

Improving approaches to risk in the built environment sector

Risk is inherent in infrastructure and construction (as it is in any other sector) and isn't something which can be eliminated. It is something which can be managed, dealt with and minimised.

Emphasis is too often placed on passing risk on, rather than managing it collectively or where best placed. This fails to incentivise the supply chain, often increasing project costs and stifling innovation and investment.

This short paper sets out the root causes of these outcomes and puts forward a series of steps for developing a better approach to risk. In doing so, it summarises key elements of the [Project 13](#) approach for decision-makers and key influencers operating in the built environment space.

What needs to change?

- Infrastructure owners should take fresh approaches to procurement, actively seeking out partners engaged in innovative research who can share novel ideas and pioneering approaches.
- All built environment stakeholders should consider how they can move from transactional business models to those that are based on the principles of an enterprise.
- The built environment sector as a whole must do more to build in funding for processes that allow testing and research of new methods outside of active projects.

What can Government do?

- Further evolve procurement, moving away from a lowest cost mindset and instead place an emphasis on assessing long-term outcomes and social impact, alongside greater investment in skills and innovation.
- Support industry innovation through establishing a regulatory and fiscal environment which incentivises companies to invest more in new approaches and technologies.
- Provide greater vocal support for projects attempting pioneering approaches to delivery to help foster a more amenable environment for innovation.

Why is the built environment sector risk averse?

When it comes to financial and project risk the UK built environment sector has a risk-averse culture. This is partially motivated by low profit margins which give rise to a preference for 'tried and true' methods. Indeed, pre-tax margins in construction that have fallen from just under 3% in 2013 to an average of -0.9% in 2018¹ do not easily lend themselves to taking on innovation risk.

The perpetual nature of risk within projects is also a hurdle to bringing about cultural change. Working with the great forces of nature, and creating

¹ [Construction News, \(2018\) CN100 2018: The top 100 UK contractors](#)

infrastructure, buildings and other assets in hostile environments – underground, at great height, in water or on sites with heavy machinery – is inherently dangerous and encourages a cautious mindset.

Whilst the motivations for minimising risks are valid and natural, it does have the effect of working to hold back innovation and efficiency. If industry is unwilling to try new ideas or new methods, the effect will further restrict progress in delivering projects more efficiently and boosting productivity.

The instinct to minimise risk, by passing that risk down the supply chain has a deeply negative impact and fails to mitigate that risk as intended. This transactional model, instead of managing risk where best placed, only serves to increase project costs as each tier factors in management costs, overheads and transaction costs; a margin as high as 50% of the final price paid by the asset owner.² This cost could be better deployed in increasing financial resilience or being re-invested into innovation and experimentation.

Another contributing factor is related to the way in which complications that can occur in the delivery of certain projects are handled by key stakeholders. Overruns or overspends on infrastructure projects are often publicly criticised by government and other related agencies. This is despite the reality that sometimes both are necessary to ensure the safety and effectiveness of an asset. Too often the response is to be critical of the disruption that is caused rather than ensure adequate contingency before it occurs. The 'blame culture' that this creates suppresses the willingness of the sector to try new things through fear of failure.

Improving approaches to risk

Evolution of industry culture

The built environment sector could do more to move towards a mindset which is more accepting of risk, focused on fostering innovation. One example is the take up of 3D printing as a construction method. The practice has been used in Spain and the Netherlands with the first 3D-printed concrete pedestrian bridge built in 2016 in Catalonia³ and the first 3D-printed bridge suitable for road traffic built in October 2017 by Bam Infra.⁴

The Dutch bridge was fabricated in just three months, using less concrete and removing the need for auxiliary materials when compared to traditional methods.⁵ Both projects were undertaken in collaboration with learning institutions, the Institute for Advanced Architecture of Catalonia and Eindhoven University of Technology. Partnering with the research community and leveraging the technical expertise that exists there is critical to unlocking innovation.

