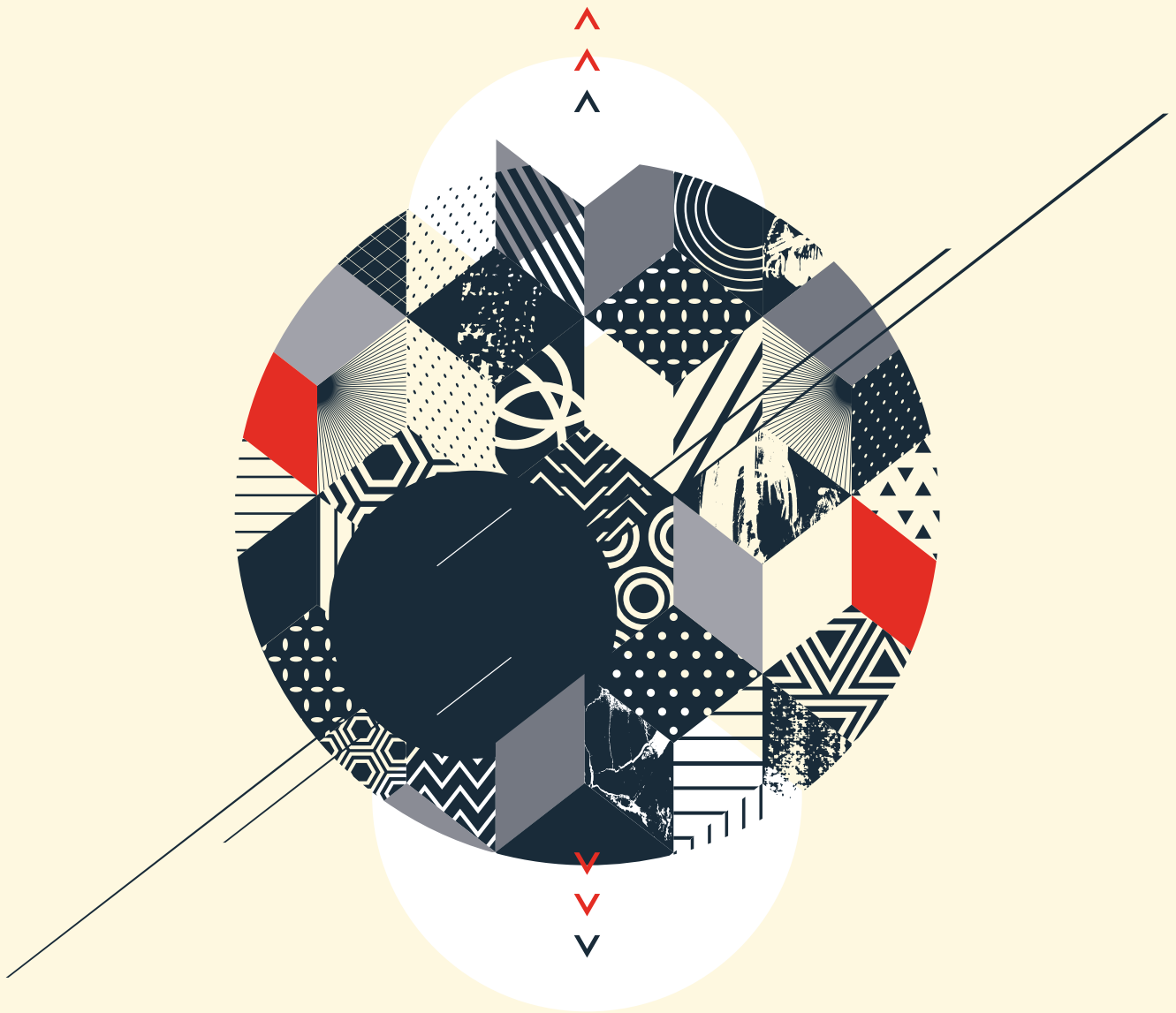


Why technology-assisted collaboration will improve performance
in project delivery and long-term value



Thought leadership from BLP

Executive Summary

Since the turn of the 21st Century, digital methods in the construction industry have been gradually replacing analogue ones. In the process they have been reducing human error and thence project risk by making the communication of intentions clearer throughout the value chain.

In this White Paper, BLP ponders the importance of digital technology to all types of organisation involved in design, manufacture, assembly and operation in two sectors, housing and office building. The tipping point is approaching where a switch to digital methods by leading firms will be complete and irreversible, with positive consequences for quality, efficiency and value.

Analogue versus digital

The traditional ways of depicting intentions in construction have been through drawings and specifications, reports and bills of quantities: paper analogues of the intended work. They are naturally ambiguous, often incomplete, beset by different versions and inconsistencies. And it takes hard work to remove all the errors. Digital information is inherently safer, a single source of truth. The data can be used for many purposes without degrading: surveys, models, simulations, analytics, fabrication, installation, operation and control. Working methods have to change however, with it being hard to run both analogue and digital workflows in any business. BIM, which is simply structured, shareable information, has its own codes of practice and style of collaboration. The experience with BIM, for example, is that once professionals have done a BIM project, they prefer to continue with it for their next job. Staff may leave if forced to regress to analogue or hybrid working. That is why many consultants and contractors now use digital methods even when they are not asked to by clients, and why they seek to align their suppliers with them as digital users. It's as hard to imagine going back to analogue as to think of the public going back to snail mail and landline phones.

