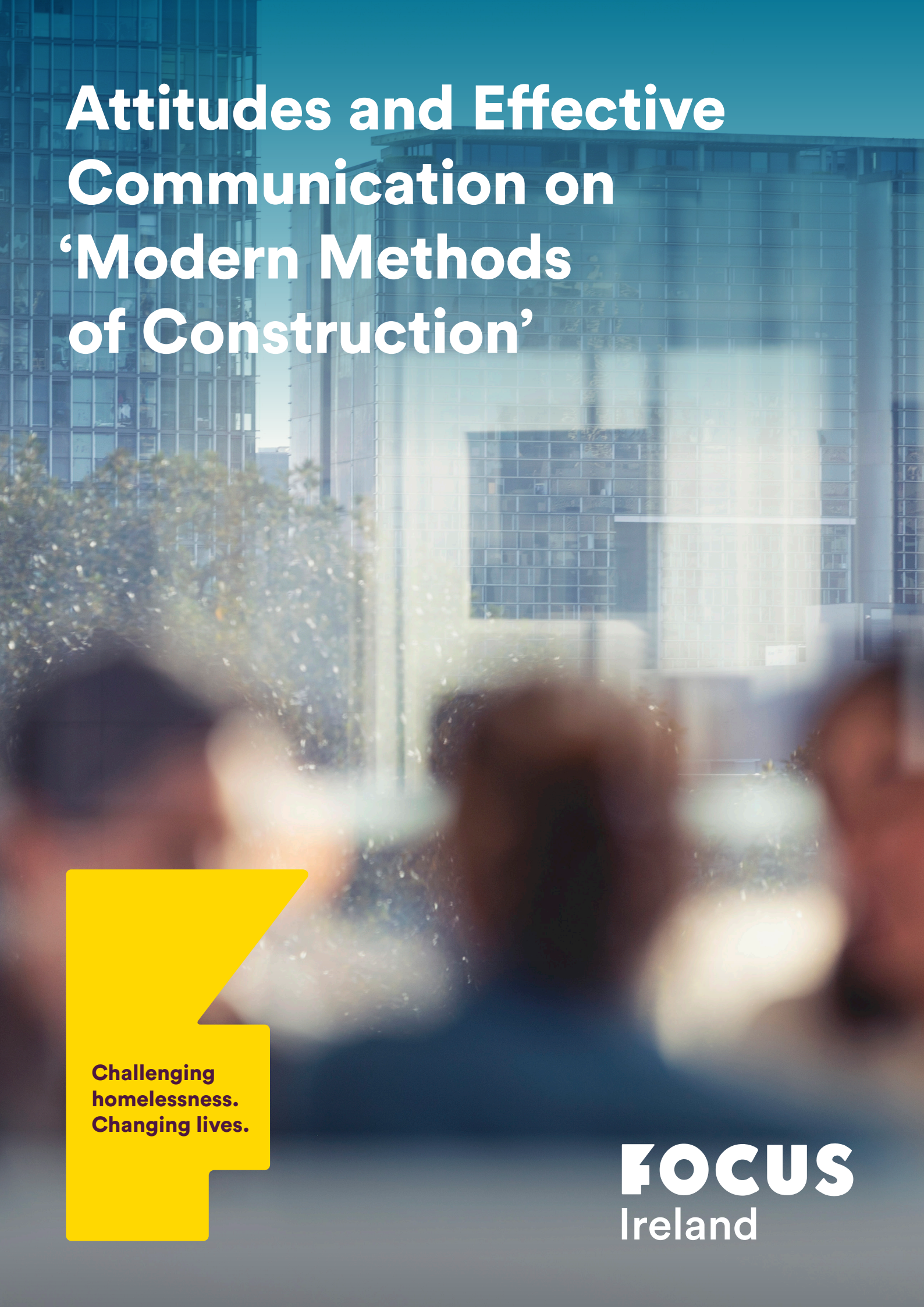
Attitudes and Effective Communication on 'Modern Methods of Construction'



Challenging homelessness. Changing lives.

FOCUS Ireland

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An Ghníomhaireacht Tithíochta
The Housing Agency

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Executive summary

Modern methods of construction (MMC) are an increasingly important approach to homebuilding in Ireland and are widely viewed as a key part of addressing the country's housing and homelessness challenges. The Government's housing plan, *Delivering Homes, Building Communities* (2025), highlights the need to expand skills and accelerate MMC adoption to meet ambitious targets for social and affordable housing. However, a major barrier to wider implementation remains the potential for local public resistance.

This research employed six focus groups involving people of different ages and housing situations, along with a nationally representative survey of 1,000 adults, to examine awareness and perceptions of MMC and, importantly, to identify effective ways of communicating MMC to the public to build support – which is the main objective of the research.

Findings

Focus group participants were generally positive about MMC and viewed it as playing a significant factor in delivery of housing. However, for some participants MMC was synonymous with 'modular' and conjured negative images of portables cabins or school prefabs. Significantly, participants emphasised the need for concerns about MMC housing quality, longevity, and design to be addressed transparently, noting that a broad stakeholder group promoting MMC could help achieve this. Notably, legacy issues with housing and planning in Ireland generally associated with the 'Celtic Tiger' period were frequently raised by participants during discussions.

The results of the survey revealed that 37% of adults were aware of the term "modern methods of construction". Among those familiar with MMC, perceptions were generally positive or neutral, commonly associating it with energy-efficient, eco-friendly homes and innovative, off-site construction techniques. 11% had lived in an MMC home, and overall 52% of all respondents said they would be happy to purchase one, while only 17% were opposed and 31% were unsure. Most believed MMC homes match or exceed traditional homes in energy performance and sustainability, though views were more mixed on affordability, aesthetics, and durability. Nearly seven in ten adults felt MMC could contribute to solving the housing crisis.

Conclusion

Public consultation for this research showed strong awareness and generally positive attitudes toward MMC. Participants associated MMC with energy efficiency, innovation, and faster delivery, though concerns persisted around quality, durability, cost, and the risk of uniform, unattractive estates, alongside broader issues unrelated to construction methods such as planning, infrastructure, and affordability. Focus group suggestions for improving public understanding included forming a broad stakeholder coalition, showcasing successful MMC projects, and actively countering misconceptions about temporary or low-quality housing.

Recommendations

- Public perceptions of MMC have been widely identified as one of the potential barriers to the widespread adoption by the construction section. While this research evidences broadly positive public attitudes to MMC in Ireland, this should not lead to complacency but form the basis for a communications strategy which will inform and sustain that general positive perception and deal with several areas of significant public concern and distrust.
- The Department of Housing, Local Government and Heritage (DHLGH) should build on the work of the Industry Capability Working Group to convene a broad coalition of stakeholders tasked with building public support and confidence for MMC. The coalition should include builders and those delivering houses; State agencies such as SEAI (Sustainable Energy Authority of Ireland) and County Councils who are also supporting MMC; financial institutions who are prepared to lend to MMC homes; and people who live in MMC homes.
- MMC communication strategies should:
  - Include a broad range of positive case studies of MMC housing developments in the community, across the whole housing sector, featuring testimonials from stakeholders including people living in MMC housing. Showcasing developments that marry characterful design with modern energy efficiency are particularly useful.
  - Avoid descriptors such as 'prefab' and 'rapid-build' when talking about MMC as they have negative connotations.
  - Accentuate the innovative and modern nature of MMC, the energy efficiencies, and the positive impact on the environment.
  - Provide detailed information on quality assurance, longevity, and architectural design to counteract perceptions that MMC is lower quality, temporary housing.
  - Provide information on the applicability of MMC across every section of the community to counteract perceptions that MMC is used solely for lower income groups or those in need of emergency housing.
  - Provide assurances that MMC developments will adhere to regular housing planning legislation and standards.
  - Provide information on the benefits for Ireland's workforce in supporting innovative technological manufacturing methods in construction through training and upskilling.
  - Acknowledge that MMC has a significant role to play in alleviating Ireland's housing crisis.

Introduction

Modern methods of construction (MMC) is a significant and growing approach to building homes in Ireland and has long been seen as an important contributor to solving Ireland's housing and homelessness problem. A key pillar of the Government's current housing and homelessness plan, *Delivering Homes, Building Communities* (2025) identified that increasing skills and supporting the adoption of MMC in residential construction will be necessary to meet ambitious housing targets including the delivery of social and affordable homes.

A considerable challenge to the further adoption and implementation of MMC in Ireland is potential for local public resistance. Rightly or wrongly, MMC is associated, often through the language used ('modular', 'rapid-build', 'prefabricated), with short-term, low quality accommodation which is aesthetically unattractive and not a positive contribution to the urban environment. The key purpose of this research is to explore perceptions and attitudes of the Irish public towards MMC, using both qualitative and quantitative methods. This was done through several focus groups and a nationally representative survey of 1,000 Irish adults. This research will also explore how stakeholders in the housing sector can best communicate to the Irish public to gain support for MMC projects.

The report begins with a review of the relevant literature including the benefits of and barriers to implementing MMC. A brief methodology section follows that outlines how public consultations were conducted. The findings of the public consultation phases of focus groups and survey questions are detailed in the following section. The report concludes with a discussion and a set of recommendations for housing sector stakeholders to effectively communicate MMC. A selection of useful large and small scale MMC case studies feature in the appendix section.

Literature review

This section reviews the relevant literature to firstly introduce Modern Methods of Construction (MMC), with particular attention to its development in Ireland over the past five years. It also outlines the benefits of MMC as well as the barriers to its implementation. Given that MMC remains relatively underdeveloped in Ireland, the available literature is limited. Consequently, a significant proportion of the sources consulted originate from the UK.

