

Cambridge Centre  
for Housing &  
Planning Research



UNIVERSITY OF  
CAMBRIDGE



Pinsent Masons

# Accelerating Modern Methods of Construction

Delivering Homes for the Future

A PURPOSE-LED PROFESSIONAL SERVICES  
BUSINESS WITH LAW AT THE CORE



**Gemma Burgess**  
**Director**  
**Cambridge Centre for Housing**  
**and Planning Research**  
**University of Cambridge**

---

In December 2021, the Cambridge Centre for Housing & Planning Research took part in a roundtable forum convened by international law firm Pinsent Masons LLP on accelerating modern methods of construction (MMC), alongside other leading industry experts.

The roundtable explored smart homes of the future, manufacturing technologies and technology issues around the design and construct of MMC products. From the discussions, it was clear that there are benefits to be unlocked by greater use of technology in products such as home energy management systems and by embedding technology in homes to enable better support for vulnerable residents in the social care sector. However, companies need to be mindful of data privacy and data ethics issues, including GDPR and Article 8 of the Human Rights Act.

The discussions highlighted how a platform approach to construction (P-DfMA) could provide greater flexibility, standardisation and continuity of process. Successful adoption of BIM processes entails committed leadership and ensuring that a digital transformation strategy is in place. Upskilling and greater integration of the supplier network is also essential.

We are currently a long way off bringing these strands of technology together – digitally enabled supply chains, offsite construction and smart homes – but a holistic approach needs to be the direction of travel to enable greater acceleration of MMC and to reap the considerable potential benefits of this technology transformation.

The government announced its commitment to Modern Methods of Construction (MMC) in the 2017 Autumn Budget and after subsequent policy statements it set out a long-term vision for a Platform approach to construction in the National Infrastructure and Construction Pipeline and Transforming Infrastructure Performance, published in August 2021. A total of £78 billion of projects are set out in a 10-year investment pipeline where MMC could be used. The government has said it will mandate a Platform approach to Design for Manufacture and Assembly (P-DfMA) for social infrastructure within two years.

In December 2021, Pinsent Masons held the fourth in a series of roundtable forums focusing on Accelerating Modern Methods of Construction.

Our first roundtable forum in November 2020, with Mark Farmer, the government's Champion for Modern Methods of Construction, looked at how the use of MMC might be accelerated. The discussions highlighted that greater joined up thinking and end-to-end supply chain collaboration across the residential development process could help streamline the delivery of housing. We also concluded that funding can be used to drive uptake in MMC and that this could also be an opportunity to drive political objectives, particularly in levelling up Britain's economy, decarbonisation and providing more affordable housing.

The second roundtable focussed on how we might accelerate MMC through the initial stages of residential development and drew upon the expertise and experience of Countryside Properties and NatWest in examining the barriers, challenges and opportunities arising from the planning process and development financing where MMC is a key feature of residential development.

The third roundtable forum explored the challenges and opportunities around the procurement, contracting and on-site delivery of major developments using MMC. In particular, we examined how, if appropriately, structured, procurement and collaborative contract structures can accelerate the use of MMC. We also examined the different risks that materialise in procurement and construction delivery using MMC.

Our fourth roundtable looked at the role of technology and how we industrialise construction. We explored the smart home of the future, technologies used in manufacturing and the platform approach to MMC, and technology used for design and construction using MMC. In addition, we examined the key issues surrounding the insurability of MMC.



In December 2021, Pinsent Masons held the fourth in a series of roundtable forums **focusing on Accelerating Modern Methods of Construction.**

# Smart home of the future

The Internet of Things (IoT) is already well established within homes and the market is only going to grow, particularly as analogue systems are gradually switched off. Openreach has proposed that by 2025, the old analogue phone network in the UK will have reached the end of its life. An estimated 14 million traditional lines will transition onto new digital services.

In addition, ESG and net zero carbon is a key driver for the acceleration and take-up of digital technologies. By using IoT and smart-building tools, individual layers of construction can be tracked using sensor technology. IoT data can be used to demonstrate how a building performs to ESG standards over time. It also enables defects to be identified early and rectified by contractors and suppliers. One participant explained that there is an IoT division within their business which focuses on the net zero living experience. They envisage that in five to 10 years the smartest homes will learn about its occupants and then anticipate their needs and drive greater efficiency.

Smart technology such as home management and surveillance will be of particular benefit to sectors such as later living and the care system. Another participant noted that as IoT technologies develop, we are likely to see invisible sensor systems such as radar and infrared, which utilise artificial intelligence (AI) and machine learning to monitor housing and care needs by recognising patterns, simulating a response, and raising alerts.

