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Voices in construction

The Great Divide

Can Digital Transformation in Construction Cross the Chasm?

Foreword

BCM Agency hosted the second Voices in Construction Insight Panel on 8th July 2021, on the topic of Digital Transformation in Construction. It brought together an extended panel of professionals from construction and related disciplines in a lively virtual discussion that forms the basis of this paper.

Representing architects, green building designers, town and transport planners, building controllers, digital modelling experts, and building materials specialists including drainage and flooring suppliers, the panel comprised:

Ben Borthwick
Smith Jenkins Town Planning (smithjenkins.co.uk)

John Carter
Clark-Drain (clark-drain.com)

Mark Doohan
Benchmark Architects (benchmarkarchitects.com)

Chris Elliott
Cotswold Transport Planning (cotswoldtransportplanning.co.uk)

Simon Green
Green Building Design Consultants (gbuild.co.uk)

Simon Heywood
Hertfordshire Building Control (hertfordshirebc.co.uk)

Mark Hipwell
Wineo (en.wineo.de)

David Turner
Agility3 (agility3.co.uk)

Once again, our thanks go to the panel for generously contributing its time and expertise to the discussion, and we hope this paper goes some way to capturing the many excellent insights that emerged during the dialogue.

Sara Stephen
Head of Insight

Introduction

Construction: an industry bearing the brunt of change

The construction industry has seen more upheaval than most in the past few years.

> **Traditionally a highly siloed industry, resistant to change, but also (as many would point out) advisedly averse to new risk when the old methods have long proven their worth, construction has been the subject of concerted Government digital reform in the guise of the Building Information Modelling (BIM) initiatives and the Digital Built Britain strategy[1].**

So, digital transformation in construction is officially well underway, if not always, perhaps, (as this paper will later show), well understood.

But meantime, construction has also been battling a host of other challenges – some digital-related, some not.

Looming (and changing) carbon targets, as we explored in the first Voices in Construction paper, have exploited digital tools' uncanny ability to turn what should be detailed and expert-led compliance evaluations into online tick-box submission processes that are deeply flawed and can result in punishing – and arguably unjustified – fines.

At the same time, of course, the Covid-19 pandemic has wrought uncertainty and volatility in the industry, alternating from predictions of a damaging construction slowdown[2], to reports that total construction in 2021 at one point 'expanded to the greatest extent for six and a half years'[3] - all cruelly shot through with a liberal dose of global materials shortages and spiralling shipping prices.

Against this backdrop of apparently existential threats to the construction industry, it may seem that the notion of digital transformation is a side-issue - a Government vanity project, a distraction. Yet nothing could be further from the truth.

[1]https://www.wates.co.uk/articles/blog/blog-the-digital-transformation-of-the-construction-industry/
[2]https://www.rics.org/uk/news-insight/latest-news/news-opinion/what-has-been-the-impact-of-covid-19-on-construction-and-infrastructure/
[3]https://www.theguardian.com/business/2021/apr/08/sharp-pick-up-in-uk-construction-amid-economy-recovery

> **“Start small, do a proof of concept, show how it delivers benefit, then build on top of that.’**
>
> David Turner, Agility3

For the fact is that digital transformation has the capacity to make the industry far more resilient to market shock, by greatly reducing the effort, risk, time, and cost involved in taking a project from conception to completion.

Traditional construction practices, for example, often result in uncertainty around requirements, and result in costly late changes and rework, as a client’s understanding of their desired outcome evolves.

But a more collaborative, holistic, integrated delivery model – the kind that true digital transformation makes possible – means greater understanding of requirements. and, possibly better alignment between stakeholders, more efficient management of supply and expenditure, and, ultimately, far less exposure to the factors that can turn a potentially profitable project into a white elephant.

These, and many other factors, have resulted in the UK Government investing over £170 million of funding in digital construction initiatives via the Construction Sector Deal, for the Construction Innovation Hub, Active Building Centre, and research and demonstration activities[4].