Despite this proof of concept, there are no projects of comparable scale within the built environment in the UK. A culture which prevents the deployment of technology proven elsewhere to be effective in cost, time and material terms is one which is inherently uncompetitive.

Encouraging the Project 13 enterprise model

The UK has significantly higher costs when benchmarked against comparable European projects, with high speed rail at least 23% higher, station costs 50% more expensive than Spain and roads 10% more costly than the Netherlands.⁶ The 'premium cost' of risk transfer

² ICE. (2017) *From Transactions to Enterprises*

³ [Iaac. \(2016\) 3D Printed Bridge](#)

⁴ [Dezeen. \(2017\) "World's first" 3D-printed concrete bridge opens in the Netherlands](#)

⁵ [IBID](#)

⁶ [HM Treasury and Infrastructure UK. \(2010\) Infrastructure Cost Review: Main Report](#)

down the supply chain in an industry with lower capitalisation and higher levels of subcontracting is considered a significant factor.⁷

Encouraging an enterprise model, bringing together all partners in a project with incentives aligned to a positive outcome, rather than a transactional model, as is currently practiced within the industry, would help to reduce these costs.

Early engagement between clients, contractors and investors is essential to bring in a wide range of expertise and identify quantifiable risks as early as possible in a transparent manner.⁸ Engaging in early dialogue allows the infrastructure owner to better understand the capabilities of potential contractors and thoroughly explore alternative approaches before settling on a procurement decision.

Ensuring also, that the owner and investors of a project properly recognise that they are the ultimate owner of risk is essential. As the main beneficiary this is both right and proper and can eliminate the risk of price inflation within a project.

An enterprise should seek to link risk to reward through incentivisation for all members of the enterprise to take steps to mitigate risk, even if they are not the responsible partner. This can be achieved through programme share (shares in the project whose value can move up or down depending on overall performance), which encourages participants and the supply chain to perform above baseline measures through financial motivation.

Shared frameworks

The Infrastructure Cost Review also cited the lack of quality and accessible infrastructure data to inform decision making.⁹ One possible answer is moving towards 'shared frameworks' or more simply, standardised methods of measuring project outcomes and measurements of risk. This would help to make comparisons between projects more easily benchmarkable and minimise project costs associated with exploration of project risk, by simplifying research.

Frameworks like this, in an environment where data is openly available and anonymised, would also serve to share best practice, or encourage learning from experience where project outcomes have been below par, increasing competence through learning without stigmatising failure. This would be of most help to smaller organisations and companies, cutting down significantly on the bureaucracy costs of dealing with multiple clients.

A safe environment for testing

One aspect which is lacking within the built environment sector is space to allow for design and innovation in a similar way to how the aviation or military sectors work. The only way to test innovation, largely due to cost pressures, is with a client where the concept must be proven within market. For new construction methods this represents a cost risk few clients are willing to take, or contractors able to afford, even where this might have significant upsides.

Encouraging space for research and development and testing of methods allows for innovations to be proven. This is not a simple goal to achieve in an environment where margins are low. However, the built environment sector should think of inventive methods of trying to achieve this.

Testing and sharing innovation is important. If successful this can lead to reduced costs, safer work environments, a more productive workforce and a more sustainable

⁷ HM Treasury and Infrastructure UK, (2010) Infrastructure Cost Review: Main Report

⁸ ICE, (2018) P13 Commercial Handbook

⁹ HM Treasury and Infrastructure UK, (2010) Infrastructure Cost Review: Main Report

sector. The built environment sector should develop processes of pooling knowledge and 'build in' investment spending into contracts which can then disseminate research to the whole sector. It is important that any such process benefits the sector as a whole and is open to a wide range of participants.

To discuss ICE's work on improving approaches to risk in the built environment sector or to find out more about Project 13 please get in touch at policy@ice.org.uk or visit www.p13.org.uk.