

Digital Twins Policy Position Paper

Executive Summary

A Digital Twin (DT) is a “virtual model of an object, a system, or a process. It is connected to its real-world counterpart by a 2-way flow of right-time data, meaning it mimics it in all aspects.” ([National Digital Twin Centre](#), 2023). They are used across all sectors and all parts of life so that we are able to test decisions before we make them and understand how different actions might affect the real world. For example, there are models which make predictive proposals (the forecast) based on feeding the current weather into a model based on historical weather data. Despite the many benefits of adopting these technologies, there are challenges to adoption, including initial cost and interoperability of data between systems.

Recommendations

- **Digital Twins adoption:** The Government should continue to make use of best practice in DT technology to help support changes to national infrastructure, healthcare, new housing and energy targets and other sectors to ensure taxpayers money is used optimally and the final product is efficient and resilient. In housing, Birmingham’s smart city digital twin supports urban planning and allows for real-time decision making to improve the city’s resilience and growth (University of Birmingham; 2023, [Development of a Digital Twin for East Birmingham](#)). The government should ensure it sets examples of good practice, when procuring and developing digital twins.
- **Clear understanding:** Stakeholders expect to see a return on their investment, but the value may come further down the line from increased security and resilience and non-financial. Decisions on digital projects are often made despite this lack of understanding impacting business investment (Digital Construction Today; 2026, [Why Digital Twins Fall Short, and the Myths Holding them Back](#)). Through collecting the right data, setting standards and sharing data securely for the public good, the UK could release an additional £7bn in benefits per year across the infrastructure sector. This is equivalent to 25% of the total UK infrastructure spend (University of Cambridge; 2018, [Centre for Digital Built Britain](#)). The National Digital Twin Centre will be pivotal in outlining case studies and blueprints for good practice and standardised definitions, frameworks and/or guidance, which is something that professional organisations can support.
- **Systems approach:** DT are an inherently interdisciplinary technology, blending user experience and interface design, software engineering, data science and many more digital skills. Simultaneously, DTs are best when designed and implemented early within product lifecycles, requiring dialogue between digital twin developers and engineers responsible for the real-world counterparts. Currently, DTs are frequently employed at later stages, meaning industry is not making full use of the benefits DTs provide. A systems-wide approach that encourages early integration of digital twins and communication between digital and real-world engineers is required to maximise DT benefits for all and provide greater interoperability. The government should emphasise a systems-approach in its cases of DT best practice.
- **Skills:** Skills in this area are not specific to digital twins, as they require skills from a range of engineering disciplines. The ability of employers to adopt a systems approach to DT integration is also limited due to a digital skills gap – an IET survey on

digital skills showed that half of engineering employers report digital skills issues in the labour market, leading to reduced productivity and growth (IET; 2023, [Sustainability skills survey – summary](#)).

- **Clear labelling:** There's a lack of clarity over what comprises a DT, whether it is a continuum between simulation/CAD to more advanced models. This affects the investment decision process. Much of the problem lies with software vendors labelling DT models incorrectly, which leads to varied definitions. We recommend that the Government should champion standardisation in this area through procurement and the Digital Twin Centre and the Digital Catapult.

Opportunities and applications

DTs promise more effective asset design, project execution, and asset operations by dynamically integrating data and information throughout the asset lifecycle to achieve short and long-term efficiency and productivity gains. They are data resources that can improve the design of a new asset or the understanding of an existing asset's condition. This has the potential to vastly reduce errors and discontinuities present in more traditional methods of information management.

A compound annual growth rate of 27.6% is expected of UK digital twin market from 2026 to 2033 (Grand Horizon Scanning; 2026, [UK Digital Twin Market Size & Outlook, 2026-2033](#)). The global DT market is expected to grow with a compound annual growth rate of 47.9%; from \$21.15 billion in 2025 to \$149.81 billion in 2030 (Markets and Markets; 2025, [Digital Twin Market size report 2024- 2030](#)). According to a survey carried out by Rockwell Automation the use of digital twins in the UK had jumped from 21% to 37% between 2024-2025, with a further 35% of respondents planning to adopt DT technology by 2026 (Digital Construction Today; 2025, [UK is European leader in digital twin adoption](#)).

DT technology can be applied at multiple stages in the manufacturing process (IET; 2022, [Apollo protocol: unifying digital twins across sectors](#)):

- **Product design:** DTs can be used to learn from products currently in operation to assist with optimising the design of next-generation assets.
- **Process design:** The historical state of DTs can be used by process control applications to better modify their future state, enabling changes to a manufacturing process to be made in real time.
- **Process management:** Displaying and interpreting the live state of an asset in operation enables the identification of issues and the improvement of materials and processes.
- **Predictive maintenance:** Real-time analysis of DT information enables predictive and adaptive maintenance activities. Continuous analysis of machine conditions in this way can lead to a reduction of unplanned downtime by as much as 30% (LLumin; 2025, [The Impact of Predictive Analytics on Maintenance Efficiency](#)).

There are also applications for DT technology within the built environment:

- **Citizen-centric data models:** Ensuring citizen involvement in infrastructure decision-making processes, from local planning through to impact assessment of infrastructure investments.
- **Regional resilience, response, and simulation:** DTs can use connected data and organisations to enable simulation and response capabilities across interconnected infrastructure, and to test potential mitigations.

Conclusion

There is a real opportunity for government to utilise DTs to a greater extent. They have the potential for more effective asset design, project execution, and asset operations by integrating data and information to improve efficiency, productivity, safety and decision-making. The increased adoption of DTs in areas such as manufacturing and the built environment demonstrates clear benefits, including optimised design, real-time process control, predictive maintenance, improved infrastructure resilience, and more citizen-centred planning. However, there are challenges to adoption, including initial cost and interoperability of data between systems that need to be addressed to enable widespread and effective implementation.

As a professional body that spans all engineering sectors, the IET is well placed to provide a convening role between industry, government, and academia to address these challenges. To view the full reports referenced in this paper, please contact: policy@theiet.org