# It's Time to Build Back Better…and Smarter

Collaborative digital transformation across whole asset lifecycle

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## 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 independent and impartial digital advisory experts supporting clients in driving their digital building agenda and smart operations & FM thinking.

Positioned either client-side, or supporting the more traditional architecture, engineering, construction (AEC) community, these 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 guarantee or deliver desired outcomes - the operational Estates & FM (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, and in general, new build projects need to look beyond handover and consider how a building will be used on a day-to-day basis once in operational in-use phase.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 design, build, operate and maintain phases

There are a lot of different technology solutions covering needs across the Design, Build, and Operate 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 a majority of these solutions fulfil a unique purpose and therefore operate in silos with siloed data sets.

Having independent digital subject matter expertise working with operational teams positioned early in capex or opex projects will ensure necessary data is created, structured, and shared between systems and data usage is maximised throughout the whole asset lifecycle.

## Where's the radically different approach?

Firstly, early engagement of Estates, FM and Operations teams on capital projects to ensure 'design and build for operations and maintainability' consideration. Secondly, 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.

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, Asset Management solutions, Digital Twins, Blockchain or horizon scanning of emerging technologies such as 5G or immersive realities. There is also the fact they are likely to be incentivised to promote their own proprietary or preferred solutions, which may well suit the AEC's immediate needs but not necessarily the client's needs as part of an integrated and interconnected long-term digital strategy.

Similar to AEC organizations, 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 phase. For example, the BIM advisor role wouldn't consider interoperability between technologies across lifecycle or how *active* data (data from IoT sensors, BMS/SCADA) aligns with *static* data, such as assets' name/number, materials or dimensions.

A key part of the digital advisor's role is to provide owner-operators and EFM teams with "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.

**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
- Following the Covid-19 pandemic, there is a focus on staff and patient/client well-being, efficiency, and health and safety

- 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, though until now, 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, smart asset management, etc.), 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.

## The importance of data

Whatever the desired business outcomes are, e.g. 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 'thing' (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 stakeholders with the necessary insights for informed decision making.

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, the more valuable the insights and knowledge. And ensuring the right data is made available can only be achieved by aligning systems, technology and processes with the client's immediate and future desired business outcomes.

## Who are the digital advisors?

Certain large organisations may suggest they can provide "all of the answers", although there's an obvious risk that they will achieve this 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 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 SME's, each providing specialist subject matter expertise and collaborating to address key issues and 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 are 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 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, and to 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 our operational estate teams will continue to deliver agreed business requirements, improve patient outcomes, operational performance and sustainability targets for the next 30 years."

**Sarah Thomas, Department of Health and Social Care**, adds: "The New Hospital Program (NHP) is working with digital subject matter experts ensuring new digital innovation and sustainability are at the heart of everything being considered by NHS Trusts engaged in the Governments new Hospital Build initiative."

As the proof of concept (PoC) progresses through the RIBA (Royal Institute of British Architects) 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 (E&FM), and sustainability. Digital advisors, underpinned by subject matter experts operating as an ecosystem partners, will allow the client to grow their digital capability, understanding, and adopt a proven methodology for others to follow.

**Michael Boyd, Head of Digital Services, WSP**:  "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 (subject matter expert) adviser SRO Innovate will help drive an operational focus into the delivery of this innovative project."

**Gordon Mitchell (Convenor) – ISO/TC267 – WG6 – Technology in Facility Management**: "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're 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 & 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 & FM team and digital advisors on capital projects is key – Operations & EFM to ensure delivery of data driven business outcomes, and digital advisors to ensure interoperability across whole project and asset lifecycle, and 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 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 silos and ensure that the right people are around the decision making table from day one, including E&FM 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 facilitate enhanced decision-making to assure desired outcomes.

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* - is just as important as the bricks and mortar.

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