Lasting transformation

2 October 2019

The public and private sectors must unite to ensure the UK construction and infrastructure sector is at the forefront of digital transformation

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The pace of technological change and innovation means we are generating more data than ever. Digital solutions, such as Netflix and Airbnb, mean we consume on demand, and we have come to expect a level of value through the services and experiences they offer.

To achieve better outcomes and improved value for money for taxpayers, infrastructure delivery ? which is so central to the UK?s economic growth and productivity ? must capitalise on the opportunities presented by advances in technology and data.

This means using digital technology to produce, use and exploit information through simulation and the rapid generation of insights for decision making. This, in turn, will enhance productivity and better manage risk.

Construction and infrastructure is the most exciting industry to be in today. We need to commoditise its common components to enable the level of service demanded by consumers, and to allow supply to flourish.

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However, while digital and manufacturing technologies are the building blocks to accelerate change, it is our skills and culture that will determine whether the UK is at the forefront of this transformation. To this end, there are 3 key questions we need to address.

- How do we attract professionals with the right skills to make a technological revolution sustainable?
- What role will institutions play in the education agenda so that 21st-century technological capabilities are a prerequisite to receiving an industry qualification?
- How will industry collaborate at all organisational levels to enable the cultural shift required to adopt new ways of delivering these changes?

It?s hard to ignore the challenges we are currently facing on some of the UK?s biggest infrastructure projects, with delays to Crossrail and increasing cost pressures on High Speed 2 both featuring heavily in the news. There?s also little doubt that the construction industry is in a febrile state, and the demise of Carillion early last year still casts a long

shadow over the market?s ability to perform.

Carrying out the basics of project delivery well is essential ? but it isn?t enough. To improve future delivery we need to learn lessons from past projects, while maintaining a portfolio view of projects and enabling alignment and integration wherever it is feasible.

Areas for improvement

In his April 2019 Infrastructure and Projects Authority (IPA) blog , IPA interim CEO, Matthew Vickerstaff, noted 3 areas where we need to improve and adapt our approach, both in the public and private sectors.

- **Behaviours and culture:** you can have the best-designed governance structure in the world, but it comes down to the behaviours and culture of the people in the system; this is more important than process.
- **Optimism bias:** we need to pay closer attention to project management, even when things are going well. We place too much reliance and expectation on immature time, cost and benefit parameters in the early stages of projects. We need to improve by nailing down a clear and realistic scope, and estimation of time, cost and benefits, throughout the life of projects. Benchmarking for better performance must be both top-down and bottom-up. Ultimately, this means being realistic about optimism bias.
- **Systems integration:** we see that projects across all sectors, especially infrastructure, require more emphasis on managing increasing technical complexity. Complex systems integration failures present late in a project life cycle, but we need to establish the conditions for success right at the start of a project.

Technology is becoming increasingly critical to addressing these areas ? and to project delivery in general ? yet it isn?t being given the same level of attention and focus as the traditional construction and civil engineering processes.

Digital transformation is a key enabler ? and the most cost-effective way to gain stakeholder confidence ? for a project or the performance of an asset. The ability to be hands off, but have eyes on our infrastructure at any stage of the life cycle, is becoming a reality through technology.

The UK industry has already established a globally renowned project delivery system, but we need to continue developing it to make it fit for the future. To deliver the next generation of infrastructure projects well, and sustain our ?600bn infrastructure investment for the longer term, it?s essential that digital solutions are planned into delivery today.

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Most importantly, we need to invest in the people with the right skills to manage these technological developments and attract them to the industry. The brand image of the sector needs to be far broader than a hard hat and hi-vis clothing if we are to capitalise on the excitement around new technology and business intelligence.

Making progress

There has already been significant success in catalysing the discussion around digital transformation. In 2011, the UK BIM mandate was set out in the Government Construction Strategy. The collaborative work between the government, the industry and academia regarding BIM means the UK is in a global strategic leadership position in terms of digitising project delivery. Full adoption of the process is still not embedded across all projects, although we are now past a tipping point in delivery. We can, however, now boast a forward pipeline of BIM projects with a projected value of more than ?160bn over the next decade.

As we become more digital, new initiatives and opportunities emerge. In 2017, the National Infrastructure Commission?s Data for the Public Good report laid out a recommendation for establishing an information management framework to underpin the creation of a national digital twin: an ecosystem of digital twins connected via securely shared data.