An introduction to MMC

A review of academic and grey literature revealed multiple definitions for what is colloquially known as MMC. No standard definition exists in academia or industry (Payne and Serin, 2023) and in many ways, it is intentionally broad so it can be utilised as an umbrella term that refers to non-traditional methods of construction (Peters et al, 2023). Ultimately the term embraces a variety of offsite manufacturing and onsite practices that facilitates alternatives to traditional house building (Momoh et al, 2021).

As part of its effort to promote MMC the UK government published a definition framework that regularised the terminology and has since been adopted by other governments including in Ireland[1] (Government Commercial Function, 2022) The framework contains seven MMC categories:

1 DHLGH (2023) Modern Methods of Construction Introductory Guide, Department of Housing, Local Government and Heritage. Available at: https://assets.gov.ie/static/documents/modern-methods-of-construction-introductory-guide.pdf

MMC definition framework

- Category 1: Pre-manufacturing – 3D primary structural systems
- Category 2: Pre-manufacturing – 2D primary structural systems
- Category 3: Pre-manufacturing – non-systemised structural components
- Category 4: Pre-manufacturing – additive manufacturing
- Category 5: Pre-manufacturing – non-structural assemblies and sub-assemblies
- Category 6: Traditional building product led site labour reduction/ productivity improvements
- Category 7: Site process led labour reduction/productivity improvements

The past few decades have seen an increasing policy and business interest in MMC (Payne and Serin, 2023). Much of this is driven by governments scrambling to find alternative solutions to address housing crises occurring in many Western societies that have adopted market-led approaches to housing provision, and, in turn, have failed to meet the housing needs of large segments of the population (Hooper, 2019). As an example, the UK government expressed support for MMC and forecasted it to have a significant contribution in mitigating symptoms of the housing crisis by contributing to a step-change in housing output (MHCLG, 2017).

The potential of MMC has been praised by various stakeholders as it represents a faster, higher quality and more efficient form of housing construction that provides a more sustainable built environment and better working conditions (Zhang et al, 2018; Sweeney, 2024). Moreover, input from industry stakeholders suggest that MMC is the best way to deliver net zero[2] solutions, while being particularly well suited to affordable housing developments (Peters et al, 2023).

Although small scale, UK developments demonstrates how MMC can contribute to moving people out of homelessness by increasing the supply of temporary accommodation (TA), which is typically used to house people who are homeless while councils secure long-term housing solutions. A case study from Cambridge, England (Ehwi et al., 2023) found that the physical features of the homes, coupled with wrap-around support services, yielded positive short- and mid-term outcomes for occupants, including improved management of their substance use and money, skills development and readiness for employment, social relations, and a burgeoning sense of community, safety, and security (also see case studies of Buckinghamshire, Barking, Bromley and Newport in Appendix I).

However, it's important not to oversimplify MMC and see it as merely a means of accelerating delivery and increasing overall housing stock (Payne and Serin, 2023). This is partly because this overlooks current industry and development systems, including regulatory, legal and financial systems, as well as bias towards traditional housing developments – which hinders MMC uptake and delivery at a mass-scale (ibid). A narrow view of MMC way of thinking overlooks numerous other benefits (which will be discussed later on) , and fuels negative stakeholder perceptions that perceive MMC as risky temporary solutions – much of which stems from the historical technical problems associated to prefabricated housing developments (Lovell and Smith 2010; Payne and Serin 2023; Pawley 1997).

2 A target of completely negating the amount of greenhouse gases produced by human activity, to be achieved by reducing emissions and implementing methods of absorbing carbon dioxide from the atmosphere.

The uptake of MMC has been slow in the past (Pan et al, 2012). This partially emanates from MMC's narrow technical focus, which heavily centres on construction and overlooks aspects of the wider development process – which hinders uptake and presents barriers to MMC gaining wider industry legitimacy (Payne and Serin, 2023). Payne and Serin suggest reframing MMC to Modern Methods of Development (MMD), as construction is only one aspect of the development process. For instance although MMC may shorten the design phase and on-site delivery, other aspects such as securing land, accessing finances, and obtaining planning permission may prevent an accelerated development process. Furthermore Payne and Serin (2023) assert that shifting to a broader institutional perspective would help capture the complexities of housebuilder business strategies, regulatory protocols, and predilections of the end users. At present they argue the paucity of research on MMC business models, regulatory practices, and consumer preferences in particular, hampers the significant contribution these factors have in supporting or constraining the use of MMC and, by extension, housing supply.

There are notable examples of national contexts where MMC has gained a significant housing market share. In Sweden approximately 45% of homes are built using modular methods (Koones, 2019; Marshall, 2019; Savills 2020). Owing to a harsh climate and abundance of timber, Sweden has a long history of employing MMC to alleviate housing challenges (Manley and Widen, 2019; Marshall, 2019; Smart, 2017). Much of MMC production in Sweden is for low-medium income markets due to the relatively low infrastructure investments (Manley and Widen, 2019). MMC in Japan covers 15% of the housing market (which is approximately triple the market share of America, UK and Australia at 5%). Primarily focused on high-income markets, MMC has been integrated into government housing policy as early as the 1980s and is generally accepted as superior to traditional house building (Patchell, 2002). Detailed case studies of both countries can be found in the Appendix section.

MMC in Ireland

In the Irish context, the first significant reference to MMC as housing policy was in October 2015. Then minister for the environment, Alan Kelly, announced that 500 rapid build houses would be provided for homeless families (Kelly, 2017). By April of the following year 22 modular homes for homeless families were completed and occupied in Ballymun, Dublin (O'Doherty, 2016).

2016 saw the launch of the Government's new housing and homelessness plan, Rebuilding Ireland, aiming to deliver 47,000 social homes by 2021. A 'key action area' of the plan was to expand and accelerate the programme of rapid-build housing to deliver 1,500 social housing units, with 200 built by the end of 2016, 800 by the end of 2017, and another 500 by the end of 2018. (Government of Ireland, 2016). By August of 2017 no 'rapid build' housing outside of the aforementioned houses in Ballymun had been completed (Kelly, 2017).

The next Government housing and homelessness strategy document, *Housing for All*, published in 2021 and envisioned as a ten year plan, stated support for residential construction innovation through the development of MMC including the establishment of a demonstration park for MMC, publication of exemplar case studies, and the development of key performance indicators for MMC and cost of construction, which will be reported on quarterly (DHLGH, 2021).

While some of these objectives were not met, there were several achievements over the period of *Housing for All*, including the establishment of the accelerated delivery programme to deliver over 1,500 social homes using MMC, the publication of a roadmap for increased adoption of MMC in Public Housing Delivery, a MMC action plan to accelerate MMC skills development, and an introductory guide to MMC (DHLGH, 2025). Further, under this plan, the Government claimed that a programme of work led by the Industry Capability Working Group delivered '*a visible increase in the use of MMC in new dwellings and an increase in apprenticeships by 66% from 2020 to 2025*' (ibid).

A key pillar of the Government's current housing plan, *Delivering Homes, Building Communities* (2025) identified that increasing skills and supporting the adoption of MMC in residential construction was necessary to meet ambitions housing targets. The plan set out the benefits of MMC, the need to reduce costs through standardisation and the use of Strategic Investment Funds, and ways to meet the growing demand for construction and MMC skills. The plan also included a new target for the use of MMC in at least 25% of all new build social and affordable housing (DHLGH, 2025).

Official data on MMC use in Ireland is sparse. However, there are indications that it is significant and growing. In 2022, approximately 100 off-site manufacturing companies in Ireland were manufacturing and supplying clients in Ireland and Europe, although most of the output is focused on non-residential construction (CPS, 2022). Another positive sign is the increase in enquires for MMC certification in housing from offsite manufacturers, doubling in number from 2022 to 2024 (NESC, 2024).

Benefits of MMC

As referenced in previous sections there is a plethora of benefits associated with MMC. As such this section seeks to succinctly capture these benefits and articulate them in more detail.

Superior quality

The superior quality associated to MMC emanates from more of the construction process taking place in a controlled factory environment, as opposed to external uncontrolled environments that have significantly more variables to manage. A controlled factory environment improves standards through higher precision engineering and improved quality control (Hooper, 2019; Momoh et al., 2021; Zhang et al., 2018). Research has also shown, in various contexts (including India, Australia and the UK) that higher quality standards was one of the major benefits of MMC and one of the key drivers to its adoption (Fussel et al, 2007; Arif et al, 2012).

Accelerated construction process

Accelerated construction processes are of particular interest considering that traditional house building methods are characterised by low productivity and outputs lagging behind targets (Momoh et al., 2021). Construction delays in traditional construction methods are predominantly affected by the following: materials availability/shortage; skills shortages; mismanagement; bad weather; local planning approvals; and mobilisation of funds (ibid). When considering various categories of MMC most onsite problems can be addressed because individual components are produced in a factory and transported onsite for installation – which can significantly reduce onsite construction time and therefore risk of onsite delays (Hooper, 2019; Momoh et al., 2021). MMC can also produce less waste, which can further reduce construction time by between 4-6 weeks (IBEC, 2021).

Reduced costs

Various sources suggest that MMC can reduce the overall cost of house building construction (Hooper 2019; Momoh et al. 2021; NHBC 2016; Zhang et al 2018) which are mainly related to more efficient delivery. For example, a NHBC (2016) report which sought to garner industry perceptions of MMC suggested there is "*some evidence of MMC leading to a reduction in costs and improved profitability, with 44% of house builders and 27% of housing associations pointing to benefits such as reduced preliminary costs improved cash flow and faster sales revenues*" (pp. 22). Additionally, employing MMC techniques reduces the overall labour requirement onsite for projects due to increased use of mechanical/automated method producing elements of the house within factories (Blismas and Wakefield, 2009).

