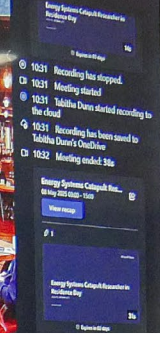


# Innovation Launchpad Network+

- Theory: Hype studies and sociology of expectations (Pollock and Williams)
- Digital twins as projects, events, processes, ideas, ambitions, and outcomes
- Evidence scheme: Energy Systems Catapult multi-sited ethnography
- Methods: expert interviews, focus groups, webinars, closed-door analysis of demonstrator



# CASE STUDY

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## The Challenge

As the UK works towards decarbonising its energy system by 2050, decision-makers face complex questions about cost, security, public trust and long-term sustainability. Digital twins – virtual models of physical systems – have been promoted as a powerful tool to simulate future energy scenarios and guide better policy decisions. However, digital twins in the energy sector are still at an early “demonstrator” stage. While they are often presented as neutral and technical tools, they raise important questions about data access, transparency, accountability and democratic decision-making. Who controls the data? Whose assumptions shape the models? And how might these systems influence future energy policy and markets? The challenge for this project was to understand how digital twins are actually being developed in practice across the UK energy sector – and what this means for governance, ethics and public trust. Rather than focusing only on technical performance, the project sought to explore the social, political and organisational dynamics shaping digital twin development.

## Innovation

The Researcher in Residence applied social science methods and theories — drawn from science and technology studies — to study digital twins as sociotechnical systems rather than purely technical tools.

**Over a 12-month period, the project combined:**

- 25 expert interviews across government, industry, universities and technology providers
- Observations of 6 workshops, 15 webinars and 6 closed project meetings
- Analysis of 3 digital twin demonstrator interfaces
- Review of policy documents, industry reports and public communications

This multi-site ethnographic approach allowed the researcher to track how digital twins were framed, promoted and debated in both public and private settings.

A key innovation of the project was the use of “hype analysis” as an analytical lens. This revealed how early excitement around digital twins helped mobilise funding and stakeholders, but also how enthusiasm shifted once practical barriers — especially around data sharing — became clear.

The project also developed a new engagement tool called “Oblique Manoeuvres”: a card-based toolkit that translates complex academic concepts about ethics and politics into accessible prompts for innovators and policymakers. This enabled more open and practical conversations about the challenges digital twins pose beyond technical accuracy or bias.

## Result

The research identified a clear pattern in how digital twins have evolved within the UK energy sector. Initial pilot projects created strong momentum and high expectations, driven by promises of real-time modelling and improved decision-making. As projects progressed, however, practitioners encountered significant operational barriers, most notably difficulties in accessing and sharing data across organisations. This led to a shift in focus away from building sophisticated models and towards developing the underlying data-sharing infrastructure required to support them. While ethical debates initially centred on issues such as model accuracy and fairness, the study found that

deeper political and economic concerns related to data ownership, procurement and market power often remained hidden. These included risks of monopolisation by platform providers, weak coordination of long-term infrastructure funding, limited public engagement, and a lack of transparency in decision-making processes. The project produced a wide range of outputs, including a peer-reviewed academic article, contributions to national policy consultations, industry webinars and conference presentations. Findings were also incorporated into advisory boards and working groups linked to major national initiatives. Within the University of Bristol, the research informed the redesign of communications and engagement strategies around digital twin facilities, helping to create a more realistic and responsible narrative about their capabilities and limitations.

## Impact

The collaboration with Energy Systems Catapult was central to ensuring that the research reached policy and industry audiences with the power to influence future practice. Through sustained engagement with government consultations, national programmes and professional networks, the project has already contributed to shaping debates around data sharing, interoperability and digital governance in the energy sector. Policy impact can be seen in the uptake of recommendations by organisations such as Ofgem and the National Cyber-Physical Infrastructure programme. Academic impact includes the establishment of a growing international research community focused on the study of technological hype and its consequences for science policy and innovation. Organisational impact is evident in the way the findings have been applied to internal strategy and communications around digital twin facilities at the University of Bristol. Looking ahead, the project will continue to inform policy development, industry practice and public engagement through new publications, toolkits and collaborative initiatives. By reframing digital twins as sociotechnical infrastructures rather than simply technical models, the research supports more transparent, democratic and socially responsible approaches to the digital transformation of the energy system.



## Energy Systems Catapult

“Ola provides a unique perspective as an independent social scientist and is able to understand the technicalities of digital twins, and draw out the socio-techno issues which may not be sufficiently explored by those with a more technical focus. How humans interact with technology is very important, we look forward to continuing to work with Ola and ensuring we don’t lose sight of the fact that humans are very much in the loop.”

## Ola Michalec

“Working with Energy Systems Catapult gave me access to key experts who would otherwise have been difficult to reach, as well as access to a digital twin demonstrator for analysis. They also provided platforms to share the findings with industry and policymakers, which greatly strengthened the visibility and credibility of the research. The impact development day they organised was especially valuable in helping me shape a clear impact plan and build the connections needed to maximise the reach of the project.”