

Industrial-scale Housing Solutions



Modern Methods of Construction in housing

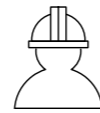
– The nation's fourth industrial revolution

There is a growing consensus that Modern Methods of Construction (MMC) has a major role to play in solving the UK's housing delivery challenges. As set out by Homes England, there is a problem of quantity, quality and pace of new home construction. This research shows that Off-site Manufacturing (OSM*) can tackle all three challenges if properly supported by the industry and policy.

A scaled-up OSM complement to traditional construction would be no mean feat. Our research shows that 13.5 million sq ft of manufacturing space – the equivalent of over 200 football pitches – is needed to increase the number of new homes from the current rate of 190,000 to 300,000 per year. Rising costs for industrial sheds will impact the rate at which new OSM space can be brought on-line and there is serious competition for space from online retailers in particular.

Nonetheless, MMC – the term used to describe OSM and Building Information Management (BIM) – is transforming the approach to building homes. As this report outlines, it would be a brave housebuilder that is still focussed solely on traditional delivery methods and of course, very few still are. Expect these early steps to be tested in larger scale schemes in the near future. More importantly, the IRR** -driven models in the rapidly growing multifamily and increasingly Social Housing sectors mean that delivery pace – the most important value proposition from OSM at the moment – is providing enhanced returns that will encourage more to switch towards OSM.

Technology disruption has finally come to housing construction. The sceptics are falling by the wayside and slowly MMC techniques are being adopted more widely. But the big leap of faith is yet to happen in volume housebuilding. This is with good reason, but increasingly choosing not to pursue OSM is also fraught with greater risk. At the moment the risks are still some way off impacting on shareholder value, but housebuilders are beginning to think more seriously about hedging this risk. Further investment will follow, not least through pressure from policy and local planning authorities.



10% 28%

UK London
% of construction workers from the non-UK/EU



6% pa

Build cost inflation



2.2%

UK house price growth
2019–2023 (annual average)



* The umbrella term for Cross-laminated Timber (CLT), Panelised, Light Gauge Steel Frame (LGSF) and Volumetric construction techniques
**Internal Rate of Return

Target practice

Volume housebuilders build at a pace that aligns with the rate of sale. Building faster is of limited benefit and would represent a risk to margins. As is often said, it is the real demand that matters, not Government housing targets.

The 18 largest housebuilders are responsible for nearly two-thirds of new housing supply, according to the latest statistics from the NHBC. That scale of market dominance controls supply chains and exerts a downward pressure on build costs. It's a highly effective business model and one that has been well-rewarded in equity markets.

Through this market cycle, the UK Government's most effective stimulus to drive up the pace of delivery has been Help to Buy. Volume builders have been enabled to contribute an extra 184,000 homes to overall supply through the programme. But Help to Buy has also stretched traditional construction capacity such that even volume builders have been feeling the impacts of labour cost inflation. Tighter immigration flows post-Brexit will exacerbate this issue.

Supply in construction workers dwindling

The construction industry has been haemorrhaging workers since the 1970s. Transitory EU workers have plugged the shortfall during stronger market phases, but the uncertainty around our future relationship with the EU is already impacting supply. Build cost

inflation has been stubbornly high at circa 4% for volume builders (but closer to 6% pa for SMEs). With house price growth now well below these rates and build cost inflation not widely expected to return to lower levels, construction costs are now eroding developers' margins.

These changes to build cost inflation are not easily reversed through traditional delivery means and are likely to act as a further catalyst for housebuilders to evolve. OSM significantly reduces the reliance on construction workers across a range of skillsets and has the added benefit of improving build quality. Although build costs are currently c. 12% higher than traditional construction, build quality and speed of delivery is notably better. Snagging costs will be significantly reduced, leading to greater satisfaction rates. They are more energy efficient, they have a smaller carbon footprint to build, there are fewer injuries on-site and the faster build means less disruption to the local area. This is why, despite higher per unit costs today, eight of the top 10 UK housebuilders have adopted this process in some form; three of these housebuilders have either built or are building their own factories.

Hurdles to overcome

Actions from volume builders are unlikely to be the main driver of sector innovation, with new entrants and scaling smaller builders having greater incentive to drive OSM forward. However, volume builders may be crucial to tackle OSM's biggest current challenge; scale. To drive the build cost premium down towards traditional construction costs requires larger manufacturers and full order books. Just a 20% allocation of annual delivery by any of the volume builders would underwrite a new factory. As shown in the table, Berkeley Group's efforts look to be the most ambitious by a major builder so far.

The problem is risk. OSM providers struggle with project-based contracts from housebuilders, making longer-term business planning more difficult. New investment is difficult when orders are irregular. In contrast, developers perceive the risk of changing construction approach as greater than the risk of disruption, while development funders perceive risks of unproven technology. The caution inherent in our industry's approach to OSM is slowing the rate of adoption and undermining the momentum needed to build a new OSM-oriented supply chain. For Government to achieve its ambitions for OSM, more proactive support is needed.