The hurdles, however, are not to be underestimated, and in this paper, we hear from professionals who grapple with these every day. Poor usability; lack of training; fear of the unknown and mistrust of the new; the wish to return to ‘how things were before’; the pain of leading the digital charge when the stakeholders you deal with are not equipped to receive or understand the outputs.

In short, digital transformation in the construction industry is happening – it is just not ‘crossing the chasm’ from upriver to mainstream any time soon.

What, then, is to be done?

[4]https://www.ukri.org/our-work/our-main-funds/industrial-strategy-challenge-fund/clean-growth/transforming-construction-challenge/

Show proof of the pudding to drive appetite

The first point that came out strongly from our panel is that the term 'digital transformation' can be phenomenally broad, depending on the point in the 'digital journey' that an organisation has reached, culturally speaking.

Clearly demonstrating that digital approaches can deliver benefit is essential to their adoption, but where and how that process of demonstration starts can vary tremendously from business to business.

For John Carter of Clark-Drain, for example, working in a long-established, family-run business that places huge emphasis on traditional design, engineering, and manufacturing skills, the move to digital transformation has been catalysed by focusing initially on digital content platforms such as LinkedIn, Facebook, and Instagram, because these have quickly shown visible stakeholder engagement and reputationally positive results.

'One of the issues', Carter says. 'is that you have to show the value a digital process can deliver in order to persuade people to back it and start using it – and for them to continue using it, it has to be straightforward.'

This 'proof of the pudding' approach, he says, will lead eventually to greater levels of digital transformation in the business.

> **"You have to show the value a digital process can deliver in order to persuade people to back it and start using it – and for them to continue using it, it has to be straightforward.'**
>
> John Carter, Clark-Drain

He gives the example of BIM, which the business is considering for the future. 'We found another service, NBS, which connects us to the architects and constructors that will find our products useful', he says. 'By showing that you're gaining traction by using one digital system, and proving it works, it enables people to buy into the idea of moving on to another.'

Agility3's David Turner shares the idea that getting stakeholders onside is key. The company produces extremely powerful 3D simulation solutions for construction and other industries, but the power of the technology itself, he says, is not necessarily the convincer.

'We do a lot of work around understanding the processes that organisations follow, how the interaction with people works, what the pain points are, and what we need to do to fit in with that.'

Again, showing the value of the technology is key. 'Start small,' he continues, 'do a proof of concept, show how it delivers benefit, then build on top of that.'

Ben Borthwick, too, reinforces the importance of listening to stakeholders to achieve optimum digital outcomes and drive acceptance of technology. 'We held many consultations, virtually utilising interactive planning website would mean for our clients,' he says, 'and having done that we were able to very effectively embrace these digital technologies, particularly in the context of the COVID-19 restrictions in terms of holding in-person consultation events.'

Digital delivering the edge

But there is perhaps no greater demonstration of value in any technology than its ability to respond when adverse circumstances raise the stakes higher than ever.

For Mark Hipwell, of flooring specialists, wineo, it was the company's far-sighted investment in transformative digital strategies that helped position the business strongly throughout the trauma of the Covid pandemic, and translate their prized expertise and hands-on customer service approach into a resilient digital model.

'We have customers all over the world – architects, engineers, designers,' he says, 'and so we created a digital floor viewer on the website and as an app that enables them to see what any wineo flooring range would look like in the room they are actually standing in, with a choice of different colours for the walls and adjacent surfaces too.'

‘We also created a digital model of the new physical showroom we are building, with collaborative features to enable us to discuss and respond to customers’ specific questions, so they get a very lifelike showroom experience even when they can’t be there in person.’

Naturally, during the pandemic, when physical contact with customers and prospects was limited or even impossible, these digital technologies proved their worth by enabling wineo to sustain customer touch points that it otherwise could have lost.

> **"For the vast majority, there is an inherent resistance to change"**
>
> David Turner, Agility3

And whilst it is difficult to put a monetary value on this kind of timely innovation, the idea of a return on investment does play a critical role in digital adoption. Agility3’s David Turner, for example, emphasises that, for his clients, digital collaboration methods tend to be adopted because communicating complex project ideas to decision-makers and stakeholders more successfully than the competition is often key to their winning tenders and new business.