Employment and skills agenda

Previously industrialised areas and regions (particularly steel, car manufacturing or other fabrication industries) have transferable skills and transitioning to MMC could generate employment opportunities in manufacturing areas where industries are contracting (Hooper, 2019). Governments could support MMC by encouraging and incentivising construction of MMC factories in areas of high unemployment as part of broader international scale industrial strategies. This could create economic opportunities and more green jobs, as well as helping to stabilise regional economies that are flagging, as advanced economies increasingly transition to digital economies (ibid).

Residential lifecycle

MMC has the potential to deliver whole of life housing due to its ability to adapt and be recyclable, which can serve households across many different life stages (Hooper, 2019). This is increasingly desirable in an age where developed countries such as Ireland grapple with adapting services to meet the needs of an ageing population (CSO, 2022). Ultimately, MMC has greater scope for adapting and customising than traditional housing developments and meets the requirements of different users – particularly sub-markets of low-income groups, older populations and the disabled (Hooper, 2019).

Environmental benefits

MMC can make a significant contribution to reduce carbon emissions. This is important in the Irish context as it is estimated that over one-third of Ireland's carbon emissions come from the built environment (Oireachtas, 2022). Environmental benefits of MMC are captured by waste reduction and increased energy efficiency, which links to meeting net-zero targets. MMC has the potential to significantly reduce waste produced because part of the construction process is being done in a controlled factory environment, with higher precision engineering and improved quality control which increased construction standards, as well as reducing both margins for error and onsite construction processes (Hooper 2019; Momoh et al., 2021).

There is a growing agreement that MMC is the best way to deliver net-zero solutions (Peter et al., 2023). This relates to increased efficiency in construction and improved quality of housing stock, which should reduce overall energy consumption over its lifecycle (e.g by improving insulation, heat retention and/or heat circulation). Blundell (2020) has noted the critical role of MMC in capturing net environmental benefits within the housing sector because environmental gains for newbuilds can be captured with more ease and affordability when utilising modern methods, as opposed to more traditional methods. This is especially pertinent given the lack of progress with retrofitting existing stock and recent research estimating an average cost of £35,000 for retrofitting existing stock so it has an EPC rating of C or above, which has been argued is unfair for affected households (Highfield, 2024).

Barriers to uptake of MMC

As discussed, the benefits to MMC are numerous, however there are significant barriers to implementation. These will be explored in detail in the following section.

Slow pace of adoption

In the UK at least, MMC has not become an industry norm, remaining the preserve of innovative adopters and specialist SMEs (Payne and Serin, 2023). This has led academics to argue that there is an industry reliance on traditional methods and for MMC to become the norm, it is vital that barriers hindering uptake (such as negative image, stakeholder perception, perceived high risk and cost, and reluctance for technological adoption) would need to be mitigated (Kolo et al., 2014). Additionally, from an industry standpoint there is a reluctance to change. Stakeholders across the supply chain are cautious about what they perceive as new and untested products, and they view MMC as high risk (Peters et al., 2023, Sweeney, 2024).

In housing, government regulations are the main driving force for change rather than consumer demands, as consumers are indifferent to the process innovations that are the main force behind homes delivered by MMC (Peters et al., 2023). In a recent and comprehensive review of MMC, Payne and Serin (2023) noted that state leadership is crucial in promoting and incentivising MMC as a mainstream form of housing provision. Hooper (2019) notes how this can be done directly, through investment and indirectly, through reforms in planning, regulation, legislation and education, as well as through construction and design quality guidance.

Scale of investment

There are caveats concerning predictions of cost reductions and efficiency benefits for MMC, in that these are largely dependent on scale. Offsite MMC manufacturing sites/ factories require a large investment upfront, with returns being generated in the long term (Hooper, 2019; Sweeney, 2024). Upfront investment includes fixed assets such as plant facilities and machinery but also labour, certification and design standardisation (DHLGH, 2025).

At present, MMC represents a small scale and relatively niche market, and is struggling to transition to larger scale developments that would provide greater economies of scale. This is in part because MMC is in an evolutionary phase and is currently perceived as risky and more costly than traditional methods, despite research showing that MMC have strong potential to achieve cost savings and reduced risk over the entire life cycle (Hooper, 2019). As such, it is clear there is a growing need for investors and lenders to engage with the sector to recognise and calculate the long-term value of products, which is critical for improving legitimacy and increasing scale (ibid). It has also been argued that a long term stable market will be required for MMC to reach scale, which the state could help establish by committing to affordable and social housing contracts (Momoh et al., 2021).

Stigma and negative perception

The image of poor quality prefabricated housing persists in the public's understanding of MMC (RIAI, 2022). This can be partly explained, at least in the UK context, to historic association with prefabricated housing development programmes of the post war period (Payne and Serin, 2023). A recent survey pertaining to barriers in adopting and implementing MMC found that there was a negative perception of offsite construction in regard to monotonous design and limited durability (Reddy, 2020). In a similar survey by Wang and McCrum (2024), language used to communicate MMC was an important finding. Members of the general public reported a positive perception towards the terms 'modular house' and 'offsite house', and a more negative perception towards the terms 'prefabricated house' and 'rapid-build house'.It is therefore important to highlight the critical nature that messaging and stakeholder engagement plays when articulating the benefits and opportunities associated with MMC (NESC, 2024). A critical part of widening legitimacy and combating stigma would be reframing MMC to Modern Methods of Development, which would encourage a shift away from a narrow technical focus on construction to a broader institutional perspective capturing the complexities of housebuilder business strategy, regulatory protocols, and preferences of the end user (Payne and Serin, 2023).

Methodology

This research employed a mixed methods approach. The first phase of the research was qualitative, and utilised focus groups to engage numerous stakeholders in discussions about MMC. The first phase informed the creation of seven questions that were included in a second phase of the research, a survey circulated to a representative sample of 1000 people nationwide.

Focus groups

The focus groups were designed to take account of the perspectives of stakeholder groups of different ages with varied housing situations. The groups consisted of:

- Pre-family renters;
- Multigenerational family households;
- Empty nesters and those considering downsizing.

A mixture of face to face and online focus groups were used. Online focus groups enabled the researchers to reach into all parts of the country, while face-to-face facilitated a more detailed discussion.

Four face-to-face focus groups were held in Dublin (3) and Waterford city (1), while two online focus groups were held.

	Target group	Age group	Tenure	Geography	Location	Attendees
1	Pre-family renters	20s to mid 30s	Renting	Dublin	In-person	8
2				Provincial towns	Online	8
3	Multi-generational family household	Mid-30s to 50s	Homeowner, suburban housing estate	Dublin	In-person	8
4			Homeowner/ renting, suburban housing estate	Waterford	In-person	7
5				Provincial towns	Online	8
6	Empty nesters/retired, planning for the future/considering downsizing	50s–70s	Homeowner/ renting, suburban housing estate	Dublin	In-person	8

Table 1: Focus groups composition

Focus group discussions were split into two main sections.

The first examined **participants' attitudes towards MMC** including:

- General sentiment of MMC
- Spontaneous impressions to the phrase 'Modern Methods of Construction', and reactions to visual prompts
- Perceptions of MMC
- Reaction to concept of MMC as a solution to housing crisis

The second section **explored use of language when communicating about MMC**.

Survey

Seven survey questions were designed in collaboration with Amárach and were included in the Amárach Omnibus Survey[3] for September 2025, reaching a nationally representative sample of 1,000 adults (18+ ROI). The survey had a 3.1% margin of error at the 95% confidence interval. The margin of error indicates the number of percentage points by which the survey results may differ from the overall population.[4]

49% of the survey participants were male, 51% were female. In terms of social class, 51% were higher social grades, 49% were lower social grades. 29% were based in Dublin, 27% in the rest of Leinster, while 27% were based in Munster and 17% in Connaught/ Ulster. The table below provides details of the age categories of participants.

Age Category	Percentage
18–34	11%
25–34	16%
35–44	20%
45–54	18%
55–64	15%
65+	20%

Table 2: Age categories of survey respondents

3 Nationally representative survey conducted with 1,000 Irish adults, balanced by age, gender, region and socioeconomic group.

4 Margin of error changes according to the size of sample, the size of the population and to the observed percentage in question.

Findings

The following section describes the findings from two stages of public consultation. The first consisted of six focus groups with various target groups across the country. The second involved seven questions that featured in the Amárach Research Omnibus survey.

Focus groups

General sentiment about house quality construction (old versus new methods)

To begin, focus group participants were asked for their general opinions about old versus new houses and the quality of construction.

The attitude of participants regarding preferences for type of home is deeply personal. Attitudes were influenced by a variety of factors, including energy efficiency, maintenance, character and lifestyle needs.

Some participants prioritised convenience, efficiency and minimal maintenance, all of which were priorities in line with modern homes. Others prioritised the character, uniqueness and perceived sturdiness of older properties.

Typically, participants acknowledged the benefits of modern homes as being energy efficient and contemporary in design. With energy costs high on the personal agenda, the impact of energy, superior insulation, and updated heating systems combined with lower costs and maintenance requirements found in modern homes were seen as an advantage.

> **Well, it's brand new. You have it the way you want it. Energy efficiency, all the insulation, windows, all that. I mean they're so techy (Group 4 participant).**

For design, the open-plan and modern aesthetic were seen as significant benefits, along with new features such as larger windows and integrated technology.

I like the look of some of the newer houses. I mean, the older ones have a lot of character and stuff, but I actually like the architecture of some of the new houses, I think some of them look kind of cool and stuff. (Group 2 participant)

Some participants expressed reservations about the perceived sturdiness of modern homes. A prevalent theme was whether modern homes would endure as well as traditional brick-and-mortar homes, with concerns about potential defects and maintenance over time.

