



**IT'S TIME TO
BUILD BACK BETTER**

... AND SMARTER

Digital transformation across whole asset lifecycle

INTRODUCTION

With asset owners seeing an increase of external pressures—whether regulatory, political, or financially—some organisations are beginning to take a radically different approach to achieve their business outcomes within the built environment. One such example is the introduction of digital advisory experts supporting clients in driving their digital building agenda and smart operations thinking. Positioned either client-side or supporting the more traditional architecture, engineering, construction (AEC) community, digital advisors are increasing the focus on how technology can drive leaner, more economical, compliant, and flexible operational outcomes. After all, it is the operational phase where we typically find over 80% of a building's total cost of ownership and carbon emission footprint.

Accreditation plaques on the wall received at handover will not guaranty or deliver desired outcomes—the operational estates and facilities management (EFM) teams will. Unfortunately, digital maturity for many operations and EFM teams is often low, hence support is needed from digital advisors specialising in digital buildings and smart operations. For capital programmes, BIM processes help, although they alone will not provide the digital transformation needed to unlock the opportunities a smart building can offer. In general, new build projects need to look way beyond handover and consider how a building will be used on a day-to-day basis. The introduction of some integrated thinking and digital know-how across whole asset lifecycle can avert the traditional cultural and organisational barriers when projects transition between the design, build, operate, and maintain phases.

There are a lot of different technology solutions covering the needs within the design, build, operate, and maintain phases. These solutions cover everything from design software, information collaboration, operational and facilities management (FM) tools, to dedicated building management solutions (BMS) and Internet of Things (IoT) applications. A lack of integrated thinking across whole asset lifecycle means many of these solutions fulfil a unique purpose and, therefore, operate in silos with siloed data sets. Having independent digital expertise working with operational teams positioned early in capex or opex projects will ensure that necessary data is created, structured, and shared between systems, and that data usage is maximised throughout the whole asset lifecycle.

01 WHERE'S THE RADICALLY DIFFERENT APPROACH?

Firstly, there must be early engagement of estates, FM, and operations teams on capital projects to ensure the “design and build for operations and maintainability” consideration. Secondly, there needs to be early engagement of digital advisors with subject matter expertise in digital buildings and smart operations. Emphasis needs to be on delivery of business outcomes in the operational phase and, therefore, the alignment of the right digital strategy covering cradle to grave asset lifecycle rather than just the project lifecycle.

While AEC organisations have some digital skills, however, they have a specific role and remit as part of a project lifecycle that does not cover all necessary digital aspects nor the whole asset lifecycle. For example, it's unlikely that they'll have a deep or wide enough IT knowledge when it comes to IoT, big data analytics, AI and machine learning, maintenance or asset management solutions, digital twins, blockchain, or horizon scanning of emerging technologies, such as 5G or immersive realities.

They are also likely to be incentivised to promote their own proprietary or preferred solutions, which may suit the AEC's immediate needs but not necessarily the client's needs as part of an integrated and interconnected long-term digital strategy.

Like AEC organisations, the BIM advisor's role is very different to the digital advisor's role. Their knowledge of IT isn't wide or deep enough, plus their role is typically focused is on the design and build phase and very little on the operate and maintain phases.

For example, the BIM advisor role wouldn't consider interoperability between technologies across lifecycle or how active data (data from IoT sensors, or BMS/SCADA) aligns with static data, such as assets' name or number, materials, or dimensions. A key part of the digital advisor's role is to provide owner-operators and EFM teams with the “art of the possible” education on the importance of end-to-end and with-end-in-mind lifecycle thinking to remove silos across data, systems, processes, and organisational structures.

Also, it's important to highlight the dangers of falling into closed, proprietary, single vendor IT architecture that may create their own set of problems.

02 THE NEED FOR DIGITAL ADVISORS TO ENABLE BETTER AND SMARTER BUSINESS OUTCOMES

While the U.K. government's mantra is "Build Back Better", we need to consider altering it slightly: "Build Back Better...and *Smarter.*"

When we say "smarter", we mean in terms of technology, processes, and organisations, and smarter in terms of the approach for how we deliver desired business outcomes. Business outcomes for AEC organisations and owner-operators are driven by outside political, financial, and compliance forces.