Without doubt, then, digital transformation in some forms can help deliver an edge both in a crisis and in ‘business as usual’ operations, and once it has proven its worth, resistance to it can be overcome.

This, however, begs the question as to where that resistance stems from in the first place – and the answer unearths some complex demographic, technological, and cultural barriers to change.

Who is resisting Digital Transformation – and why?

Simon Green, of Green Building Design Consultants, sees this in many ways as a generational issue. Younger people – those who have grown up as 'digital natives' – tend instinctively to both understand and embrace new digital processes and deliverables.

Paradoxically, however, for tools that are generally designed to facilitate collaboration, this is where the benefits break down, because the younger people often then have to 'explain the results to the senior people who can't use that process.'

The result, he says bluntly, is that the '40-plus' generation in construction is often simply 'slipping behind.'

"Businesses that fail to adopt this technology are 'going against the flow of the traffic', and will, ultimately, no longer be in 'the middle of the market'."

Mark Doohan, Benchmark Architects

Mark Doohan, of Benchmark Architects, takes up this theme – and paints a picture of the possible consequences of failing to adopt digital transformation in construction.

Today's generation of young people coming into contact with construction, both as workers and as customers, embrace transformative technologies as part of their everyday lives, just as readily as they 'play with their PlayStation VR' at home. Therefore, businesses that fail to adopt this technology are 'going against the flow of the traffic', and will, ultimately, no longer be in 'the middle of the market' – and thus 'will get left behind'.

It is an absurd thought that any construction industry player could simply refuse the evolution that is necessary to secure its own succession planning in this way – essentially signing its own death-warrant – so there must be other significant obstacles at work here that are making the transition to digital much more problematic.

> **“Our target audience can be anything from 16 to 65, and their willingness to engage digitally is very different. You have to make things easy for all the audience to use.”**
>
> Mark Hipwell, wineo

Usability is (almost) all!

To some degree, this goes back to John Carter’s earlier comment about ensuring digital technologies are straightforward to use, and it is clear that much improvement is needed here. Too often, perhaps, because digital tools are an engineering achievement in themselves, too much focus has been placed on their technical strengths, and usability has suffered.

Simon Green agrees. His customer relationship management (CRM) system, he says, is ‘very good at capturing records, but incredibly clumsy to use’, and he calls for ‘more investment in systems to make them much more intuitive, and make it easier for them to do the job they were meant to do.’

Mark Hipwell frames the problem differently, but ultimately with the same emphasis on the challenges of usability. ‘Our target audience,’ he says, ‘can be anything from 16 to 65, and their willingness to engage digitally is very different. You have to make things easy for all the audience to use.’

On this point, several of the panellists cite the analogy of digital banking, which people tend to use confidently and effectively across age groups, by instinct, but by the construction industry’s own admission, it is failing here.

The fifth annual Construction Manager BIM survey, for example, shows that of almost 300 construction professionals, over 50% say they hardly ever make use of BIM on their projects, with the results ‘highlighting a lack of digital skills that is holding uptake back.[5]’

So, age, skills, and usability seem to be huge factors in influencing whether digital transformation is or is not successfully adopted. But there are deeper human behaviours to contend with, too.

[5]https://www.bimplus.co.uk/poor-digital-skills-hold-back-bim-adoption/

Digital divide or expectation gap?

Simon Green characterises these as ‘the fear of the unknown and the fear of the system’; David Turner describes them an ‘inherent human resistance’ based on ‘the risk of the new’. (As we alluded to in the introduction, why introduce a new risk by attempting to fix something that, to date, does not appear broken?).

Certainly, effective training can play a part in dispelling these fears, as John Carter notes. But again, what is striking here is the difference in expectations between the generations.

> **"In our industry, the danger is that young people are embracing technology but then having to explain it to older, more senior management who are falling behind."**
>
> Simon Green, Green Building Design Consultants

For older professionals, it is about being trained to use a certain tool as a precondition to being able to deliver what is required from that tool. For younger professionals, the default anticipation is that they will be able to use whatever tools they are given to achieve whatever outcomes are required.