Biggest problem going forward, how good the quality of the house is, how in 20 years time, how will it stand up against all the different types of weather and all that kind of stuff. (Group 5 participant)

Nostalgia for older houses appeared to be very important for participants. Many participants prized older homes for their charm, larger rooms and gardens, as well as their unique features (e.g fireplaces).

I love the size of the older houses. They don't build them like sitting rooms and bedrooms. They don't build in the same size anymore. (Group 4 participant)

The warmth and individuality found in traditional structures can contrast sharply with the uniform look that some people associate with modern or modular builds.

Yeah, I like the character of older houses, the history, just the uniqueness of them. Yeah. I think a lot of the brand-new houses nowadays are copy and paste jobs but there's a lot of character in the older houses in different parts of the country and stuff. (Group 3 participant)

While it was acknowledged that older homes may require costly renovations and updates to reach contemporary energy standards, they are perceived as more 'solid' or durable.

...so, she would say, you know those older houses would last 10 times longer than her apartment. (Group 3 participant)

The responses reveal a clear dichotomy in preferences which could inform perspectives on future housing developments. The divide underscores the importance of tailoring communication to resonate with diverse preferences and to positively emphasise the benefits of contemporary housing design.

First impressions of the phrase modern methods of construction

Participants across the six focus groups had mixed perceptions to the phrase 'modern methods of construction'. Reactions ranged from excitement about potential breakthroughs – such as faster, more sustainable builds – to scepticism about quality, cost and aesthetics. In several cases, participants wondered if 'modern' might mean cutting corners or producing bland, uniform housing. Overall, there was a blend of intrigue and scepticism.

Key perceptions and associations:

- Common associations included prefabrication, energy efficiency, and modern features, while concerns were raised about the aesthetics of modern housing.
- For many participants MMC was synonymous with 'modular' and conjured images of portables cabins or school prefabs

> **"my image of a modular home is a bit different. It's almost like a porta cabin or like one of those mobile homes that's like massive. Which I'm pretty certain that's what they are" (Group 1 participant)**

- Others have encountered MMC references in the media, mostly tied to 'faster builds' or accommodation for students/refugees. But in overall terms, this is not an automatically negative perception.

When first confronted with the phrase 'Modern Methods of Construction', and asked to write down their first impressions, many participants had limited prior knowledge of the specific concept. In the absence of clarity, some participants fell back on familiar references and imagery, using terms like 'modular' and 'prefab' almost interchangeably with 'modern methods'.

> **I put in prefabrication. A lot of it is now ... it comes in like already ready. You know what I mean? (Group 4 participant)**

The idea of pre-build components, whether as entire modules of individual parts, was a common association. This often included concepts like timber framing and off-site manufacturing.

> **Modular homes. I don't know too much about that, but I've heard they're like... there can be factories that prebuild them and then just like land them on the site. That's all my knowledge. (Group 1 participant)**

A recurring theme across all groups was participants often linking MMC to faster construction times. Many participants agreed that the streamlined, possibly factory-based processes which shorten building times could address housing shortages or high construction costs if done correctly.

I said mass construction ... faster development as well (Group 1 participant)

Speed of build, quality of materials and their performance and target friendly (Group 3 participant)

I see like airtight efficiency (Group 6 participant)

For many participants, the phrase hinted at modern, eco-friendly features with advanced technology and a departure from traditional building. They were intrigued by the word 'modern', associating it with innovation.

Insulation, mod cons, optimal use of space. Energy efficiency and safer to some extent (Group 1 participant)

The associations linked MMC to improved insulation, better energy ratings, and environmentally friendly features. Participants also mentioned advanced technologies like air-to-water systems, underfloor heating, and solar panels.

Well, you'd expect like triple glaze with those. You expect modern ventilation systems, as I said already underfloor heating, you know, very efficient builds, be it, you know solar panels to back it up (Group 5 participant)

Participants had varying perceptions of the aesthetic appeal of MMC homes. Some envisioned modern designs with large windows and open-plan living, while others expressed concerns about uniformity and a lack of character.

Several groups expressed concerns that MMC builds are generic in design, leading to 'cookie-cutter' homes lacking individuality and contributing to a monotonous built environment.

"in my view, I think they're all the same. They're generic designs like you look at 3D houses now. They've got shapes and round corners. That to me is a good design. But what we're getting nowadays is very standard." (Group 3 participant)

Quality concerns were only mentioned for this section of the groups (regarding just the phrase) by a minority of participants. The first was from Group 5 who gave some anecdotal feedback which came to mind when hearing the phrase.

"I'm just thinking in terms of affordable homes that are being built. I met a plasterer one night and he was saying that he's throwing them up. They're going to be very quickly a kind of copy and paste job with the walls paper thin. You'll hear everything. So, I think it's the people who are priced out of normal housing who won't really have a choice in the spec of these kind of affordable homes being built"

The second participant, from Group 6, mentioned quality as a possible concern when hearing the phrase.

"I wrote down quality, possibly high, possibly low. So it's unproven and the builder would have to have a good reputation"

Reaction to visual prompts

Participants' were provided with visual prompts of MMC housing to highlight certain features as indicative of MMC, though there were variations in how different groups interpreted these features. The consistent general visual cues used to identify an MMC were buildings that looked very similar to one another, appeared mass-produced or 'uniform' and were often described as lacking 'character' were commonly labelled as MMC.

Visual Prompt #1

"because it looks like it's been built for purpose. Like everything's just a bit crammed ... like, you know, I see a few trees in the back, but like there's no character" (Group 1)

Large, homogenous housing developments (with identical facades, roofs, or materials) were thought to signal offsite or modular construction techniques.

"it looks like one of those new type of estates that are being built, you know, where everything is combined and it's kind of integrated as such" (Group 6)

The issue that participants focused on as a negative was not always the construction method, but the construction volume. They appear relatively accepting of the construction method.

Visual Prompt #2

Repeatedly, the presence of solar panels often prompted participants to view a build as more modern or recently constructed.

> **"it's like the solar panels on top" (Group 1 participant)**

A lack of chimneys was sometimes interpreted as a sign of newer design and possibly a MMC build.

Despite these comments, participants also recognised that solar panels or missing chimneys alone do not guarantee modern construction methods.

> **"that looks like as modern as well. Just because, I don't know, the windows and it's quite similar to those ones…" (Group 2 participant)**

A sleek, 'boxy', or contemporary design – often with large windows, minimal ornamentation, and new landscaping led participants to think of MMC. Projects that looked more 'traditional' had varied roof lines, visible chimneys, or older brickwork details were seen by participants as conventional.

Visual Prompt #3

Visible signs of steel of modular frames were a strong indicator of MMC for some participants. Timber frames in a photo could be interpreted in two ways: either as standard 'traditional' builds (timber-frame houses being common) or as a sign of factory-made panels. Opinions were split.

Walls or sections that looked 'dropped in' or 'precast' were associated with offsite modern manufacturing. Some participants noted that certain facades appeared 'assembled' rather than built brick-by-brick on-site.

Exploring perceptions of MMC

The conversation in the focus groups then moved to perceptions of MMC. Most participants emphasised MMC's potential to rapidly deliver homes – a key benefit in light of Ireland's housing shortage. They referenced situations in which entire houses appear 'almost overnight', finding it both impressive and necessary given the urgency of demand. However, while speed appealed to many, participants stressed that durability and high-quality standards must be maintained. Several recall 'cowboy builders'(rogue traders) or rushed developments during the Celtic Tiger era, underscoring concerns that faster builds can sometimes compromise workmanship.

Participants appreciated that building certain elements (e.g roofs, windows) offsite in controlled factory environments can promote consistent quality. Many felt this approach might avoid the subpar construction seen when developers rushed to meet high demand in the past.

Modern MMC are perceived to incorporate modern insulation, triple glazing, heat pumps, and other green technologies. Some participants noted that these enhancements could improve temperature regulation and reduce energy costs, ultimately benefitting both homeowners and the environment.

While not everyone agreed, some participants expected off-site methods to reduce costs – especially if local factories manufacture components in Ireland. A more streamlined, assembly style process could decrease onsite labour expenses, though it remains unclear whether such savings would be passed on to buyers.

Groups acknowledged that transitioning to MMC might reduce the need for traditional onsite labour while creating new factory jobs. While a minority had concerns that there could be a reduction in the demand for traditional building skills and trades, the majority recognised the overwhelming desire to inject greater capacity into the sector to increase output. Some saw this shift as an opportunity for updated training programmes, positioning Ireland's workforce to support advanced manufacturing methods in construction.

Many participants questioned whether MMC homes had long-term durability and could withstand decades of wear and shifting weather patterns. Personal anecdotes referenced problems (e.g window leaks, poor insulation) in newer properties. While some trusted that strict planning and modern regulations could uphold standards, overall scepticism persists. However, some noted that if proper oversite is in place, 'faster' does not necessarily mean 'poorer'.

Many describe MMC projects as 'out-of-the-box', 'prefab-like', or lacking character, especially compared to older homes with distinct features. Larger estates built by developers can look nearly identical, which some find too generic. A few participants

appreciated the sleek look, but the prevailing view was that personalisation and 'feel' are missing in mass-produced units.

Participants recalled poor-quality prefab classrooms or portacabins, leading them to associate MMC with impermanence or lower standards. While many acknowledged that technology has advanced significantly, the old 'prefab' image persists in public opinion.

Some concerns arose in the focus groups related to tangential issues – that don't relate to MMC. Even with offsite components, onsite finishing (plastering, electrics etc) remains essential. Participants expressed worry about a broader decline in people entering manual trades, which can slow all types of construction – MMC or otherwise.

Rapidly built estates do not automatically address issues such as parking, road access, schools, or green spaces. There was an underlying fear in the focus groups that large developments can strain local infrastructure if not carefully managed. Some participants recounted difficulties travelling locally, of problems getting school places and GP appointments.

