

POLICY PURPOSE AND EFFECT ON THE USE OF MODERN METHODS OF CONSTRUCTION IN THE ENGLISH HOUSE BUILDING SECTOR

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Policymakers regularly cite Modern Methods of Construction (MMC) as a favoured method to improve productivity and quality of new houses, but the perception of many within, and associated to, the sector is that despite policy directions, the house building sector in general continues to be resistant to its widespread use. Whilst previous studies have considered aspects of the use of MMC within the house building sector, the disconnect between policy creators, and those affected by it, as to its purpose and effect remains under-researched. The aim of this paper therefore is to investigate and explore the purpose and effect of policy on use of MMC in the English house building sector. An exploratory critical review of literature relevant to policy, MMC and house building in England identified key policy areas connected to MMC use. Findings reveal four principal policy purpose clusters influencing MMC use in the sector: ‘pipeline predictability’, ‘regulations and guidelines’, ‘commercial market’, and ‘robustness’. The work aspires to facilitate greater clarity for policymakers and the sector in relation to the effect of policy and the use of MMC for house building in England.

Keywords: houses;; house building; MMC; policy; policymakers

INTRODUCTION

Concluding the September 2024 parliamentary debate (Hansard 2024) on the House of Lords Built Environment Committee report (Lords Built Environment Committee 2024), Baroness Taylor (for the Ministry Housing, Communities and Local Government (MHCLG)) concluded that, “Innovation has revolutionised so many sectors and transformed the way we live, with incredible gains in productivity and living standards, yet much of the housebuilding industry continues to build in the same way it has for hundreds of years”. Previously these comments may have been associated with the wider building sector (Egan 1998), now more commonly directed at house building alone - perceived by many as the last to modernise. Policymakers in England (Commons Built Environment Committee 2019; Homes England 2023; Lords Built Environment Committee 2024) regularly cite MMC as a favoured approach to improve productivity and quality of new houses, but based on the perception of many within and associated to the sector there is a question over why,

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despite policy directions, the house building sector continues to be resistant to its use (Farmer 2016; De'ath and Farmer 2020). Given the apparent disconnect and lack of clarity, the research seeks to answer the question, what are the policy areas, and principal purpose, that are thought to influence the use of MMC in English house building?

Delimitations

This section sets out the scope, reasons behind, and the focus for the paper's research. Housing, planning policy and associated legislation has been a devolved function since the 1998 Acts (Devolution of powers to Scotland, Wales and Northern Ireland 2013), which left the UK government with responsibility for England alone. As such, data is relevant for England rather than the UK unless otherwise stated. Whilst a 'house' may generally be understood, it is often legally defined by what it isn't (Morton 2022), so for the purposes of this research, it is a permanent residential property (within the scope of General Permitted Development Order (GPDO) C3) (Litchfields 2021), not divided horizontally but used as a single residence with the building assessed as a single entity for the purposes of Council Tax, regardless of whether it is detached, semi-detached, or of terraced construction. Houses remain the most populous type of homes built each year in England (approx. 75% (ONS 2023)), whilst house builders as a sub-sector remain distinct from general contractors (Pan and Goodier 2012), concentrating on land acquisition and building houses, rather than constructing other building types. The top 20 English house builders by output are responsible for approximately 75% of those houses constructed each year (Gardiner 2021). Several publications have sought to establish the taxonomy (Ayinla *et al.*, 2020; Vásquez-Hernández *et al.*, 2025), history (O'Neill and Organ 2016) and wider understanding (Green 2024) of non-traditional building methods. Given the context of the research however, focused on policy in England, the paper has chosen to define MMC in the terms of the UK government's seven categories (MHCLG 2019) (Figure 1) albeit limited to categories 1-5, which are deemed by many (Lords Built Environment Committee 2024) to be more appropriate. Whilst the history of offsite construction is extensive, the literature researched stems from 1997 onwards, being the year that Rethinking Construction (Egan 1998) was commissioned, and the current policy debate on MMC reignited (Matthews 2024).

