



2022 Construction Predictions Issue 5

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Digital trends



Further digitising the construction lifecycle: Embracing digital ledgers and realities

The productivity challenges in the construction sector are well known. Construction productivity growth lags many sectors and is well below the national average in developed countries like the UK¹.

Many issues are behind the slow growth, such as skills shortages, fragmentation across the supply chain, competitiveness, high-risk projects and slim profit margins². For an industry that contributes 9% to the EU's GDP³, leveraging the latest technological advancements is critical in order to mitigate risk and improve productivity.

Traditionally, digital solution adoption has been a challenge for the industry where a 'build once' approach does not support investment in non-traditional, high-cost solutions. However, with Industry 4.0 solutions such as blockchain, digital twin, and virtual and augmented reality (VR/AR) becoming more accessible, affordable, and widespread throughout the supply chain, and more agile practices becoming more common place, it is no longer a question of 'if', but 'when' and 'how' firms invest and implement digital ways of working.

These digital solutions have the potential to help the construction sector move beyond the capabilities of Building Information Modelling (BIM). Organisations will now be able to trial the asset before it is built, test construction sequencing, model thousands of what-if scenarios, automate processes and democratise information and, consequently, transform the industry.

A democratised and secured environment

Trust is based on all parties having access to the same information at the same time. This trust is further reinforced if the information has been validated by all parties following the same rules.

It is expected that blockchain can be used as that cornerstone in the construction industry to democratise project data, remove confidence barriers that certain centralised processes can entail and unlock a variety of use cases.

A relevant example of blockchain technology is Smart Contracts. These execute preconfigured instructions (in the form of code) which are validated by a blockchain ledger. As the quality of the data is trusted by all parties, automating certain processes can yield interesting benefits for our industry, as already experienced in Finance and Real Estate⁴.

This level of automation can accelerate the administration of contracts and significantly reduce end-to-end processing times, particularly where certain contractual conditions are well defined.

This technology also adds an additional layer of security. Once the information has been stored in the appropriate block of the ledger and is visible to all parties, any tampering is averted. For an industry in which claims and disputes cause major delays, significant settlement fees and widespread frustration, blockchain technology could help significantly reduce the quantity of them.

Your digital twin

Supported by improvements in cloud and edge computing, mobile hardware and apps, and onsite highspeed internet access (5G/mobile wireless networks) and adoption of digital models has increased and is evolving rapidly across many aspects of the construction lifecycle. In structured phases, from the very early stages of 3D modelling to the more current collaborative ways of working backed by governments⁵, certain aspects of the project lifecycle have changed tangibly.

Current graphical rendering capabilities now provide higher fidelity images than ever before. In addition, cloud technologies and increasing data volumes⁶ now supplement the models with historic and, often, live information. Organisations are now adopting more advanced ways to offer clients, and the wider society the ability to "visit" a physical asset, to visualise the features they require and request data about its components in order to make their decisions from the comfort of their desks, thus contributing to reducing our carbon footprint and site-related health and safety risks.

Digital twin technology is no longer limited to viewing and navigating a model, and organisations will now be able to replicate a range of processes related to executing the project lifecycle. Clients will also be able to track materials and plant movements more accurately, model resources and monitor progress using a digital representation of the workflow⁷. This increased end-to-end visibility will be coupled with automation and AI analytics to start, for example, automated orders when certain levels have been reached and act on any bottlenecks identified.

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Choose your reality

Digital Twins and blockchain used together can transform the industry's operations. A trusted digital representation of the physical asset and relevant construction processes can enable a more agile and interactive approach to the way we embark on construction projects. This is accelerated further by Virtual and Augmented Reality technology becoming more accessible.

Most smartphones are equipped with some augmented reality functionalities, enabling consumers to shop in smarter ways such as checking whether a sofa fits into your living room before making the purchase⁸. Powerful yet affordable virtual reality headsets are driving a whole new area of the entertainment industry with users seeking immersive experiences from their own homes in virtual worlds including gaming and attending events⁹.

The same technologies driving consumer trends are also making an appearance on the construction site. Mobile phones with LiDAR scanning technology coupled with smart apps allow accurate, rapid model update without hiring specialist services¹⁰. We have seen hard hats with integrated AR screens and integrated computers that allow technicians to navigate and update 3D models in the field, in real time¹¹.

These technologies are also supporting virtual and remote ways of working, and improving the safety and efficiency of workers; robots coupled with AI provide continuous site surveying for model development and construction progress updates¹², UAV drones provide visualisation data across vast areas and extreme heights at low cost¹³ and even fully wireless sacrificial sensors which provide live feedback on concrete maturation to enable real time quality assurance¹⁴.

As digital solutions become more accessible to broader sections of the construction industry, there are increasing opportunities to invest strategically in digital strategies which create the foundation for efficient and agile ways of working throughout the value chain and across multiple projects. The digital way of working is no longer a vision of the future for the construction industry, but the next step in its evolution that is ready to be embraced.

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