In terms of potential build-cost savings from MMC, participants doubted that developers would pass on cost reductions to buyers, keeping overall home prices elevated. These issues are about the perceptions of the property and construction markets, rather than the method of construction.

Addressing the housing crisis: hopes and concerns

Every participant in the focus groups acknowledged Ireland's housing shortage and could see some role for MMC in speeded up supply. Participants recognised that high-density MMC apartment blocks and estates may meet the demand for more housing in urban areas.

A minority of participants saw it as more acceptable to use MMC for short-term or specialised housing (e.g student or refugee accommodation) rather than 'forever homes'. This association risks the perception of MMC as 'temporary' or less robust than traditional methods. However, some participants pointed to successful European examples where modular construction has been employed to create permanent, family-oriented homes, challenging the notion that MMC must be limited to quick fixes.

Many participants highlighted that new builds – regardless of if they use MMC – are often priced beyond the reach of average buyers. Affordability remains a systemic issue, tied to land costs, market demand and developer margins, rather than solely construction methods. MMC was cited by many participants as a viable entry point for those seeking their first home due to faster build times.

Potential drawbacks for families were highlighted in the focus groups – including smaller gardens, a lack of community feel, or concerns about maintenance. Regardless of how homes are built, participants emphasised the need for proper planning – including parking, roads, schools, green spaces, and other community services – to accompany new developments.

It was argued by some participants that if quality and affordability can be achieved, it can serve any demographic. While there is no universal agreement on a single target market, most participants saw MMC as one piece of the broader puzzle in alleviating Ireland's housing crisis.

Of interest, many of the issues that arose in the focus groups in relation to housing and construction were not linked to construction methods. For example:

- The absence of community infrastructure such as schools would happen regardless of whether traditional methods of construction of MMC were used.
- The scale of developments. Developments have been getting larger since the 1960s, with a pause during the decade after the Great Financial Crash. There needs to be a broader societal recognition that the population has increased by almost 1 million people, and that they are going to need somewhere to live.
- Demonstrate how the quality of contemporary MMC is different to building in the Celtic Tiger era or even further back with the omnipresence of prefabs in Irish education.
- Employment consequences of the change. The required increases in housebuilding capacity is not feasible with the current construction workforce.

Use of language to communicate about MMC

The positioning of MMC is starting from a broadly positive position. Participants acknowledged the benefits of properly done rapid construction, increased productivity and consistent quality, and the energy, economic and living benefits of modern homes. There was some references to prefabs in the past but that is not the default position.

Participants stated that one way to effectively communicate about MMC is to make it clear that MMC is already in place and happening and that positive stories from those who live in MMC built homes will also assuage fears. Participants also suggested that stakeholders should showcase that the types of MMC homes built currently are better than those built in the past during the Celtic Tiger era. That includes providing clear information on quality assurance, longevity, and architectural design. Further, participants suggested that addressing misunderstandings about 'factory-built' homes – by rigorous testing, advanced materials, and standardised certifications – can mitigate preconceived notions of poor quality. By demonstrating that MMC can replicate or even exceed the durability of traditionally built homes, MMC advocates can address concerns about quality. For participants, showcasing projects that blend characterful design with modern energy efficiency can bridge the gap for those who typically prefer older properties.

Participants expressed the need for a strong coalition who believe that MMC is as good as, if not better, than traditional methods. They believed that this would help to dispel myths and mysteries about MMC

The coalition should include:

- Builders and those delivering houses;
- State agencies such as SEAI and County Councils who are also supporting MMC;
- Financial institutions who are prepared to lend to MMC homes;
- Those who live in MMC homes.

In regard to social housing and organisations working to house lower income groups and people who are homeless, participants felt that it is key to not let MMC be positioned solely as a solution to social housing issues. It is a universal solution that has applicability across every section of the community including social housing provision. The use of MMC is already happening in the social housing provision through the AHBs and through the County Councils. The sale of large developments to the AHB sector is already happening (and is underpinning residential housing activity at scale). MMC should be seen as a *solution*, not a *temporary solution*, to the housing crisis in all its forms.

Summary of focus group discussion

The focus groups provided useful insight into perception of MMC and ways to effectively communicate about it. Participants were predisposed to be positive to MMC - it is not seen as a second-class construction solution and is not typecast as such. Participants saw the fundamental requirement for more housing output, and that MMC could play a significant factor in delivery of housing. Of significance, legacy issues with housing and planning in Ireland – often associated with periods of "boom and bust," such as poor-quality construction, insufficient infrastructure, and labour skills shortages – were raised by participants during discussions. Crucially, participants stressed the need for concerns regarding the quality assurance, longevity, and architectural design of MMC houses to be addressed in an open and transparent manner, and noted that establishing a broad stakeholder group tasked with promoting MMC is one way to achieve this.

Survey

This section gathers the findings from seven questions included in the Amarach Omnibus survey circulated to a nationally representative sample of 1,000 people.

Q1. Have you heard of the term "modern methods of construction"?

63% of the population hadn't heard the term "modern methods of construction". 37% had, with higher awareness levels noted among males and over 55s. See Appendix 2 for further details about demographics for 'Yes' response.

Q2. What do you associate with the term "modern methods of construction"?

This question sought spontaneous associations with the term 'modern methods of construction'. Multiple terms and generally positive / neutral sentiments were used in most of the descriptions provided by respondents. Table 3 below provides further details.

What do you associate with the term "MMC"?	Percentage
Warm, energy efficient, eco-friendly homes	23%
New of innovate construction techniques	22%
Prefabricated/Off-site construction	18%
Non-traditional materials used (e.g. timber, steel)	17%
Built with speed and efficiency	16%
Modular buildings	15%
General building and housing construction	7%
Good quality, modern builds	5%
Other	4%
Not sure	4%
N/A	8%

Table 3: MMC descriptions provided by survey respondents

To inform responses to the next set of questions the following definition was provided to respondents:

> Modern Methods of Construction (MMC) is a phrase used to describe a range of building techniques which aim to improve efficiency, sustainability, and quality in the construction industry. Unlike traditional methods, which often involve on-site construction with bricks and mortar, MMC focuses on off-site construction and the use of prefabricated components.

Q3. Have you ever lived in a residential property constructed using modern methods of construction?

11% of respondents had lived in a residential property constructed using modern methods of construction. 77% had not, and 12% were unsure.

Q4. If yes, did you specifically choose a home built using MMC, as opposed to choosing a traditionally built home?

52% of respondents that had lived in a residential property constructed using modern methods of construction (n=111) specifically chose a home built using MMC. 27% didn't have specifically choose MMC, while 21% didn't have any choice in the matter. Residents of Dublin and younger people were more likely to have lived in an MMC residential property. See Appendix for demographics related to questions 3 and 4.

Q5. If you were in a financial and general position to purchase a home/move house now, would you be happy to purchase a home built using modern methods of construction rather than traditional construction?

Only 17% of the population of respondents were not open to living in an MMC home; whilst just under one third were unsure (30%). Over half (52%) said they would be happy to purchase a home built using MMC, and this spans all demographic groups. Awareness and experience further strengthen likelihood. See Appendix 2 for more information about demographics of respondents that would be happy to buy MMC home.

Q6. How would you rate the following elements of modern methods of construction compared with traditional methods?

The majority of respondents perceived MMC homes are as good as, or better than, traditionally built homes in respect of energy performance and sustainability. Less so re affordability, aesthetics and quality/durability, however very few compared them negatively on any measure. See figure 1 below for more details.

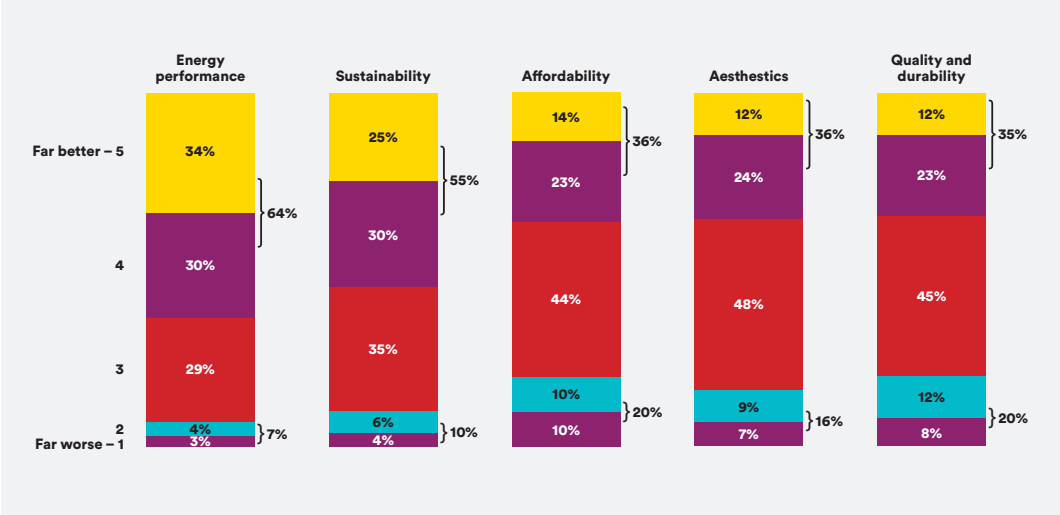

Figure 1: MMC v traditional methods ratings

Figure 2 below shows some clear patterns across the sample when demographic and experience trends are reviewed. In terms of gender, more males than females rate MMC better than traditional methods across all metrics. Over 45s rate higher on energy/ sustainability, 25-34s on affordability, aesthetics and quality. Munster residents rate higher than most others on 4 of the 5 metrics, and those aware of or have lived in MMC rate higher on all.