Category 1	Category 2	Category 3	Category 4	Category 5	Category 6	Category 7
3D primary structural systems (volumetric modular)	2D primary structural systems (structural panelised)	Non-systemised primary structure (offsite components)	Additive manufacture	Non-structural assemblies and sub-assemblies	Traditional product led site labour reduction / productivity improvements	Site process led site labour reduction / productivity / assurance improvements
Offsite and near site pre-manufacturing					Site-based process improvements	

Figure 1: Modern methods of construction definition framework (MHCLG, 2019)

METHODS

An exploratory research method was selected through a systematic selection (Figure 2) of relevant literature on the subject. The effects of policy on the use of MMC in house building appear to be under-researched from the Scopus keyword search, but through the process described and with inclusion of reference papers from government, policy think tanks and professional bodies, 60 papers over the last 25 years in total formed the basis of the review. The review of the literature identified data, facts, and arguments relevant to MMC and house building, and enabled the broad categorisation of policy areas that had, or had the potential, to influence its use. In places the literature referenced specific policy instruments, rather than policy areas, so part of the review process involved interpretation of arguments in the context of the

probable policy areas intended, grouped into four principal clusters to establish common links, themes, and purpose.

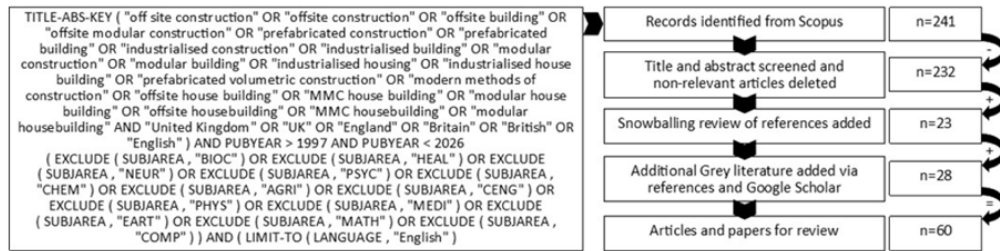


Figure 2: Process for selecting papers for review

Exploratory Critical Literature Review

There may be a broad appreciation of policy as a concept, however it remains challenging to agree a common definition (Cairney 2015), its general scope, or the categorisation and use of policy instruments (Salamon 2002) to shape and direct policy to achieve its desired outcome. Whilst many perceive it in terms of government direction in the form of public policy, it also covers those strategies and plans in the private, Not for Profit (NFP) and Non-Governmental Organisations (NGO) sectors. However, for the purpose of this research, areas are deemed to be capable of being categorised if they can be seen as directing objectives or strategy through the lens of being financial, regulatory and non-regulatory policies. The inherent variability in descriptions and labels (Bryman 2016) used in the reviewed literature, required an iterative approach to common descriptions to identifying and create policy areas, and then clusters, with sometimes interchangeable references to both policy and instruments. The review explored ways to identify and categorise policy references, whether through the lens of explicit or implicit direction, or potentially use of similes such as Carrots, Sticks and Sermons (Bemelmans-Videc *et al.*, 1998), to reflect the sometimes more subtle approach that can be used by policymakers.

Identifying Policy Areas

Throughout the review process, policies and policy areas referenced in relation to influencing the use of MMC in the house building sector were identified and described, to identify a comprehensive list of 25 policy areas (Figure 3). The review occasionally interpreted the author's implied intent and focus as indicating that a policy area had, or would have, an effect, even though a particular policy or instrument was not always explicitly identified in the literature, and whilst some, such as Agapiou (2019) restricted policy to the areas of planning, regulation, funding, insurance and warranties, however, many of the legal and contractual issues identified could also be deemed to be the product of policy.

The absence of specific literature through the search, and the use of snowballing to find additional papers through reference searches (Figure 2), suggests a research gap in connections between policy, MMC and house building, with no papers fully addressing the research question. The review also identified the lack of data in assessing the use of MMC, its effect on house building, nor a framework to gauge its long-term robustness, with 30% of the papers citing data's absence as a detriment to the understanding of MMC use within the sector. Using the approach taken by Bemelmans-Videc *et al.* (1998), the policy areas were grouped into clusters by their overall purpose and approach to influencing the use of MMC in house building, resulting in 25 policy areas within four distinct but interlinked clusters:

- A. Policies that enable ‘pipeline predictability’ for house builders in England (7)
- B. Policies that create the ‘regulations and guidelines’ that house builders work to (7)
- C. Policies that shape the ‘commercial market’ that house builders work within (6)
- D. Policies that embed the ‘robustness’ of the house builders’ approach over time (5)

