust and confidence are low in any major project, this can cause interventions which have unintended consequences. Additional project reviews, supervision, and checks can drive overhead costs up. In turn this creates more interfaces to manage which causes operational drag and slows things down.

A further implication is the knock-on environment this can create for other major projects - potentially causing delays to funding decisions.



Why did we explore the views of Gen Z?

In 10 years time, a third of the workforce will be from Gen Z. We wanted to challenge conventional thinking and see what the future infrastructure leaders might do differently. We asked our apprentices, graduates and junior consultants for their views and ideas – informed by their own experiences, perceptions, and research they have undertaken.

Why do projects go over-time and over-budget?

Our Gen Z team felt there were 3 main reasons:

1. **Poor project planning** – with poor schedule and risk planning causing delays, and inadequate cost and contingency planning causing budget overruns.
2. **Behavioural and people factors driving project delay and cost overruns** – the team highlighted concerns around internal politics, poor communication, and stakeholder management, leading to confusion and lack of common purpose around the project.
3. Processes are key but the team have also called out the importance of having strong leadership, with greater clarity of project vision and purpose, and **greater diversity and inclusion in project teams**.

What solutions should be put in place?

The Gen Z team proposes solutions:

1. **Open communication with clients and team, and better setup of projects** – flat hierarchies that enable polite upward challenge, high performing teams mentality and being more open around risk and issue likelihood and severity.
2. **Focus more on the behavioural and people-based solutions** – creating teams that can truly adopt and implement innovation and new technology, use of behavioural frameworks to work together and communicate more effectively.
3. **Make use of current generation leader experience** – complement behavioural improvements with proven capability, such as rigour in risk analysis and more realistic and relevant benchmarking.

What will be different?

The team felt that many of their ideas were not necessarily new and were surprised they have not been fully implemented yet. Perhaps including Gen Z within our major project teams could create the catalyst for this to change.

What our Gen Z workforce had to say:

“Inaccurate forecasting at the planning stage causes projects to overrun on schedule and cost. Utilising actual time and cost benchmarks should help achieve a better reflection of reality. This should be coupled with honest and accurate reporting of risks, possibly through third-party review.”

Isabella Montgomery,

Trainee Consultant
– 8 months in industry

“If there is a lack of strategic leadership on a project, it results in a lack of direction, poor resolution of programme level risks and issues, and teams that are not aligned around a clear vision with milestones, and are more likely to act around their respective siloes.”

Leila Behzadi-Spencer,

Junior Consultant
– 6 months in industry

“It appears that the industry’s approach to procurement is for clients to weigh decisions heavily in favour of cost. This creates arms-length supply chain relationships, rather than ones focused on working transparently towards the project vision, with realistic contingency planning for risks (the industry-wide lack of contingency planning for the recent pandemic is evidence of this).”

Ayrton Dhillon,

Junior Consultant
– 2 years in industry

Current generation leader views

Views from our current leaders suggests that optimism bias is caused by three main factors:

1. Behavioural optimism bias

Behaviourally driven optimism bias can occur across project lifecycle.

At the feasibility and planning stage, there can be moral hazard – a pressure to articulate a budget, timescale and cost-benefit ratio which will be sufficiently attractive for the scheme to be approved. Within asset owner / operator organisations, departments compete to secure funding for their asset renewal or refurbishment programmes. Recent PMI research has also shown the importance of planning and effective programme set-up, suggesting the potential for a 13% improvement on programme cost efficiency.

At the design stage, there can also be a pressure to be overly optimistic about the project - including too much risk provision can signpost uncertainty, which decision makers or investors do not like. Collaboration between client, contractor, and regulators can improve collective understanding and an appropriate provision for risk which can be managed jointly. The Department for Transport has been working towards this approach.

In construction, the client-contractor procurement and delivery models, and the behaviours these then create, will determine how risk and uncertainty are managed, and in turn the level of optimism bias in estimated out-turn costs and completion dates. The Project 13 working group has identified different approaches and models which will enable better collaboration across the sector.

2. Complexity driven optimism bias

Many of our infrastructure projects are complex and are simply very difficult to nail down on scope and risk at their onset, as well as being very challenging to build. Examples such as Thames Tideway Tunnel, Lower Thames Crossing, and Hinckley Point C Nuclear New Build are huge multi-disciplinary engineering projects.

For HS2, there are very complex interfaces between train, track, signalling, and civils/ tunnelling. These are not new concepts, but the technology and expectation in each area is all new and evolving – seeking to harness innovation and be future-proof. On large multi-year programmes, policy on sustainability, decarbonisation and climate change is also evolving which may require changes to be made in design or construction delivery methods.

Major programmes and regulated sector portfolios have many stakeholders to work with - regulators, government departments, investors, contractors, consultants, local authorities. There are many interfaces to manage, and often they change in make-up, or by individuals, or their requirements, expectations and preferences change during the project.