The UK government took the major step of mandating the use of BIM by 2016 in its 2011 Construction Strategy, for use by all central government projects. It did so because the inertia of analogue methods was enormous and there would be no spontaneous change unless a dominant client forced it on its suppliers. The lessons from manufacturing and retail, which changed 25 years earlier, were that payback was massive, with huge increases in productivity and in quality of product and service. But only dominant buyers could pull their suppliers into the new world. The government plan is to set in train changes that will eventually spread across all sectors as the benefits become clear.

Housing

The British housing industry is really several distinct industries: mass housebuilders, apartment developers, housing associations, local councils, self-builders and a huge repair, maintenance and improvement industry which also builds individual homes. All of them use traditional skilled trades which are becoming in short supply. Yet we need to double the rate of output to house our people and stop the unsustainable rise of prices and rents. Digital methods offer housing developers a range of benefits: surveys at speed to capture site and existing building facts, feasibility and design studies with myriad options, use of standard design elements from a digital library, ability to simulate proposals in context for planning permission, energy performance simulation, offsite fabrication by machine tools, improved site safety and logistics, stronger marketing and sales techniques, part-automated building management for lettable property. House building for sale doesn't need the speed and scale of offsite construction as it builds only at the rate of sales. Rentable property can however, fully exploit digital technologies to erect large estates in short timescales and manage them with digital assistance. The rise and rise of Build-to-Rent is partly because of this ability to exploit the new capacity created by digital methods.

Office building

An office developer can benefit from the same list of digital methods, but with different emphasis. The town-planning process is the highest risk stage and digital tools help to study options and visualise them in context. Cities are creating their own digital models, into which developers' digital proposals can be fitted to check all the effects, visual, overshadowing, wind, traffic, pedestrian flows, and soon fire and other regulations. Virtual reality displays from the digital model allow the public and councillors to experience the proposals as never before possible. So too can prospective tenants, with options quickly



studied to avoid the need for Category A fitout that might be wasted. The new powerhouse application is however 'Smart'. Equipping office buildings with sensors and controls which utilise the Internet of Things (IoT) enables both developers and tenants to benefit. Buildings can be more comfortable, secure and supportive of their occupiers, whilst cutting operating costs and emissions. Space use efficiency can rise as the building can know how it is being used, and by whom. BIM information is an essential part of a Smart building, supporting good facility management and workplace utilisation. Developers will offer data to tenants, who will request it to enable them to take the responsibilities they are given to repair and maintain. Few do this now, but they soon will.

Client uptake of BIM

The government mandate to its own departments has taken five years of mentoring to achieve, and even now it's not complete. The cultural shift required is large, not only to change established ways of working, but also to exploit the benefits of collaboration for better project delivery. Risk aversion holds people back, whilst digital methods actually reduce risk.

One major barrier to client uptake across the industry is the perceived effort required to learn the new methods and the cost believed to follow from asking for BIM. The authors of the BIM Codes of Practice invented a whole new language with myriad acronyms to describe the process and there is no doubt that this is alienating. The professionals find it hard going and there is no 'BIM for Dummies' for clients. The result is that many clients get BIM used on their jobs without actively participating themselves. They allow their consultants and or contractors to use it for their own benefit but don't reap all the benefits themselves. By not asking for BIM they also don't spend money on it, not understanding the business case for client-led BIM. Actually, the cost of BIM should be less than analogue alternatives, as should the cost of the building. The pilot projects done under the government mandate shows this effect, with 20% savings achieved, partly down to BIM. Consultants who have got over the learning curve into their third or fourth BIM project are working more rapidly and with less waste than before. Contractors who have standardised on BIM processes don't charge more, they cut their contingencies as risk reduces. The only extra costs could flow from the provision of additional services or performances, enabled by BIM and subject to a business case.

A simpler way for clients to move into active BIM use would be to look at a seven-step programme, leaving the jargon-filled official codes to their consultants and contractors.

- 01 Make a strategy. Identify what is of value and set out a roadmap of how they will move towards active BIM clientship.
- 02 Formalise the team's use of BIM. This involves giving client authority to an Information Manager, probably the lead consultant, to set rules, share model rights and provide a server on which the team shares all its work.

- 03 Rethink how teams are assembled, to ensure competence, compatibility, and collaboration. Scratch teams don't work as well as established ones. Facilitation may help too.
- 04 Equip client offices to work with BIM. No special kit or software is needed, just the ability to use a model reader.
- 05 Think what information needs to come out of the model at each decision point in the programme, to support decisions on design and on progress. Add that requirement to the appointments.
- 06 Consider what Operation and Maintenance information is needed at handover to run the building. Clients are getting two assets, a real one and a virtual one. Add that requirement to the appointments.
- 07 Look at creating standard library models for anything you repeatedly require, from a house type to an office toilet layout.

The basic change is for the art of making the brief to evolve to include the information that should come out of the BIM process, its function, form, timing and economy. Clients who ask for 'everything' mean that they don't know what to ask for. 'Everything' is unaffordable. The economical amount is that which delivers identified value.

BIM is a collaborative approach, though in present UK practice there is no need to abandon the established forms of contract or insurance. That may come later. The world admires the UK approach to BIM and is turning it into international standards. This will be a great opportunity for exporting construction services. There is hope that this industry, so long unable to raise its productivity and client satisfaction, may be on its way to doing so with the help of digital tools.



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