As Mark Doohan puts it, ‘Nobody asks what kinds of software these guys can use any more, because they expect to be able to use all of it.’

Decidedly, the barriers to the adoption of digital transformation in construction are indeed complex.

Falling at the halfway fence

Frustratingly, one of the most stubborn hurdles to digital transformation in the construction industry occurs because a well-developed and innovative digital process in one part of the decision chain produces outputs that the subsequent stages in the chain are not equipped to make effective use of.

In a sense, this is related to Simon Green's point about the breakdown in digital workflow between the generations, but it is occurring at a much more 'macro' level in the interface between construction industry professionals and the councils or other public sector bodies that are ultimately responsible for approving construction proposals and designs.

Ben Borthwick and Mark Doohan are both vocal on this point. 'We have invested in building an excellent planning portal that enables applications to be completed digitally,' Borthwick says, 'but once the plans are submitted, they just disappear into the council's back-office system.'

Mark Doohan echoes these concerns. 'We can put together a fantastic design, polished and brought to life using advanced modelling techniques delivered by partners like those in this session, but when it gets to the council, they don't have the tools to view, interrogate or interpret it.'

'They are literally printing the model out as a 2D PDF file on a piece of paper, annotating it by hand. It would be so much better if we could send the 3D model through, and they could simply send it back with the clashes highlighted in the same medium.'

It is, Chris Elliott says, 'like stepping back in time'. 'The designs are not to scale when they are printed, he explains, 'so they have people measuring them with a ruler to try and figure them out!'

> **"There's got to be a better way to present these schemes."**
>
> Chris Elliott, Cotswold Transport Planning

‘Do as I say, not as I do.’

Doohan also points out that many of the digital innovations that private companies in the construction sector have adopted were mandated by councils in the first place – who now find themselves unable to work with them meaningfully.

‘The private sector is running around trying to meet changing council standards – and successfully finding efficiencies along the way – but when the outputs feed into the councils’ systems, they’re often not being integrated or used as intended.’

For both Ben Borthwick and Chris Elliott, however, there are also unhelpful regulatory realities at large that could be adversely affecting how councils are able to engage with digital methods of working.

Elliott says that during the pandemic, councils’ move to virtual meetings greatly improved work practices, making it possible for planning professionals to fulfil their obligations without, as he puts it ‘travelling the length and breadth of the country to make a 7 p.m. planning meeting in which I would deliver a three-minute speech.’ Borthwick agrees, stating that this virtual engagement approach ‘has been a revolution.’

Yet the law has ruled that councils’ right to hold virtual meetings expired on 6th May 2021[6], meaning that physical council and planning meetings are now once more obligatory. ‘Parliamentary legislation is needed to change this’, Elliott asserts, ‘and it really needs to happen.’

But to ease off on the councils for a moment (because some are setting a sterling example in digital transformation, as we shall see later), is it even realistic to assume that the kind of openness and transparency that these reciprocal digital processes, once they work fully, will be built on, will be accepted by all in the construction industry?

Doohan’s view is that this fits with a world that has moved to a position of information sharing, but John Carter raises a definite generational issue. ‘Admitting clashes or issues isn’t easy for older people,’ he says, ‘and they often don’t know how to accept them.’

Again, the path to digital transformation, it seems, is fraught at every turn.

[6]https://commonslibrary.parliament.uk/will-online-council-meetings-be-extended-beyond-6-may/

And now the success stories...

Yet the reality is that digital transformation is taking place within the construction industry, and is delivering no shortage of advances along the way.

Simon Heywood, of Hertfordshire Building Control, relates a particularly slick example that he is nonetheless keen to emphasise was, first and foremost, the result of a very clear strategy to 'work with people to understand the need, and satisfy it.'

The challenge in question was how to present the result of site surveys and inspections to customers as a 'tangible outcome' that would enable them to quickly see that the surveyor had been on site and thoroughly checked their work, rather than as a traditional report that lacks these proof-points and, in addition, takes additional time to write and send.