Some examples include:

- *The Hackitt report, which includes Golden Thread traceability and auditability.*
- *Government Soft Landings and Treasury's Green Book.*
- *ISO standards, British standards, and new engineering contracts (NECs).*

Additionally:

- **About 40% of the world's carbon footprint comes from built environment.**
- **There is a focus on staff and patient and client well-being, efficiency, and health and safety following the COVID-19 pandemic.**
- **Organisations are looking for new business model opportunities or new ways of working that are enabled by data and digital innovation.**

Technologies to achieve integrated, whole asset lifecycle management have been available on the market for several decades. Until now, though, they have only been used effectively in industries, such as oil and gas, aerospace, defence, and utilities. However, as they become more cost-effective, we see them more frequently adopted in built environment projects. Even if most of us do not fully understand the ins and outs of this technology (IoT, edge and cloud computing, blockchain, big data analytics, digital twins, and smart asset management), we do know they are integral when covering the whole asset lifecycle.

To avoid data and organisational silos, solutions need to be open, interoperable, and integrated to meet client needs, and whether these technologies are used for new builds or incumbent legacy estate. It is clear that open, interoperable systems—comprising of modular best-in-class solutions that produce re-usable (non-siloed) data—will mitigate risk and offer operational efficiency benefits. No matter what technology is used to support whichever process by any organisation, the data that they create or manipulate is key.

03 THE IMPORTANCE OF DATA

Whatever the desired business outcomes are—such as reducing maintenance backlogs, target net-zero carbon emissions, enhancing patient or staff well-being, service quality, personnel productivity, or asset reliability—they will need data to inform or confirm the investment business case.

Every decision should be data driven, and every asset can be connected and monitored either at installation or retrospectively. Once the right data has been identified, collected, filtered, structured, analysed, and shared, it can provide decision makers with:

- **Goal Alignment** – Ensuring that target KPIs are fed the right data to inform accurate and insightful reporting.
- **Confidence**– Eliminating guess work and estimates by ensuring that you make decisions with knowledge that they were made from trusted information. Decision-making becomes easier, faster, and more reliable
- **Insights** – Facilitating deep-dives into data and uncover patterns and events. With the addition of machine learning and artificial intelligence, additional insight can be provided into future predictions and forecasts
- **Real-time Information** – Maintaining currency of asset performance data across the whole organisation, reducing the need for periodic reports or unscheduled events
- **Situational Awareness** – Knowing what is happening in the asset’s performance and reliability, as well as the effects of management decisions over time.
- **Contextual Visibility** – Bringing data to life through harmonising design and engineering data, from 2D process diagrams to complex 3D/4D models, reality meshes, and digital twins.

Where possible, data-driven decision making should use client-owned data. Data should not be limited to static information, such as materials used or dimensions, but also include active data from smart connected assets and locations, such as room occupancy, footfall, asset tracking, asset performance, and from BMS/SCADA systems.

The digital infrastructure for a building or project should also be able to accommodate other data sources, including anonymised visitor and/or patient data, socioeconomic data, and procurement and supply chain data. The more varied and precise the data sets, the more valuable the insights and knowledge. Part of the role of the digital advisor for digital buildings and smart operations is to identify the right data, in right format, for the right person and at the right time.

And this can only be achieved by aligning systems, technology, and processes with the client’s immediate and future desired business outcomes.

04 WHO ARE THE DIGITAL ADVISORS?

Certain large organisations may suggest that they can provide “all of the answers,” although there’s an obvious risk that they will achieve them using their own closed proprietary, single vendor IT architecture, therefore potentially tying the client into a long-term contract complicated to terminate. If the client’s digital and data strategy is based on criteria such as open, interoperable, re-usable data, future-proof and “best in class,” then approach of an ecosystem digital advisors becomes imperative.

This paper stems from an ecosystem of organisations, each specialising in different aspects across the design, build, operate, and maintain project phases of a construction project. Ecosystem partners range from large multinationals to small subject matter experts, each providing specialist subject matter expertise and collaborating to address key issues. Together, they drive transformational change that will enable and deliver significant business benefits for the end client and wider built environment sector.

By removing traditional organisational and technology silos to ensure open and interoperable systems and data, supporting an integrated end-to-end process, this ecosystem of complementary partners is currently developing a proof of concept in association with Leeds Teaching Hospital Trust (LTHT) to measure the value and benefits of a different way of working. The focus of the ecosystem of partners work is ensuring that the necessary data to achieve desired business outcomes is created, structured, and shared between open and interoperable systems from early in design and build phase, as well as ensure that a “golden thread” of information is maintained across whole asset lifecycle into the operate phase.