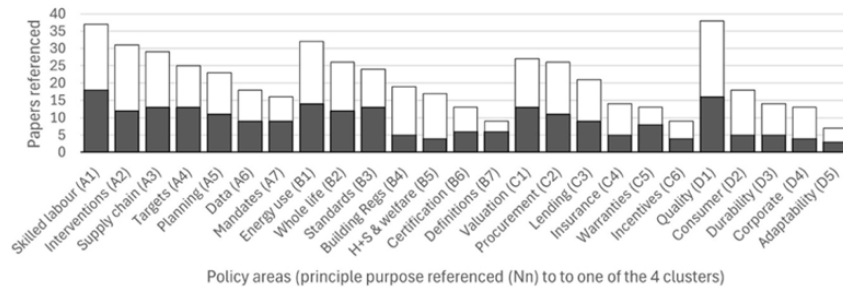


Figure 3: Policy areas and overall purpose cluster referenced within reviewed literature

Pipeline Predictability

The traditional house building business model (Farmer 2016) has evolved to accommodate the stop-start demand and economic cycle, with the capacity to instantly change development on any given site (Lang *et al.*, 2016). This approach is considered unsuited to the manufacturing processes used in MMC, particularly those in categories 1 and 2 (Figure 1), with papers referring to the effect that a predictable pipeline (Make UK Modular 2023) would have on MMC use in house construction. The papers make varied references to absent or poor data(A6) collection across several areas, which is reflected in a wider debate about the Office for National Statistics (ONS), and others’ ability to collect relevant and high-quality data (Hudson 2025). The lack of reliable data has, and will continue to have, a detrimental effect on decision making around MMC use, and house building in general.

With the partial exception of the creation of a skilled workforce, all items in this cluster were within the field of public policy, with the focus on the government’s capacity to act or lead. The papers’ discussion on the need for skilled labour(A1) focussed on the role of bodies such as CITB to improve training, skills and knowledge about MMC (Farmer 2016), but also acknowledged that government could lead through direction or legislation (Hill 2019). Whilst the unpredictability of the planning(A5) system was cited by 38% of the articles as having a detrimental effect on MMC use, there was an acknowledgment by some that this was not a unique problem for the sector (Peters *et al.*, 2023), but a problem in its totality, albeit the current permission led approach had partly led to the traditional house builder business model (Payne and Serin 2023), and without significant changes (RTPI 2023), the system to some degree would continue to encourage the use of non-MMC systems.

The remaining four policy areas identified in the papers relate to the effects on MMC use following general and specific government interventions(A2) - whilst sometimes less precisely defined in articles, such intervention referenced the general funding for social housing, research, land release, and financial backing for high capital investment requirements linked to MMC production (De’ath and Farmer 2020), with the latter, specifically generating conflicting comments on the effectiveness of Homes England (Lords Built Environment Committee 2024).

The government’s ongoing housing targets(A4) were seen as potentially a key driver for innovation in construction, but also regularly used as a driver for MMC use (Peters

et al., 2023)- the targets themselves were seen as influencing the need for MMC (on the basis that the house building sector was currently capacity limited). The capability to promote MMC use via mandates(A7) (funding through Homes England, but previously through the Housing Corporation) was seen by many to be potentially highly effective (Chakravarti and Cowley 2024), but the non-stipulation of categories 1 and 2, for the measure being based on pre-manufactured values (PMV) instead was criticised (Lords Built Environment Committee 2024), for allowing too much content from lower categories to be used. The suggestion that pipeline predictability through the application of targets(A4), the use of mandates(A7) and government intervention(A2) to support capital intensive manufacturers would also lead to the creation of a stable supply chain(A3), which was deemed as essential for government (house building supply), as it was for MMC contractors (Alhawamdeh and Lee 2024), particularly following a number of supply chain failures, harming the potential for future investment in the sub-sector (Saad *et al.*, 2024).