	Gender			Age						Class		Region				Heard of MMC		Lived in MMC building	
% Far **better** than traditional methods (code 4 or 5)	Total	Male	Female	18–24	25–34	35–44	45–54	55+	54–65	ABC1	C2DE	Dublin	Leinster (excl Dublin)	Munster	Conn/Ulster	Yes	No	Yes	No
N=	**1000**	**494**	**506**	**112**	**160**	**202**	**181**	**148**	**197**	**508**	**492**	**289**	**268**	**268**	**175**	**369**	**631**	**111**	**765**
Energy performance	64%	**68%**	60%	53%	53%	58%	**67%**	**73%**	**75%**	65%	63%	65%	65%	**67%**	56%	**79%**	55%	**83%**	65%
Sustainability	55%	**58%**	52%	50%	53%	51%	**58%**	**59%**	**58%**	**58%**	52%	**58%**	53%	**58%**	49%	**66%**	48%	**73%**	55%
Affordability	36%	**40%**	32%	25%	**43%**	33%	36%	38%	**39%**	37%	36%	**41%**	28%	**44%**	29%	**43%**	32%	**55%**	36%
Aesthetics	36%	**39%**	33%	33%	**43%**	33%	31%	38%	38%	32%	40%	42%	33%	**39%**	26%	**46%**	30%	**71%**	32%
Quality and durability	35%	**41%**	30%	34%	**44%**	33%	22%	37%	**43%**	32%	**39%**	**43%**	33%	35%	27%	**47%**	29%	**70%**	32%

Figure 2: MMC v traditional methods ratings – demographics

Q7. The use of MMC is already happening at scale in the housing sector in Ireland. To what extent do you think that homes built using modern methods of construction can be part of the long-term solution to solve the housing crisis in Ireland?

Overall, 6 in 10 respondents believed MMC will help towards the long-term solution to solve the housing crisis in Ireland. Whilst 10% said homes built using MMC will not help, a further 9% believe MMC is the answer, and some, 21%, are unsure. Figure 3 below contains further details across demographics of respondents.

	Age						Class		Region				Heard of MMC		Lived in MMC building	
	Male	Female	18–24	25–34	35–44	45–54	55+	54–65	ABC1 F50+	C2DE F50-	Dublin	Leinster (excl Dublin)	Munster	Conn/Ulster	Yes	No	Yes	No
N=	**494**	**506**	**112**	**160**	**202**	**181**	**148**	**197**	**508**	**492**	**289**	**268**	**268**	**175**	**369**	**631**	**111**	**765**
They are the answer to the issue	13%	6%	5%	10%	13%	9%	8%	9%	9%	10%	10%	9%	9%	8%	13%	7%	26%	7%
They will help towards the issue	58%	60%	50%	52%	53%	65%	70%	63%	62%	56%	61%	60%	57%	57%	66%	55%	55%	64%
They will not help to solve the issue	10%	10%	11%	16%	13%	6%	10%	7%	10%	11%	10%	10%	11%	11%	9%	11%	9%	10%
Unsure	19%	24%	35%	22%	21%	20%	11%	21%	19%	23%	20%	20%	23%	24%	11%	27%	10%	19%

Figure 3: Attitudes towards MMC as a long-term solution to solve the housing crisis

Summary of survey results

In the nationally representative survey of 1,000 adults, 37% of the population had heard the term "modern methods of construction", with higher awareness levels noted among males and over 55s. Of those who had heard the term MMC, the majority had positive or at least neutral ways of describing their understanding of MMC, frequently mentioning associations such as warm, energy efficient and eco-friendly homes, along with references to new and innovative construction techniques. Off-site pre-fabrication and non-traditional materials were also commonly mentioned.

11% said they have lived in a home constructed via MMC, with half of this group having chosen to do so. When all were asked whether they would be happy to purchase a home built using MMC, 52% of the total sample would. Only 17% of the population were not open to living in an MMC home, and the balance (31%) were unsure. Awareness and previous experience further strengthen likelihood of openness to live in an MMC home.

The majority perceive MMC homes are as good as, or better than, traditionally built homes in respect of energy performance and sustainability. Less so re affordability, aesthetics and quality/durability, however very few compare them negatively on any measure. Overall, nearly 7 in 10 adults believe MMC homes will help towards or provide the answer to the housing crisis.

Discussion

There has been increasing interest in MMC in both the policy and business spheres in recent decades as governments in many Western countries attempt to address housing output shortfalls. For various stakeholders, MMC represents a more efficient way of building housing when compared to traditional methods. It is quicker to construct, is of high quality, has a lower carbon footprint, and can lead to better working conditions. Because of this it has potential to alleviate acute housing issues for low income households and people who are homeless.

There are indications that MMC use is growing in Ireland, and it has become government policy in recent years (although delivering of MMC housing has been disappointing). In its latest housing plan, the government set a target for the use of MMC in at least 25% of all new build social and affordable homes by 2030. While the benefits of MMC are many, the high cost of upfront investment, stakeholder wariness about new technology, and historic stigma associated with forms of MMC, specifically 'prefab' and 'rapid-build' housing, has contributed to slow pace of uptake by stakeholders.

Public consultation in this research revealed that there is significant awareness of and support for MMC. 37% of survey respondents had heard the term 'modern methods of construction', while 52% reported that they would be happy to purchase or move into a MMC home, and 30% were unsure. Over half of the respondents that had lived in a MMC home (n=111) specifically chose this type of housing. Overall, 60% of survey respondents believed MMC will help towards the long-term solution to solve the housing crisis in Ireland.

Research participants across focus groups and a nationwide survey positively associated MMC with energy efficiency, innovation, speedy and efficient construction, workforce opportunities, and alleviating the housing crisis. However, there were concerns about the quality and durability of homes (equating faster construction or 'rapid build housing' with lower standards), high costs , and the building of large, uniform housing estates that lack character and appeal. This research also found that the negative image of 'prefab' housing still persists in regard to MMC.

It is important to note that several concerns raised by research participants, specifically in the focus groups, were not linked to construction methods, but rather broader housing issues in Ireland, such as planning, the need for community amenities, strains on local infrastructure, affordability, and the reality of labour shortages.

In regard to effectively communicating MMC to the public, there were several useful suggestions from focus group participants. Suggestions included: the formation of a broad coalition of stakeholders to promote and build confidence in MMC; they should communicate that MMC is happening at scale, across the whole housing sector, and provide positive examples in the community; there should be a campaign to dispel common public misunderstandings particularly in regard to associations with temporary housing solutions and a lower quality and durability of housing.

Recommendations

- Public perceptions of MMC have been widely identified as one of the potential barriers to the widespread adoption by the construction section. While this research evidences broadly positive public attitudes to MMC in Ireland, this should not lead to complacency but form the basis for a communications strategy which will inform and sustain that general positive perception and deal with several areas of significant public concern and distrust.
- The Department of Housing, Local Government and Heritage (DHLGH) should build on the work of the Industry Capability Working Group to convene a broad coalition of stakeholders tasked with building public support and confidence for MMC. The coalition should include builders and those delivering houses; State agencies such as SEAI (Sustainable Energy Authority of Ireland) and County Councils who are also supporting MMC; financial institutions who are prepared to lend to MMC homes; and people who live in MMC homes.
- MMC communication strategies should:
  - Include a broad range of positive case studies of MMC housing developments in the community, across the whole housing sector, featuring testimonials from stakeholders including people living in MMC housing. Showcasing developments that marry characterful design with modern energy efficiency are particularly useful.
  - Avoid descriptors such as ‘prefab’ and ‘rapid-build’ when talking about MMC as they have negative connotations.
  - Accentuate the innovative and modern nature of MMC, the energy efficiencies, and the positive impact on the environment.
  - Provide detailed information on quality assurance, longevity, and architectural design to counteract perceptions that MMC is lower quality, temporary housing.
  - Provide information on the applicability of MMC across every section of the community to counteract perceptions that MMC is used solely for lower income groups or those in need of emergency housing.

- Provide assurances that MMC developments will adhere to regular housing planning legislation and standards.
- Provide information on the benefits for Ireland's workforce in supporting innovative technological manufacturing methods in construction through training and upskilling.
- Acknowledge that MMC has a significant role to play in alleviating Ireland's housing crisis.

Appendix 1 – MMC case studies

This section will focus on MMC case studies in a variety of contexts, and will be split into two. The initial section will focus on national contexts where MMC has gained a bigger market share and explore what mechanisms were utilised to garner support from stakeholders, as well as development bodies. The following section will then seek to highlight examples of MMC case studies in the UK, where the housing, development and regulatory systems shares similarities with Ireland. The scale of the developments varies, although they are predominantly smaller-scale due to MMC current position as a niche disrupter in the housebuilding sector. All the dwellings are permanent, as opposed to temporary, and uses range from: affordable and social housing, temporary accommodation and houses for sale.

National contexts with developed MMC markets (large-scale)

Japan and Sweden are considered world leaders in modern housebuilding approaches due to their high rate of adoption of the new and complex product, compared to most other countries in the world (Manley and Widen, 2019; Savills, 2020). Although, each context is differentiated by their consumer focus, with Japan more focused on high-income markets and Sweden more focused on medium-low-income markets (ibid.). Both have achieved significantly greater market shares than many of their western counterparts, in Sweden around 45% of homes are built using prefab methods, which is much greater proportion than Japan (15%), which is still around triple the market share of America, UK and Australia (5%) (Koones, 2019; Marshall, 2019; Savills 2020). This section will now focus on Japan and Sweden, individually, in greater detail and identify what helped their respective MMC industries flourish, where other western contexts have struggled. Followed by a short section which will employ comparative methods to analyse key differences between the case study areas of Japan and Sweden.