Amanda Gomersall, Leeds Teaching Hospital NHS Trust’s general manager, corporate services and real estate, said:



“Our trust has embarked on one of the largest hospital builds in recent years, providing us with an opportunity to rethink how we integrate technology within our capital projects and legacy estate for the benefit of patients and staff. The trust absolutely recognises the importance of static and active data, generated from a joined-up suite of ‘best in class’ interoperable solutions covering whole asset lifecycle...”

“We are working collaboratively with digital advisors, part of an ecosystem of subject matter experts, which together is a key differentiator. This ensures that our operational estate teams will continue to deliver agreed business requirements, improve patient outcomes, operational performance, and sustainability targets for the next 30 years.”

04 WHO ARE THE DIGITAL ADVISORS?

Sarah Thomas, Department of Health and Social Care, added:

“The New Hospital Program is working with digital subject matter experts, ensuring that new digital innovation and sustainability are at the heart of everything being considered by NHS Trusts engaged in the government’s new hospital build initiative.”

As the proof of concept (PoC) progresses through the Royal Institute of British Architects’ (RIBA) stages, partners will continue to identify and remove obstacles whilst focusing on improving people, organisation, processes, and IT, including respective product and data integration.

The PoC is only possible because of the client’s desire to embrace a transformative approach in use of digital technology within a built environment project. Along with the participating consortium of ecosystem partners, the client recognises the need to significantly improve its ability to accurately measure all critical factors relating to its operations, estates and facilities management, and sustainability. Digital advisors, underpinned by subject matter experts operating as an ecosystem partner, will allow the client to grow their digital capability and understanding, as well as adopt a proven methodology for others to follow.

Michael Boyd, head of digital services at WSP, commented:

“WSP have been engaged as digital design advisor to support the Leeds Teaching Hospitals Trust to deliver a world-class smart healthcare facility. Our digital healthcare advisory service in partnership with our specialist SME adviser will help drive an operational focus into the delivery of this innovative project.”

Gordon Mitchell, convenor – ISO/TC267 – WG6 – Technology in Facility Management, added:

“Examples like this showcase the opportunity to integrate the best of the world of standards coming out of technical committee 267 and our related bodies into realised examples, which in turn inform the future needs for our international roadmap. This creates a continuous circular approach which enables us all to have a said in what best value digitisation looks like for the operational built environment.”

CONCLUSION

The built environment is evolving. We are already seeing the green shoots of meaningful, early engagement from some initial adopters who are prepared to lead the way in applying smart technology for more efficient ways of working. As a result of these initial engagements, lessons learned will help the client realise benefits, supported by robust digital evidence. In a diverse industry sector, which has not always enjoyed integrated thinking, the opportunity to realise digital benefits is significant within the built environment. Savings in productivity, efficiency, traceability, health and safety, compliance and particularly sustainability are attainable—if organisational, process, and technology silos are removed, and digital expertise is engaged.

Early engagement with operations, estates, and FM team and digital advisors on capital projects is key. Operations and EFM ensure delivery of data-driven business outcomes while digital advisors ensure interoperability across whole project and asset lifecycle, as well as the availability and re-usability of necessary data.

Like the role of data scientists several years ago, the position of a digital advisor to enable digital buildings and smart operations will evolve and be adopted by the industry over time. The role should not be hidden organisationally under an AEC's IT department, nor confused with BIM advisors.

The benefits of applying these simple rules can enable and support the delivery of business outcomes such as net zero carbon emissions, improving well-being agendas, and reducing maintenance backlogs and operational costs. The built environment must adopt a new way of working and recognise digital—and how it's applied. This environment is just as important as the bricks and mortar!

The digital advisor role is one that needs to be included in key decision points, advising the client, and working with all stakeholders to ensure that guidelines are followed, and forward-thinking principles are adhered to. Building owners and operators are understanding that data is pivotal in helping them deliver business outcomes. Accordingly, they should endeavour to:

- *Break organisational, process, and technology siloes and ensure that the right people are around the decision-making table from day one including EFM and digital advisors for digital buildings and smart operations.*
- *Make technology and the resultant data part of a coherent, joined-up digital strategy that covers the whole asset and project lifecycle.*
- *Contractually ensure their entitlement to all data created throughout the asset lifecycle.*
- *Harvest client-owned data from open and interoperable systems that will enable modular, best-in-class, and future-proofed solutions.*
- *Generate and manage data to facilities enhanced decision-making to ensure desired outcomes.*

HOW CAN WE SUPPORT YOUR EAM NEEDS TODAY?