The response was a tool that enables the surveyor to take photos of the work on site, overlay these with voice commentary and explanations on the spot, and, when completed, automatically emails this output to the client – an approach that Heywood describes as 'much simpler'.

'It's about understanding the outcomes you want to achieve, and applying the technology to that', he explains. 'You have to have a clear objective, and buy-in from your people. The technology is only an enabler, the strategy must be right first and foremost.'

Bringing designs to life

Elsewhere, Birmingham and some Greater London councils have fully embraced 3D modelling and augmented reality (AR) to streamline and improve the building design and planning permission process.

The architect shares the 3D model with the council, the council employee goes to the proposed building location and, through a pair of AR glasses, views the proposed design – for features, aesthetic fit, and any possible issues – in situ. Clashes are flagged on the model, sent back for correction by the architect, and a final in situ view can then conclude the process.

This approach clearly has the potential to greatly shorten the approval time for a particular construction design, but like many other digital transformation initiatives in construction, it is not yet commonplace.

What, then, must happen for us to see more digital transformation success stories in this sector?

Taking Digital Transformation further: what do we have to do?

There is of course no simple answer to such a complex question, but Mark Doohan uses a memorable phrase to warn that it is not enough just to rely on the organic uptake of disparate technologies – instead, collaborative buy-in to one clear digital transformation vision is key.

'We need to get people out of their "digital booths", where they're all working on their own thing' he says, 'and get them together to sponsor and steer the development of this new digital transformation model.'

The ability of a more holistic digital approach to deliver better measurement – and, by extension, demonstrate greater efficiency, and therefore increased value to stakeholders, decision-makers, and customers - may, he hints, be a driver that helps to promote this step. In his company's own digital transformation efforts, for example, he states 'we are making a move to measure most of what we can.'

> **"If you don't embrace this, you're going to be left way, way behind!"**
>
> Mark Hipwell, wineo

The endless search for tools to make construction professionals' workload easier to manage may also be a catalyst for improved digital collaboration. Many of the panellists now use digital workflow solutions such as Asana, Atlassian, and Monday.com to keep them on top of tasks and deliverables, and these applications can be shared between the organisations and individuals involved in the various links in the chain in any given construction project.

The commercial drivers, too, are compelling. Whilst, as Mark Hipwell, notes, digital transformation is never going to be able to deliver the physical sensation of touching and examining a piece of floor covering, the opportunity for private sector construction organisations is to use digital methods to vastly shorten the timeline between a prospect choosing to investigate flooring options (or any other saleable construction product or service) and making a favourable purchase decision – whether in a physical environment or not, and come rain, shine, or pandemic!

Dealing with underlying issues

As for questions of age and culture, these are more difficult barriers to overcome in the here and now.

Issues relating to technical skills and confidence can potentially be addressed by more intuitive technologies that perhaps borrow approaches from applications people already use every day.

However, unwillingness to share information (and especially information that can be perceived to reflect badly on the individual concerned), in organisational cultures where 'knowledge equals power' is still the underlying belief system, is a more difficult hill to climb.

Perhaps this turns on the eternal human question of 'what's in it for me?' – and here, it is important that what we typically see as features or enablers (ease of use, for example) are positioned more strongly to stakeholders as incentives and benefits ('get more done for your manager for less work', for example.)

For Simon Heywood, one key to boosting the attractiveness of digital transformation could be to embed it deeper into the supply chain to support a more agile, timely building control process and avoid redesign and rework.

'If every building material came with a barcode or a QR code that could instantly confirm its compliance or non-compliance against local controls for any given design, many designs would ultimately progress to approval and construction much more rapidly, with a lot less wasted work and effort', he remarks.

"We are highly collaborative and interactive, there is a buzz working around other people, and I think this element is sometimes missing from the digital world"

Ben Borthwick,
Smith Jenkins Town Planning

Conclusion

Not so much ‘divide’ as ‘disconnect’

We have seen, then, that the route to digital transformation in construction is neither entirely smooth nor entirely impassable.