Japan – innovation, customisation, and consumer-focus

Japan's MMC/prefab housing sector is highly innovative and has developed a user-orientated approach by integrating specially developed marketing, design and quality-orientated techniques into its production processes (Friedman, 2021). A user-oriented approach has been established by developers continually striving to engage with users and bridge the communication gap between themselves and their clients. The result is a mutually beneficial market, whereby users benefit from a sense of ownership and individuality, while developers benefit from customer satisfaction and a positive reputation (ibid.). Consequently, Japan's factory-manufactured houses are seen as superior to conventionally built ones, which differs from common western perceptions, which centre around perceived low-quality and high-risk.

Japan is a world leader in implementing MMC in housing delivery, with efficient production processes, targeted marketing strategies and consumer outreach, and high-quality designs that offer variability and flexibility at affordable prices. Japan's MMC housing market was established in the post-war period when prefab housing was employed to help meet demand, MMC housing remained popular ever since. And as urgent demand for housing in the 1960-70's consolidated MMC position in the Japanese market, traditional methods were unable to meet demand due to material and labour shortages. Prefab housing provided an affordable alternative and drastically accelerated their wider acceptance during this period (ibid.). Moreover, government policy through the 1980-90's encouraged MMC uptake and integrated it into mainstream housing policy, with policies designed to encourage homeownership, housing quality and increase the number of available housing units promoting the use of MMC (Patchell, 2002).

Friedman (2021) notes that a critical feature of Japan's MMC housing market is the extensive system for mass-customization, which enables a higher degree of consumer participation throughout the development process. This is facilitated by a modular production method, with developers focusing on a custom design for each unit, while mass-producing an array of housing components which allows clients to customise their homes to their specific needs. Essentially, prefab homes are mass-customized primarily using a standardized component system for structural, exterior and interior arrangements. To provide the necessary flexibility, a modular system is employed, in which housing components are divided into categories of volume, exterior, and interior, and fitted in a variety of ways using a universal connector system. An example of how customisation can enhance user satisfaction can be exemplified by exterior component choices, such as roof, walls, windows, verandas, balconies and entrances, which define the visual identity of a house from the outside and are vital in fostering a sense of ownership. Catalogues, design-consultancy services, and information centres offer samples which aid clients with their decision-making, which ultimately improves user experience and satisfaction. Japan's modular and standard component systems facilitate a high-degree of customisable options which help the market cater for diverse user demographics, thus increasing demand, while controlling costs through mass-production and economy of scale, thus making the developments economically viable and still affordable for users (Friedman, 2021).

The Japanese MMC housing industry achieved its renowned reputation through an attention to quality control, with users generally unable to distinguish between modern and traditionally built dwellings. Moreover, research found that perceived higher quality of prefabricated housing was the most significant factor attracting potential users (Noguchi, 2003). The market gained users and stakeholder support, as well as a reputation for high-quality, through targeted stakeholder engagement strategy that centres around information centres. These centres provide public education as well as playing a critical role in advertising MMC homes by offering technical information about materials, construction methods and amenities. They also function as exhibition and consultation bases, where staff advise clients on customization, with the aid of advanced computer technology (Friedman, 2021).

Overall, Japan is an exemplar case study and demonstrates how stakeholder engagement, centred on advanced technology, user-orientation, and high-degree of customisation, can be utilised to gain wider acceptance within the industry, as well as consumer trust, all while stimulating market growth. However, there are certain specificities about Japan's context which has supported the application of MMC housing delivery. Dwellings in Japan have much shorter lifespans, in part due to the frequency of natural disasters such as earthquakes (Manley and Widen, 2019), with an average of 26-years, which is significantly lower than the UK's minimum expectations of 60-years. Moreover, homebuyers often prefer to build their own homes. With it being common for families to simply demolish their homes and build new ones on the same site as their needs change, with companies in Japan now offering full housing replacements within a 50-day period. This is why Japan has over six times the amount of new build housing to the UK, despite the population being approximately double (Friedman, 2021).

Consequently, MMC processes are particularly advantageous because of the high-degree of customisation that can be offered and very short-construction times, which make this style of development very suitable to Japanese social context. However, there are caveats, for instance the customisation process is not straightforward as it may sound, with it being difficult to strike the right balance between standardisation and customisation, while still capturing each household's preference in an efficient way, and other contexts, such as America, have struggled to apply aspects of the Japanese approach (Payne and Serin, 2023). Furthermore, simply replicating the Japanese approach, which places a high-degree of emphasis on customisation and user-orientation, is a time-consuming process as well as being information intensive (Patchell, 2002; Payne and Serin, 2023), which can make it undesirable to developers as it eats into profit margins.

Ultimately, lessons can be learned from Japan, particularly regarding the level of interaction between developers and users, which helped navigate through quality concerns and improve stakeholder confidence, and the overall image of MMC homes. This was achieved by Japanese MMC housing companies, development agencies and government collaborating, with the quality of the products gradually improving, while effective marketing strategies and branding techniques improved the sectors image (Noguchi, 2003). In addition, state actors supported MMC uptake through policymaking and establishing regulatory bodies for MMC, the Japan Prefabricated Construction Suppliers and Manufacturers Association, with the later establishing industry standards for quality, which fostered public and stakeholder trust (Patchell, 2002). All in all, while there is a pervasive hangover of previous low-quality prefabrication applications in most

western contexts, the Japanese case shows that this is not necessarily an end of the story situation (Payne and Serin, 2023). And although it must be cautioned about expecting to replicating the Japanese approach in a very different cultural context, lessons can still be learned, which can inform context sensitive package of direct and indirect measures that can drive uptake and growth in other MMC sectors.

Sweden – largest MMC housebuilding market share

Sweden has the highest penetration rate of MMC, with around 45% of the housebuilding market, which rises to approximately 80% for single-family homes (Koones,2019; Savills, 2020). Swedish MMC firms generally aim at the low-middle-income market as a mean of maximising returns due to the relatively low infrastructure investments (Manley and Widen, 2019). Sweden has a long tradition of employing MMC in housebuilding, which dates back over 80-years (Smart, 2017). The key drivers behind Sweden's adoption of MMC in housing delivery are Sweden's punishing climate and an abundance of timber (Manley and Widen, 2019; Marshall, 2019; Smart, 2017).

Sweden is drawn to MMC in part because its severe climate, characterised by long winters, high levels of rainfall and temperatures routinely falling to -20°C, means the development land is soft enough to facilitate on-site development for very limited amount of time (Marshall, 2019; Smart, 2017). Consequently, developers have historically looked for ways to deliver new housing as quickly and efficiently as possible, while ensuring high build quality, particularly regarding thermal insulation (Smart, 2017). So, Sweden's high market share, in part, stems from a need to shorten the onsite installation process, because there would otherwise be a high-risk of on-site disruption due to challenging climatic conditions (Marshall, 2019).

Furthermore, Sweden has a long extensive history of using timber in housebuilding process because approximately 70% of Sweden's land area is covered by forests which provide an abundance of premium quality timber (Marshall, 2019; Smart, 2017). This demonstrates how Sweden's geographic context has created a housebuilding market well-suited to offsite manufacture, because timber lends itself well to many of the processes used in MMC (Marshall, 2019). Moreover, Swedish government has played a role in driving MMC house building as they have sought to reduce the environmental impact of construction and improve the sustainability within the sector (ibid.), with their government even allocating areas in the country, such as the city of Växjö, where new structure must be manufactured from timber in order to promote sustainable building practices (ibid.). Growth in the MMC house building sector is also being catalysed by a major building boom; with skills shortages in traditional construction trades placing further pressure on the sector, as such MMC houses are in high demand (ibid.)

Comparing Japan and Sweden – lessons learned

Generally, the key difference between the case study areas is Sweden has a larger market share, 45% compared to Japan 15%, while Japan has a much larger market because their population is approximately ten times larger than Sweden's (Manley and Widen, 2019). The difference in proportion and scale has produced different approaches in their respective sectors. While Sweden aims at the lower-middle-income markets driven by the need to capture large market segments, Japan operates in reverse, with high capital investment and a focus on competing within a high-income market segment as there is less of a need to capture large market segments due to a much larger population (ibid.). Manley and Widen identified six metrics to compare: cost, quality, performance, delivery, flexibility and innovation, when comparing the nations and summarised the key similarities and differences when reviewing both contexts as follows: the difference in costing strategies between the two countries is high (with Japan more expensive and Sweden more affordable); quality has a low level of difference (with both countries offering high quality); performance has a high difference (with Japan leading due to the need to accommodate natural disasters, such as earthquakes); delivery times are equally fast in the two countries; flexibility is equally low in the two countries; and innovativeness has a high level of difference (with Japan driven by frequent seismic disasters).

Ultimately, Japan has adopted a more innovative and consumer-focused approach that targets more exclusive markets, whereas Sweden has adopted a more pragmatic and inclusive approach, with firms reliant on attracting larger market bases to attain economic viability (ibid.). Although, Japan and Sweden are world leaders in the MMC housebuilding sector, they are still imperfect and must navigate specific issues. For instance, Japan is renowned for a consumer-focused approach that offer greater flexibility to meet consumer needs, however, Japanese firms still need to manage the balance between efficiency and flexibility, and although Japan offers a higher-degree of customizability than any other context, it has been argued that they ultimately had to favour production efficiency over true customisability, and are tied to this strategy by their heavy capital investment and economic viability concerns (ibid.). Whereas Sweden's limited market base, due to low population density, means their industry struggles to have sufficient capital to invest, particularly in comparison to Japan, in research and development, innovation, development of new products, as well as limiting the drive to compete around performance (ibid.).