Regulations and Guidelines

The capacity to direct, control and influence the building sector through regulatory means is long established, whether by statutory instruments (The Construction (Design and Management) Regulations, 2015), creation of specific standards (DLUHC 2023) and bodies (such as BSI), or compliance frameworks (Vagtholm *et al.*, 2023). Whilst not strictly part of the formal regulatory framework, the MHCLG definitions(B7) framework (2019) was cited by several papers as an essential part of future support for MMC use in housing, whether through clearer direction in targets, or linked to future standards, with the latter believed to have a significant effect. The effect that building regulations(B4) may have on the use of MMC is described in 40% of the literature, but more recently in the context of the current regulations not being responsive (Commons Built Environment Committee 2019) to the systems being adopted, and as a barrier to greater use. In a similar context, the capacity and requirement to measure and assess the whole life(B2) of the building, particularly through embodied carbon use (Daniel *et al.*, 2024), is referenced as a potential policy change that would have a significant effect, although the evidence that all MMC systems would benefit is not proven (O'Hegarty *et al.*, 2025). The perceived benefits of MMC systems (Goodier and Pan 2010) in relation to satisfying policies directed to reduce energy use(B1), and the drive towards zero-carbon use through the adoption of the Future Homes Standard (DLUHC 2023) are cited to have had a significant effect on MMC use by house builders (Make UK Modular 2023) through the application of offsite systems. Whilst the establishment of recognised standards(B3) (Price *et al.*, 2019) for MMC systems seen as essential, particularly in relation to certification, warranties, and insurance (Agapiou 2019), the introduction of standardised components is more contentious. Many authors recognise that a kit-of-parts approach may produce more consistent adoption of MMC systems in house building (Kennedy *et al.*, 2023), particularly in relation to supply chain stability, whilst many manufacturers remain wary of regulation that stymies innovation (Make UK Modular 2023).

Likewise, the capacity to provide certification(B6) for components and systems seen as a significant step in creating more opportunities (Alhawamdeh and Lee 2024) for MMC use by removing perceived barriers, particularly in relation to warranties, insurers, and lenders. Legislation in relation to health, safety and welfare(B5) on construction sites isn't necessarily new or targeted specifically at contractors using

MMC but has been seen as a potential driver for many contractors in its adoption (Pan *et al.*, 2008), particularly to avoid working at height (such as using pre-finished roofs).

Commercial Market

Traditional house builders are long established, know their sector well, use proven traditional approaches to construction, finely adjusted to the financial and regulatory systems they work within (Pan and Goodier 2012). All of which can potentially result in a commercial market highly resistive to innovative approaches, referred to by Saad *et al.* (2024) as ‘innovation negativism’. The early adoption of an MMC system approach is recognised as key to successful procurement(C2) during the design and building stages (Farmer 2016). Existing commercial frameworks and legal contracts were designed around traditional building approaches, with milestones based on commercial stages that don’t necessarily suit MMC systems (Thompson 2021). Acknowledging the barriers that exist in traditional professional and commercial contracts, whilst actively promoting alternative routes, will have a significant influence on procurement practice (Agapiou 2019).

Likewise, the ongoing question about the issue of warranties(C5) for MMC constructed houses was referenced as a significant barrier to wider adoption. The policy approach taken by relevant bodies such as NHBC to new systems is either an attack on innovation (Make UK Modular 2023), or an appropriate management of under researched risk (Green 2022). This has resulted in the creation of the Build Offsite Property Assurance Scheme (bopas.org) by the MMC sector, to issue accreditation for MMC systems. The issuing of warranties impacts two further areas that derive predominately from private sector policy making: the insurance(C4) of the finished houses, along with cover for the manufacturers and developers within the sector; and the decision by banks to agree competitive lending(C3) to the individuals (Agapiou 2019). The risk-averse policy approach by commercial companies to both is seen to have a clear effect on the decision for individual to purchase homes using MMC, but also on the decision to lend to, or invest in, businesses that use or manufacture MMC systems, particularly after the ongoing spate of announcements and insolvencies within the sub-sector (Saad *et al.*, 2024).

The final two policy areas identified within this cluster relate to appreciation of the construction valuation(C1) linked to using MMC systems, and the associated incentives that government could use to support the use of MMC to alleviate the barriers and challenges highlighted elsewhere. The policy approach to the first of these concerns the estimates used within the RICS Red Book, which do not allow for higher capital costs associated with houses constructed using MMC, nor make allowance for the lower maintenance and running costs that some believe result from MMC use (Lords Built Environment Committee 2024). A position cited in relation to grant funding for affordable housing (Chakravarti and Cowley 2024), with the acknowledgment that MMC construction costs will become more compatible with traditional systems once the market expands, matures, and stabilises.