As a result, HM Treasury, in conjunction with the Centre for Digital Built Britain, and advised by the IPA, established the Digital Framework Task Group. The group includes regulated utilities, infrastructure, and private- and public-sector asset owners interested in higher performance of their networks. The group intends to achieve this goal through trusted, secure and resilient data sharing across networks and aims to support the industry digital transformation at large.

In March this year the Transport Infrastructure Efficiency Taskforce released the report Transport infrastructure efficiency strategy: one year on in conjunction with the IPA to outline their progress around benchmarking and modern methods of construction, including digital construction. Their drive for adopting automated design techniques is a key productivity enabler that can help to change the perceived focus from lowest capital cost to highest value. In most organisations, this digital transformation sits on the agenda at board level.

The board must therefore ask itself the following questions:

- How do we adapt to enhance our resilience to change?
- How do we create new opportunities?
- How do we mitigate risks and threats from disruptors and more agile organisations?
- How do we prioritise our digital investment choices and monetise our products and services as a result?

The Digital Transformation Task Group, formed under the banner of Project 13 and the Infrastructure Client Group, have established a digital model being piloted by clients to understand their organisational maturity in digital transformation. The assessment explores front, middle and back office roles and their associated responsibilities, and creates a heat map showing an organisation?s capacity for change. If you can understand your digital maturity in this area, then this heat map will allow you to create a vision for transformation and plan your steps to achieving digital change. This can be more difficult for less agile organisations.

Government commitment

Through the Government Construction Strategy, IPA are aiming to increase the capability of the client. Earlier this year, government working groups on Building Information Modelling, Soft Landings and Modern Methods of Construction combined to form the Smarter Infrastructure Working Group. This brings together groups strongly advocating for change in construction through digital, manufacturing and whole-life performance.

The government recognises the significant benefits digital transformation can bring and is working proactively with the industry to realise them. The IPA-led Transforming Infrastructure Performance programme is important. It engages with data throughout the project life cycle ? from benchmarking at project inception, to using new technologies to deliver smarter techniques for infrastructure.

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Through the Construction Sector Deal and the Government Construction Strategy, the government has also invested significantly in innovation in the industry, and made good progress in encouraging and supporting organisations to adopt new technologies and in incentivising desirable behaviours in the marketplace.

One of the benefits of adopting a manufacturing approach to construction will be to simplify ? and standardise ? digital and performance requirements. This will give organisations a clear vision of the skills they need to develop for the future. Although transformation is still in its infancy, the IPA recently published a call for evidence relating to a new digital approach to building known as Platform Design for Manufacture and Assembly (P-DfMA). P-DfMA is a manufacturing approach to construction, using sets of digitally designed and interoperable components that are configurable across a range of economic, social and housing infrastructure.

Reducing the variety, but not the opportunity, for customisation is also part of the digital transformation agenda. We believe this simplification will allow organisations in the sector to streamline how they respond to their customers and deliver by learning from previous projects.

This also involves being specific about the 60?80% of requirements that are shared, and working on the value that can be generated on the 20?40% that is location-specific. For example, in Plymouth, 60?80% of a school will have the same needs as one in Newcastle. The 20?40% will differ due to geography or local requirements.

While the appetite for digital transformation grows, the level of investment remains difficult to address.

Perhaps organisations are too focused on the next project to address systemic issues. How can these organisations take a more portfolio- or system-level view of investment priorities?

By introducing standardisation, we create the opportunity to optimise and transform delivery models. There is likely to be an impact on commercial models for project delivery as optimisation occurs and transformative technologies are more readily available. We will need the commercial models and investment to match the ambitions of clients and industry.

The IPA will support the use of technology and modern methods of construction to

deliver smarter infrastructure. We will also promote and facilitate the digital transformation through initiatives such as the Digital Framework Task Group and the Geospatial Commission, a committee formed to promote best use of geospatial data.

To realise our vision for digital transformation we need to continue to work collaboratively with both the industry and academia towards a sustainable digital culture. Organisations can then take their own steps towards transforming infrastructure performance.

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Further information

- Related competencies include: Construction technology and environmental services , Leading projects, people and teams , Managing projects
- This feature is taken from the RICS Construction Journal (September?October 2019)
- Related categories: Data and design , Project management