<i>Housebuilder</i>	<i>Action</i>
Barratt Homes PLC	10% of output built by OSM in 2017, with target to reach 20% by 2020
Bellway	No evidence of building using OSM techniques
Berkeley Group	Building factory in Ebbsfleet
Bovis Homes	No evidence of building using OSM techniques
Countryside Homes	Building factory in Warrington
Crest Nicholson	10% of output built by OSM in 2017.
Galliford Try	Using OSM techniques to build 56 units at Townhill Park, Southampton
Persimmon PLC	Set up their own OSM factory, Space4
Redrow	Usage of elements of OSM: service pods, modular garages and smartroofs
Taylor Wimpey	Will be building prototypes from their Project 2020 initiative, which will include OSM



Housing and industrial location theory

JLL has interviewed 10 prominent OSM providers to understand the norms for current housing output and overall factory capacity. This research concluded that in order to reach the Government's new homes target of 300,000 homes per year, it would take nearly 13.5 million sq ft of additional OSM factory space across the country, equating to over 90% of current available industrial space as of Q3 2018.

For the target to be achieved, it may be that Local Authorities leverage recent loosening of borrowing cap restrictions to become housebuilders again. One of the best ways to do this while supporting industry innovation is through adopting OSM. Public sector-backed OSM factories could service their requirements and cross-border collaboration between Local Authorities would reduce overheads and risk. Registered Providers have a big potential role to play here, too.

Two types of factories are needed: manufacturing/component factories and assembly factories. Regional manufacturing/component factories will provide standardised components such as roof trusses, door frames, skirting and stairwells. Assembly factories will be positioned across the UK in areas of higher housing demand to reduce delivery times and cost.

There is an opportunity for Local and Combined Authorities to enable the OSM pipeline by encouraging a proportion of all new build developments to be manufactured locally. As noted above, consistent order volumes will de-risk supply chains and open up the opportunity for cost efficiencies.

Consider the nine Combined Authorities across the country, with most surrounding key regional cities such as Birmingham, Bristol, Leeds and Manchester. The buying power at this level would be a catalyst for OSM orders and de-risk the creation of new factories.

Wider benefits



Council tax increase



Resident spending on goods & services



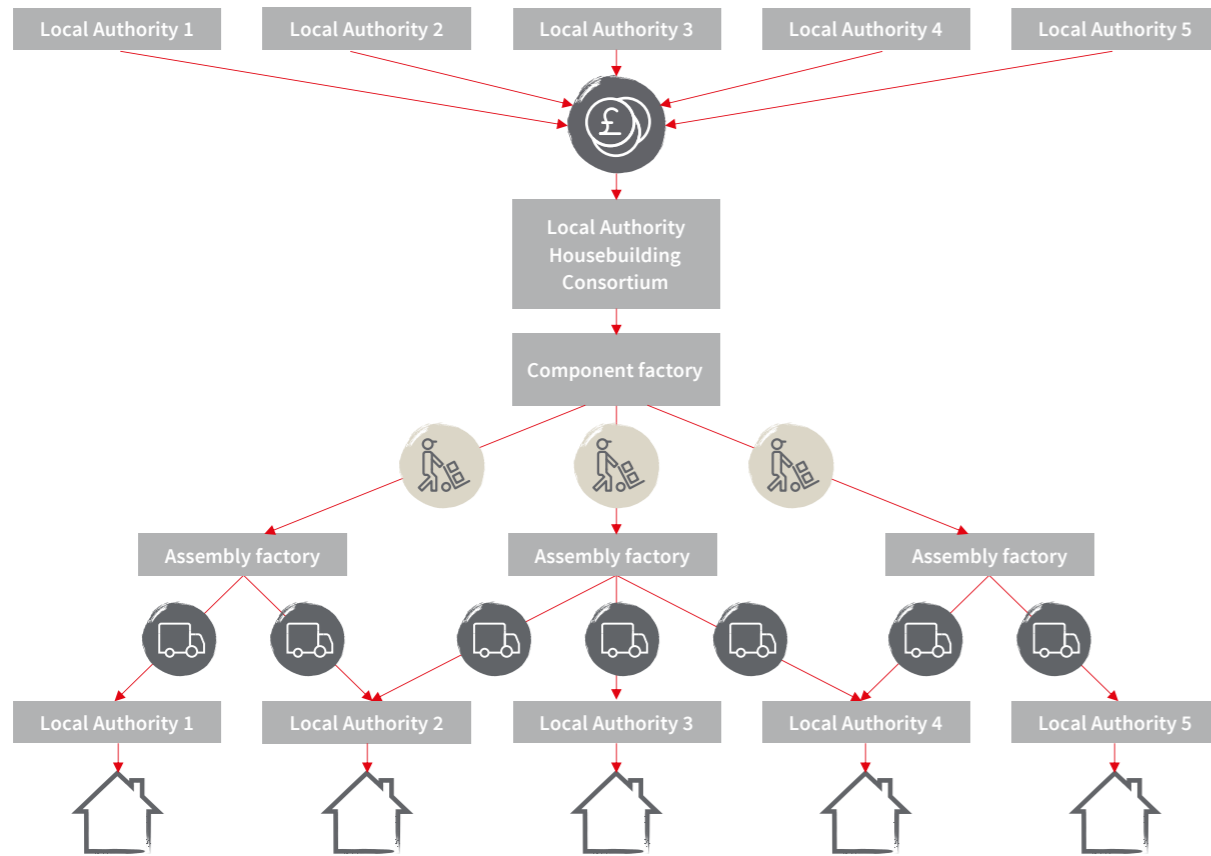
Local employment growth (direct and indirect)