Connected homes will become part of the smart city:

**"In future, the digitalisation of data sharing processes for built assets will be across a range of scales and task activities; from the growth of smart city projects; and the aspiration for connected digital twins to create a national digital twin."**

There was consensus among participants that technology is evolving at a much faster rate than the market can keep pace with. This creates a challenge when deciding which technology in which to invest, as there is a danger that it may become obsolete within a short space of time.



MMC projects often appear to be expensive by comparison to traditional build, **as the design and engineering costs are not properly apportioned.**

# Data privacy and data ethics

Embedded technology has many potential benefits such as healthcare and environmental assessment, as well as the contribution of data for the public good for the smart community. However, it is important to consider the issues surrounding data such as ownership, privacy, and ethics.

One participant noted that their business uses embedded sensors which gather data. Although the data is anonymised, it does relate to people and therefore falls under GDPR. Facial recognition technology presents another potential pitfall to consider. The Information Commissioner's Office recently announced a provisional intent to levy fines for misuse of facial recognition technology. The Public Algorithm Bill recently introduced into the House of Lords shows that there are concerns in respect of these technologies at a high level.

Participants agreed on the importance of having policies in place regarding the use of data and transparency. Having a framework in place to govern how data is managed and used could provide a solution, as well as establishing a transparency standard which specifies the uses of algorithms and AI. The Cabinet Digital Office has recently published a transparency standard which encourages local authorities who use algorithms to support a decision to use a transparency tool to specify how the algorithm is being used and how any impacts have been mitigated. The real estate sector could adopt a similar approach by using data trusts which add a cyber physical layer into the development process and create a trusted digital environment.



One participant noted that their business uses embedded sensors which gather data. Although the data is anonymised, it does relate to people and therefore falls under GDPR. Facial recognition technology presents another potential pitfall to consider. **The Information Commissioner's Office recently announced a provisional intent to levy fines for misuse of facial recognition technology.**

# Technologies around manufacturing and using a platform approach to MMC

Commenting on having a platform approach to MMC, one participant noted that the key advantage is continuity i.e., having a visible pipeline and a consistent team. Traditional building processes are still very fragmented but with a platform approach it starts to drive continuity. By using a Platform approach to Design for Manufacture and Assembly (P-DfMA) there are economies of scale all the way through the supply chain.

However, a different mindset is required, as the industry transitions to becoming a service provider. One participant commented that in traditional build, the commercial model is centred on low-priced tenders and keeping overheads as low as possible, but a rethink is needed for P-DfMA:

**“Construction has been completely optimised to put the least amount of money on the table at any one time and the least number of fixed overheads – this leads to challenges we all understand. Moving to an industrialised approach does change the basic commercial structure when continuity is prioritised. We can’t make this change without in turn changing procurement and all other steps changing too.”**

With a platform approach, one is not reinventing the wheel on design, which is important as the design phase is inherently risky. In contrast, with traditional build, this entails a redesign on every single project. One company is using a platform approach to build defined products which are customisable:

**“We are proposing to set out defined products with defined interfaces, so you invisibly standardise but allow some customisation on the visible elements to provide choice to the clients and to avoid all sites looking the same.”**

People, processes and tools are required to be able to develop at scale using MMC. Another company is also adopting a product-based platform approach as an operating system. They are looking at various outcomes and problems associated with traditional construction methods such as product performance, social impact, skills gaps, materials shortages, embodied carbon etc to address all these different aspects. It is envisaged that by having a standardised approach, it will help to eliminate claims and defects. Another participant agreed that by having a standardised approach to design, the focus is on continuous improvement rather than reinvention.

One participant explained that their company has moved away from timber frame and instead uses insulated panels which create an airtight envelope and is much more energy efficient. The cost of manufacturing has been a challenge, as it is with any new materials or manufacturing process. It has taken the company four years to make the cost of insulated panels as competitive as timber frame or traditional build. This has been largely achieved through economies of scale and efficiencies in the manufacturing process



One participant explained that their company has moved away from timber frame and instead uses insulated panels which create an airtight envelope and is much more energy efficient. **The cost of manufacturing has been a challenge, as it is with any new materials or manufacturing process.**

# Greater government incentivisation is needed to overcome barriers

Creating an efficient, capable manufacturing supply chain requires investment, but how is finance organised? According to one participant, there are challenges, as those providing development finance regard industrialised construction as risky. This was a view shared by another participant who said that there needs to be more government support to overcome these challenges:

**"In terms of what's needed to get over the barriers – it needs more government support to actually drive things forward and that will ultimately be subsidies. The New homes bonus consultation which concluded in spring looks at the possibility of MMC homes being incentivised as part of the bonus – this is the direction of travel needed to help members of the industry overcome these challenges."**

Another participant noted that there has been more of a shift towards MMC and new models of working due to the pandemic but agreed that for manufacturing at scale to take-off, it needs policy oversight from the government e.g., stipulating that a certain percentage of homes on a development must be built using MMC.