The government’s role in encouraging and supporting a changing market towards MMC systems achieved through a more targeted use of incentives(C6) via taxation and grants. The analogy to recent policy towards electric cars, whether via grants (used to discount the purchase price of the car, and the installation of home charging points) or taxation (lower BIC rates for company cars, and road tax duty) suggests that a similar approach to those using MMC systems could, if wished, have a significant

effect on developers (grants for capital investment) or purchasers (discounts on Stamp Duty or through Council Tax) (Peters *et al.*, 2023).

Robustness

The capacity for MMC systems to be holistically robust over time may have a more significant effect on its adoption now than in previous decades. Several papers recounted the earlier drivers and problems associated with offsite use in England over the past century (O'Neill and Organ 2016), and whilst the current taxonomy for MMC may be novel, the principles are not, which may suggest that the sustainability of the approach is yet to be comprehensively proven to consumers or the corporate bodies that invest in it.

The durability(D3) of the systems against traditional methods, especially for organisations that remain the long-term owners of the properties (Kempton and Syms 2009). Homes England's investment in the AHP for 25% MMC use will need to be tracked to assess the condition and value of the homes over time which is certainly of interest to Registered Social Landlords (RSL), and their approach to data collection and sharing through the sector will be critical (Chakravarti and Cowley 2024). In addition, the quality(D1) of various systems assessed and recorded over time is discussed in many papers, but without specific policies cited, to establish which methods generate fewer defects on handover compared to traditional approaches and whether maintenance costs are lower over time (Kempton 2009) - however the assumption that a focus on quality is an obvious benefit from using MMC systems is not evidenced. Whilst the policy towards adaptability(D5) requires elements to be designed into new houses (Building Regulations Part M, and Lifetime Homes Standard), the capacity for future changes to be made to MMC systems may not be clear (Penny 2024), particularly within category 1 and 2 (Figure 1).

Corporate(D4) organisations require significant assurance that investments are justified, but with limited relevant data available in relation to MMC and ESG (Environmental, Social and Governance) policies (Alhawamdeh and Lee 2024), the effect may be to rely instead on headlines of past insolvencies and withdrawals from the sector, rather than data-driven evidence. Finally the need to gauge consumer(D2) support for future MMC systems (Alhawamdeh and Lee 2024) is critical given past reputational problems (O'Neill and Organ 2016), and whilst potentially assessable through surveys of tenants in social housing, or purchases made of private houses, there is currently no differentiation made within the ONS data of how houses are built in England to allow for independent analysis of consumer preferences.

CONCLUSION

Observations are made regarding the research limitations together with an indication of the policy areas that may currently, and potentially will have in the future, the greatest effect on the use of MMC in house building in England, followed by a recommendation for further research. Firstly, the lack of specific literature on policy in relation to MMC use is perhaps surprising and suggests that there is a significant research gap, particularly in relation to the white literature, which tended to be evenly published over the past 25 years, and as such not always referencing more recent data or developments, whilst the grey literature, often authored by think tanks or trade bodies, can have an inbuilt bias. Secondly, the references to policy areas within the literature tend to be implied, not always reflective of policy practice or able to quantify the scale of influence, so requiring clarity around taxonomy and purpose. Lastly, the reference to poor data around house building, MMC use, and consumer

perception is of concern both from a commercial but also government perspective, leading to potentially poor decision and policy making.

To a degree the policy purpose four clusters identified (pipeline predictability, commercial market, regulations and guidelines, and robustness) have the potential to operate in synergy to influence the use of MMC, given that they seek to create a predictable pipeline for houses, constructed within a receptive commercial market, to appropriate regulations and guidelines, and embedding the robustness of the house building approach over time. The literature suggests that policies that create predictability in house building, will have the greatest effect on MMC, in particular its capacity to supplement the current market limited by the supply of skilled labour, whilst those directed at robustness, are seen as the least likely to influence its use, albeit the regularly cited assumption that a drive towards higher quality standards will naturally benefit MMC systems isn't convincingly evidenced. The discussion about supply chain stability may potentially lead to more active government interventions and incentivisation, along with greater standardisation, a drive towards net zero, and the use of whole life costing for determining value - all of which may well have a greater influence in the future, especially if housing targets remain a key policy objective of this government. The research has identified 25 policy areas, within four principal policy purpose clusters that have, and may have in the future, an effect on the use of MMC in English house building. However, the research limitations identified above, suggest that further research of the sector's relevant stakeholders would gain a greater insight into the perception around, and experience of, specific policy and its effect in practice on the sector, helping to determine which of the 25 policy areas, or four clusters, are the most influential, and why.

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