To conclude, lessons can be learned from both contexts, and it demonstrates how MMC market development strategies need to be context specific. Overall, MMC has massively impacted, disrupted and catalysed a high-degree of market change, but with different strategies, that were fit-for-purpose in regard to their respective contexts. Ultimately, although replicating either national strategies should be cautioned, due to the large role each context plays in influencing their respective strategies, lessons can be learned from these international exemplars, and interested stakeholders can interpret these lessons in respect of their own national, industrial and economic contexts.

MMC case sites (small-scale interventions)

This section will now explore seven MMC housing development projects. The scale of the developments is fairly small due to the challenging climates which favour traditional methods over MMC. All are located in a Scottish, English and Welsh contexts as examples from Ireland could not be sourced, although these contexts share similar characteristics to an Irish housing and development systems. All these developments are permanent and are a mix of 1–4-bedroom flats and houses, that are either for affordable/social rent or temporary accommodation (TA) purposes. All the case studies that will be discussed have been selected because they have helped deliver housing solutions that help localities meet identified or provide emergency housing solution to mitigate symptoms of the affordable housing crisis.

Connect modular – affordable housing

Connect Modular, part of The Wee House Group who specialise in custom build housing, is an established developer of modular housing based in Cumnock, East Ayrshire. They are BOPAS accredited and have a property portfolio of over 2k homes (Wee Housing Company, 2024). Two of their development sites will be reviewed in this section, the first is Scotland's largest modular housing site, and the second is Scotland's largest social modular housing site.

Riverside Scotland, Dundonald, South Ayrshire

Riverside Scotland will be the largest affordable modular housing development in Scotland, the site being 250 dwellings. The first phase, completed in 2022, delivered 63 affordable dwellings, containing a mix of 1-4 bedroom houses and flats. The project has a budget of £9.8m, £4.7m was government funding, and was completed in budget and one month ahead of schedule. And 90% of the construction was completed in controlled factory conditions.

Figure 3: Riverside Scotland housing development (Connect Modular, 2023)

Bridgehousehill, Kilmarnock, East Ayrshire

This is currently the largest modular social housing development in Scotland, and was completed in Summer 2024, containing over 100 social homes for rent, with them being a mix of 2–4 bedroom dwellings. The project budget is £17m, £10.5m of which is government funding. It will be delivered as part of a public private partnership between Scottish government, Cunninghame Housing Association and Connect Modular.

Figure 4: Bridgehousehill housing development (Connect Modular, 2024)

Premier Modular – emergency housing solutions

Premier Modular was established in 1956 and is one of the UK's leading offsite construction and modular building specialists. They provide high quality building solutions for both temporary and permanent applications across the public and private sectors for healthcare, education, defence, commercial, infrastructure, construction, and residential markets (Premier Module, 2024). Both cases that will be focused on are permanent residential dwellings that will be used for Temporary Accommodation (TA) purposes. TA is what Local Authorities (LA) offer to homeless households while they wait for their application for help to be processed and to be offered a settled home, households can spend years in this type of emergency housing accommodation while LA source suitable housing solutions. Households find themselves in TA because they approach LA for homeless support, whether they are at risk of homelessness or already homeless, and LA have a legal obligation to provide TA while their case is reviewed. If the case is deemed suitable and there is an obligation to provide a long-term housing solution, TA is provided until suitable accommodation is sourced.

Bridge Court Apartments, Buckinghamshire council

This development will consist of 58 permanent one-bed flats, used for TA purposes. Bridge Court is built on the site of a former car park and there was a requirement to maximise the building footprint for housing provision. Project budgets were not published publicly, although Buckinghamshire Council (2023) calculated the 58 new units will provide £1m saving compared to nightly paid accommodation. The council supported this development as demand for TA is currently outstripping supply in the area.

Figure 5: Bridge Court (Premier Module, 2024a)

Wivenhoe Apartments, Barking

Wivenhoe has also been delivered by premier modular, in collaboration with Barking and Dagenham Council. The site contains twenty 2-bed flats, that will be utilised for TA purposes. The contract was £1.5m, for a 15-week project and on-site construction was done swiftly in 25-days.

Figure 6: Wivenhoe apartments (Premier Module, 2024b)

ZED PODS – innovative affordable housing solutions for repurposed council land

The next three cases will detail ZED PODS developments. ZED PODS is a modular build company dedicated to developing high specification zero carbon homes (ZED PODS, 2024). The housing projects typically focus on working in collaboration with LAs, in this case Newport in Wales, as well as Bromley and Bristol in England, to develop innovative housing developments on under-used council land, primarily car parks. And although the land-uses changes slightly to encompass residential uses, in these three cases the car parks have remained in function, while ZED PODS has improved the supporting infrastructure as part of the development, such as adding electric vehicle charging ports, bike safe storage options and enhanced security systems. Moreover, these developments are zero-carbon and deliver new homes to highest energy efficiency, EPC rating A. As such, the following sections will now briefly contextualise the three case study examples.

Hill Street House, Newport

This development was a public private partnership between Newport Council, Linc Cymru HA and ZED PODS. The project was completed in 2021 and delivered 12 permanent single-occupancy flats, that are marketed at affordable rents. Newport City Council secured Welsh Government Phase 2 Homelessness grant funding to increase the supply of affordable social housing – and part of this funding was utilised to develop 12 new ultra-low carbon, high quality homes on an under-used council-owned car park (Young, 2023). The project has provided 12 new homes for people previously living in temporary or supported housing and who were ready to move into more permanent accommodation (ibid.).

Figure 7: Hill street house (ZED PODS, 2021)

Kevin Fenton Mews, Bromley

Kevin Fenton Mews, completed in 2023, is an environmental and socially focused development for London Borough of Bromley, which provides 25 homes for vulnerable households who are in TA and mostly living outside the borough. It is a 100% affordable rental residential scheme, comprising of two blocks of a total of 10 × 1-bed and 15 × 2-bed flats, including wheelchair accessible units.

Figure 9: Kevin Fenton Mews (ZED PODS, 2023)

Figure 8: Hill street house context map (ZED PODS, 2021)

Figure 10: Kevin Fenton Mews, inside one of the dwellings (ZED PODS, 2023)

Hope Rise, Bristol

This project was delivered in collaboration with Bristol City Council and YMCA. The project, completed in 2020, delivered 11 social rent and low-carbon, modern design apartments which were installed as a permanent living space for young workers and vulnerable households (ZED PODS, 2024).

Figure 11: Hope Rise (ZED PODS, 2020)

Figure 12: Hope Rise, inside one of the dwellings (ZED PODS, 2020)

All the above case studies, whether large-scale international exemplars of Japan and Sweden or smaller-scale UK based exemplar sites, demonstrate how different MMC approaches can be applied to deliver new housing developments. The cases of Japan and Sweden highlight different national approaches, which are impossible to replicate in differing contexts, of how MMC can be utilised to deliver new housing to low, medium, and high-income markets. Moreover, it also reveals the importance of engaging stakeholders, marketing the benefits of MMC and delivering quality developments, in order to obtain stakeholder support which ultimately facilitates growth and uptake in the sector.

The smaller-scale interventions in the UK demonstrates what is possible, even in a context that contains significant barriers to delivering MMC housing developments. All these developments, whether social or affordable rentals, TA or repurposed council land, reveal how MMC can help deliver alternative housing developments that are more socially inclusive. Ultimately, most western contexts are grappling with increasing complex and dysfunctional housing systems that are aggravating housing inequality and manifesting in increased levels of precarity and homelessness. These small-scale interventions demonstrate effective ways to deliver good quality affordable or emergency housing solutions that meets identified housing need.

It is also important to note the current instability in the MMC market for businesses operating in an English context. For example, some of the key MMC developers who were seeking to increase scale, such as Ilke homes, House by Urban Splash, Swan Housing and Berkley Group, by opening or increasing the number of specific MMC factories have recently either reduced production, or more commonly been forced to close due to economic viability and profitability issues (Battersby, 2023; Gardiner, 2022; Jessel, 2022; Morsby, 2023). This has been a significant hit to the English MMC housebuilding market and highlights how established companies that are seeking to invest in MMC and help stimulate market growth are struggling in England's current development system and housing market. This effectively demonstrates how barriers are preventing the application of MMC in English housebuilding, thus intensifying calls to reform the development system in order to increase uptake and market growth in a sustainable manner.

Appendix 2 – Survey demographics data

Q 1: Have you heard of the term "modern methods of construction"? Demographics for 'Yes' response.

Gender	%
Male	44
Female	30

Age	%
18–24	22
25–34	31
35–44	34
45–54	31
55–64	46
65+	52

Social Class	%
ABC1	41
C2DE	33

Region	%
Dublin	38
ROL	40
Munster	35
Conn/Ulster	33

Q 3 & 4: Have you ever lived in a residential property constructed using modern methods of construction; and if yes, did you specifically choose a home built using MMC, as opposed to choosing a traditionally built home? Demographics for 'Yes' response.

Gender	%
Male	14
Female	8

Age	%
18–24	17
25–34	19
35–44	13
45–54	8
55–64	5
65+	6

Social Class	%
ABC1	10
C2DE	12

Region	%
Dublin	16
ROL	10
Munster	9
Conn/Ulster	7

Q 5: If you were in a financial and general position to purchase a home/ move house now, would you be happy to purchase a home built using modern methods of construction rather than traditional construction? Demographics for 'Yes' response.

Gender	%
Male	56
Female	49

Age	%
18–24	40
25–34	49
35–44	53
45–54	52
55–64	59
65+	57

Social Class[5]	%
ABC1	54
C2DE	50

Region	%
Dublin	60
ROL	53
Munster	51
Conn/Ulster	42

Heard of MMC	%
Yes	68
No	43

Lived in MMC	%
Yes	82
No	51

5 Socio-economic grading tool. ABC1: Upper middle class, middle class and lower middle class; C2DE: Skilled working class, working class and lowest level of subsistence.

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