Creating an efficient, capable manufacturing supply chain requires investment, but how is finance organised?  
**According to one participant, there are challenges, as those providing development finance regard industrialised construction as risky.**

# Technologies around the design and construction of the assets

One participant noted that when Building Information Modelling (BIM) was first introduced, the focus was on asset information, so BIM was used primarily for 3D modelling. Ten years on, where BIM projects are being delivered, there is limited information on the actual products being installed. BIM 4 Housing has worked with BRE to create standardised libraries to record this information. These standard libraries are now free to access and are re-usable.

The UK BIM Alliance has also been advocating data standards. In January 2021, the UK BIM Alliance produced a 'Plain Language Guide to Product Data for Manufacturers in the UK and Europe' which provides guidance on why structured data is important and implementing information management across the supply chain for products.

Another issue using BIM in manufacturing is that there have been instances where different BIM models have been used on a project but there was no connectivity between the models. According to one participant, this has resulted in clients struggling to interpret data. To address this issue, Innovate UK has looked at digital components and products to create digital connectors between elements to enable different components to become connected.

A holistic approach is required for BIM processes to be successfully embedded:

**"The technology is still developing especially when it comes to digital twins. Digitising built asset data is not just a technical process alone it also concerns how construction firms are transforming the delivery process through the adoption of BIM digital processes etc. Again, this is not about new tech but committed leadership and management, digital transformation strategies, skilling up the supplier network, developing trust-based relationships with clients."**

There is a reluctance to share data within the industry, but collaboration is essential:

**"Data ownership and data sharing is where you drive the opportunity, particularly where it comes to BIM, but we're all adverse to sharing data whether personally or collectively, but this is how we will inform learning and drive change through the sector."**

One participant has been working with fire safety officials and asset managers etc as part of the Golden Thread Initiative to ascertain what data is needed to keep a building safe. In addition, HSE asked them to look at it from a risk perspective to identify the risk that needs to be mitigated. The outcomes of this project are now being applied to the standard libraries.

Data Sharing Agreements are becoming more commonly adopted and used to safely share data across the project ecosystem.



# Creating a customer-centric focus and the potential for monetisation

A recent corporate occupiers survey by CBRE found that demand for IoT and ESG is being driven more by occupiers than investors. The survey highlighted that occupiers do want more and are prepared to pay which will translate to a greater potential within the residential market.

It was noted by another participant that the UK is highly unusual in the lack of choice for customers. In contrast, other parts of the world, notably Germany, Scandinavia, Australia, Japan and the US, are already far more advanced in MMC and offer far more choice to customers:

**“This world of choice is out there, and it is deliverable, as evidenced by other countries. In the UK, I believe we don’t yet know what customers want except what we don’t yet provide: better, greener, more beautiful”**

One participant highlighted the extra value that can be created in a zero-carbon home in terms of sale or rental income and the possibility of monetising some of this and commented that if people are willing to pay for the product then it will be adopted.

## Insurance

There was concern among participants that the challenge of insuring an MMC product is a barrier. There is a distinction between warranties and operational building insurance. Warranties that are accepted by mortgage lenders are essential for selling residential properties constructed using MMC.

NHBC dominates the warranty market, accounting for around 60-70% market share; other providers, however, can be more accepting of MMC. One participant noted that government frameworks tend to have very traditional requirements for warranties, usually NHBC. However, NHBC has been slow to adopt certain MMC products, although it has been somewhat faster in its approach to timber frame MMC solutions:

**“For new products, the insurance industry is very traditional and slow to adapt to the change. We are actively working with NHBC but there are still hurdles and barriers.”**

Another participant commented that the insurance industry needs to look outside the UK to gain an understanding of the performance of MMC technologies:

**“The insurance industry in the UK is still talking about the tech as if it’s new and inventive. However, these technologies are well established elsewhere in the world.”**

The insurance industry is highly regulated which restricts the ability of the insurer to take on a lot of risk and the industry regards MMC as a big risk. The industry relies on backwards-looking data to determine the performance of a building. However, for MMC products in the UK, the data is simply not available.