With significant Government funding behind it, some convincing real-world examples of how it is improving the efficiency and cost-effectiveness of construction processes, and a technically savvy generation of younger workers, users and customers coming up through the digital ranks, the prospects for its continuing adoption are, undeniably, strong.

At the same time, what is abundantly clear is that, in some respects, there are more human obstacles to digital transformation than technical. What this seems to be pointing to is not so much a digital chasm that construction must cross, as a digital disconnect that construction must resolve.

But is there any area in which digital transformation will not deliver in construction – or, at least, any practice it will not be able to supplant?

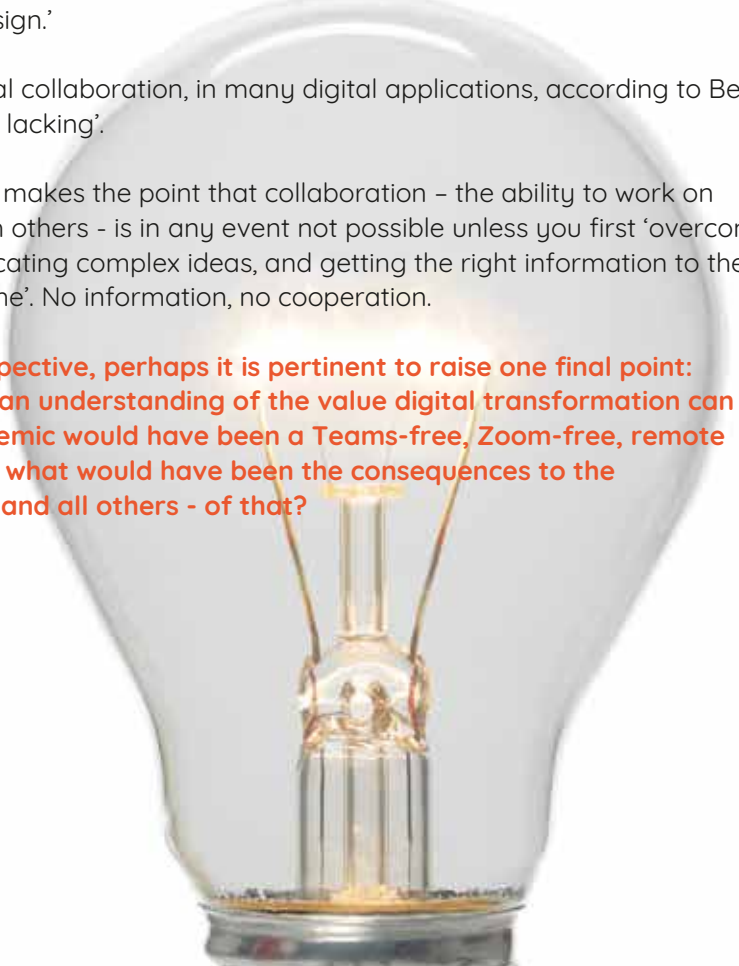
Clearly, as Mark Hipwell has commented above, digital transformation cannot replace physical appraisal of an object, and he does also mention that sometimes the digital world can set unrealistic expectations of procedural ease and speed that the accompanying physical processes – like posting a sample, for instance – then fail to deliver on.

But there is also a degree of conviction amongst the panellists that, in some regards, there will never be an effective replacement for eyeball-to-eyeball collaboration with pencil and paper. ‘Sometimes,’ Mark Doohan comments, ‘you just have to get six people round a table and scribble on a design.’

And for all the talk of digital collaboration, in many digital applications, according to Ben Borthwick, ‘collaboration is lacking’.

Nonetheless, David Turner makes the point that collaboration – the ability to work on projects harmoniously with others - is in any event not possible unless you first ‘overcome the difficulties in communicating complex ideas, and getting the right information to the right people at the right time’. No information, no cooperation.

To put all this into perspective, perhaps it is pertinent to raise one final point: without an implicit human understanding of the value digital transformation can deliver, the Covid pandemic would have been a Teams-free, Zoom-free, remote working-free zone. And what would have been the consequences to the construction industry – and all others - of that?



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