Investment in local infrastructure

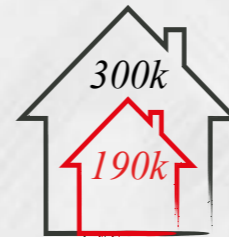


Stamp Duty increase



Regional delivery plan

Supply/demand imbalance

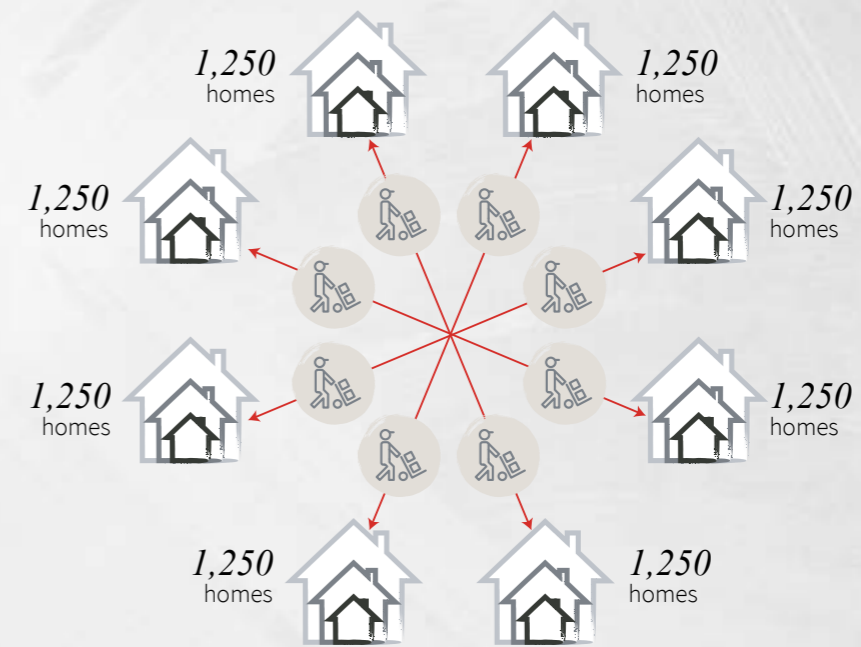


Average construction rate

Shortfall



10,000 homes per region



Output per factory	10,000 homes pa
Size of each OSM factory required	1.3m sq ft
Construction costs (of each OSM factory)	£50psf x 1.3m sq ft = £65m
Construction costs (new homes)	Two bed houses: £110,000 per unit Three bed houses: £130,000 per unit (5,000 x £110k) + (5,000 x £130k) = £1.2bn
Overall cost per factory	£65m + £1.2bn = £1.265bn
Average unit cost to cover manufacturing	£126,500

The assumptions made in the illustration on the previous page are based on conversations with OSM providers as well as in-house expertise at JLL. Although indicative, the figures offer a useful guide to the scale of investment needed to increase new housing supply by approximately 5%. The supply chain will need to evolve dramatically if housing is to emulate the form of other manufacturing supply chains and this will take time and money to mature. Government at all levels can take a more active enabling role by acting as a supplier or by filling order books in the case of Local Authority direct delivery.

Local Authorities can lower costs by using public sector land to build OSM factories rather than leasing from industrial landlords. Upskilling local workers is vital to increasing housing supply as poaching existing construction workers will only inflate build costs further. OSM could offer the UK manufacturing industry a much-needed boost, as the manufacturing workforce has fallen by 33% in the past two decades, according to the ONS. The desired outcome is to eventually incorporate automation into the manufacturing process, improving delivery whilst also lowering costs in the long term. This is significantly further down the road however and local workers will still be needed to build local homes for the foreseeable future.

Final word

It is quite easy to paint a foolproof picture of why and how to increase OSM housing supply. There is no quick fix to this challenge and it will take time and significant investment from both old and new industry participants. Government also has a proactive role to play and in truth, there is a lot of activity already underway.

Local Authorities can join forces to enable delivery from volume housebuilders as well as a range of disruptors. The OSM risks,

both perceived and real, must be mitigated. Part of the job is to better articulate the benefits – quantity, quality and pace of course, but also sustainability, job creation and redistribution, and a range of benefits to local economies and communities. There are plenty of reasons for the naysayers not to take a more proactive approach to OSM. Increasingly, this is the risky option.



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