3. Quality and leadership capacity

Collectively the industry has many tools at its disposal, including helpful guidelines from the Infrastructure Projects Authority, the Major Projects Authority, and Project 13. But these tools and information are only useful if we have the right people and right experience in leadership roles so they can all be effectively implemented.

An optimism bias in this context is that we assume we have experienced leadership capacity across the portfolio of all the infrastructure programmes we are attempting to deliver. Currently we are attempting to deliver the UK's largest ever infrastructure portfolio simultaneously. Major investments for road, rail, water, energy networks, communications, hospitals and schools across the UK – £6bn for new hospitals, £27bn into the road investment strategy (RIS2), £4.2bn into urban transport, and £5bn into gigabit broadband rollout, to name a few.

Because of optimism around leadership experience and capability we may commit to time, cost and productivity targets that are not feasible. This leadership capacity shortfall can be down to several factors.

Do our leaders have enough capacity?

It may be the case that those most equipped to lead are distracted by having to deal with issues of PR, stakeholders or excessive levels of governance put onto the programme. This limits them from being able to engage, inspire and lead their team from the front, or from being able to engage with the project in sufficient depth.

Are we working collaboratively enough?

Given the complexity and multiple interfaces in infrastructure projects, it is likely that skillsets have been disaggregated across the industry, its organisations and supply chain. Tackling this means simplification of organisational models and a more collaborative approach to leading successful project delivery across interfaces.

Do we need to build up our skills and capability?

It could be the case that we are genuinely overconfident around capability and we are pricing and planning projects for “best day, best team and best productivity” rather than the “average day, likely team and average productivity”. The solution to this is to rethink our assumptions and ensure we invest in the capabilities of future infrastructure leaders – particularly Gen Z.

What should happen next?

We have identified six areas of opportunity. These have been developed by combining the experience and technical knowledge of the current generation, with the fresh and innovative views of Gen Z.

By adopting some of these recommendations, we can unlock the full value of the public investment, restore public trust and confidence in the sector, leverage further private investment, and improve quality of life across the UK.

Recommendation	What does this mean?	Why would it make a difference?
Focus on project outcomes	Adopt procurement models that do not promote aggressive behaviours between client and contractor. Potential adoption of Project 13 recommendations around outcome incentivisation and more collaborative supply chain relationships.	More incentive to deliver on-time, to-budget (with a knock-on effect on productivity). Also, more collaborative and open relationships enable risks and issues to be identified and resolved better, with more focus on long-term value rather than short-term profit.
Strengthen role of the Infrastructure and Projects Authority and use of NIP	Greater authority to act as a guiding mind across the industry, to share lessons learnt, project and programme benchmarks, and provide demand certainty across infrastructure.	Enables projects and programmes to deliver efficiently and to high-quality through use of best practice and assess performance through benchmarks. Increased demand certainty will unlock private investment.
Invest in skills development as an industry	Identify new models to grow future skills e.g. training apprentices on capital delivery programmes rather than in organisations, developing new skills right now (e.g. digital, programme planning) and improving leadership skills as well as technical skills.	Provides the necessary tools and capability to solve increasingly complex problems, as well providing the capability necessary to unlock value from digital. Also equips leaders to provide strategic direction and decision-making to accelerate programmes.
Enhance collaboration and governance	Creating a more collaborative and transparent culture between and within client, consultant, and contractor. This is a culture which provides regular two-way communication throughout the lifecycle, and works together to identify, validate, and implement solutions.	Pressure to 'not fail' and hide risks can lead to non-identification of risks or the under-valuation of the risk severity or likelihood. If materialised, this risk could impact the programme critical path, escalate costs etc. Communication avoids this.
Commit to better use of technology	More effective use of technologies such as 6D BIM, blockchain technology for smart contracts, off-site manufacturing, and new materials (e.g. mass timber). Also, better collaboration with emerging tech start-ups focused on infrastructure (as seen in the Arcadis City of 2030 accelerator).	These technologies enable faster project delivery, cost-effectiveness, and productivity. 6D BIM allows clash identification visualisation, off-site manufacture reduces unit costs, new materials can reduce whole-life cost and increase user experience, and blockchain offers opportunities to reduce transaction costs.
Get more value from data	Making better use of more benchmarks and evidence-driven schedule and cost planning, with predictive analytics. Also, better use of data for programmes that are in-flight to assess delivery of benefits and provide early warning of issues.	This is data that is already being generated, it is mainly about documenting it. It adds value by helping to identify issues early (to resolve them earlier), and to ensure that planning is not overly optimistic on time and budget.



Conclusion

As an industry we know these next steps need to be taken. We also have an unprecedented opportunity with a major investment programme, combined with a disrupted post-COVID world where the new-normal needs to be established. We have never had a better opportunity for transformational change. Gen Z can hold us all to account to make it happen, and we should seek their help to do just that.



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