There was concern among participants that the challenge of insuring an MMC product is a barrier. **There is a distinction between warranties and operational building insurance.**

# CONCLUSIONS



## TECHNOLOGY

There is further work required to bring the three key strands together – design and construction, manufacturing and smart homes – but that is the direction in which we need to travel.



## IOT AND SMART HOMES

The market is expanding at an exponential rate; technologies are evolving rapidly, and it has been difficult for the construction industry to keep pace with the rate of change. However, with drivers such as net zero carbon and the imminent analogue switch-off, it is more important than ever that the construction industry does not get left behind.



## DATA PRIVACY AND DATA ETHICS

There are significant benefits to embedding technology in products, not least gathering data for net zero requirements and smart monitoring in the healthcare sector. However, there are data privacy and data ethics issues, such as GDPR and Article 8 of the Human Rights Act, to take into consideration. It is recommended that companies establish a framework and policies around data transparency and dealing with data.



## DRIVE TO P-DfMA

Building safety and fire safety regulation, it is important to understand exactly what products and materials have gone into the build. This is difficult to ascertain in traditional projects, but off-site construction largely solves this issue, as there is much more information available on the products and therefore far more certainty as to the materials used.



## DATA STANDARDS AND BIM

Work is underway in the industry to enable connectivity between digital twins. This has implications not only for a particular project but the ability to create digital twins for smart cities in the future. Having a standardised and rigorous approach to data and the management of data is essential for collaboration and to overcome the current fragmentation within the construction industry.



## CREATING VALUE AND MONETISATION

The public sector, driven by a need to deliver housing at speed, is utilising MMC to a much greater extent than the private sector. Showcasing the benefits of using MMC, such as social value and lower embedded carbon in products and processes could help to encourage further innovation within the private sector.



## INSURANCE

Insurance and warranties were identified as one of the biggest blockers to innovation in MMC. There needs to be far greater collaboration between the insurance industry and the construction industry to overcome this.



## INTERNATIONAL EXPERIENCE

There is a wealth of experience and data outside the UK with other countries far more advanced along the journey of modern methods of construction. We need to tap into this experience to establish case studies of best practices.



## EDUCATION

It is evident from our series of roundtable forums that, to accelerate the adoption of MMC, there is a need for greater education within the industry, the planning system, housing associations and local authorities.

## CONTACTS



**Iain Gilbey**  
Partner, Planning and Zoning,  
Head of Residential Sector

☎ +44 (0)20 7418 8223  
☎ +44 (0)7585 996 268  
✉ iain.gilbey@pinsentmasons.com



**Tom Johnson**  
Partner, Real Estate, Head of  
Residential Development

☎ +44 (0)121 260 4008  
☎ +44(0)7747 771 696  
✉ tom.johnson@pinsentmasons.com



**Graham Robinson**  
Global Business Consultant

☎ +44 (0)20 7418 7091  
☎ +44 (0)7767 670 798  
✉ graham.robinson@pinsentmasons.com



**Sue Chadwick**  
Strategic Planning Advisor

☎ +44 (0)20 7490 9685  
☎ +44 (0)7717 451 458  
✉ sue.chadwick@pinsentmasons.com



**Nigel Blundell**  
Partner, Construction and Projects

☎ +44 (0)121 626 5737  
☎ +44 (0)7876 797 202  
✉ nigel.blundell@pinsentmasons.com



**Louise Wager**  
Senior Associate, Real Estate

☎ +44 (0)121 629 1508  
☎ +44(0)7342 057 617  
✉ louise.wager@pinsentmasons.com



**This note does not constitute legal advice.  
Specific legal advice should be taken before acting on any of the topics covered.**

**Pinsent Masons LLP** is a limited liability partnership, registered in England and Wales (registered number: OC333653) authorised and regulated by the Solicitors Regulation Authority and the appropriate jurisdictions in which it operates. Reference to 'Pinsent Masons' is to Pinsent Masons LLP and/or one or more of the affiliated entities that practise under the name 'Pinsent Masons' as the context requires. The word "partner", used in relation to the LLP, refers to a member or an employee or consultant of the LLP or any affiliated firm, with equivalent standing. A list of members of Pinsent Masons, those non-members who are designated as partners, and non-member partners in affiliated entities, is available for inspection at our offices or at [www.pinsentmasons.com](http://www.pinsentmasons.com). © Pinsent Masons.

For a full list of the jurisdictions where we operate, see [www.pinsentmasons.com](http://www.pinsentmasons.com)