

Building Capability to Deliver Growth

Developing the organisational capabilities for a modernised construction industry



Construction
Leadership
Council





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The construction industry is being asked to deliver the homes, infrastructure, and places that society needs while responding to pressures on productivity, cost, quality, sustainability, and an increasingly constrained workforce. At the same time, technology and new approaches to construction are creating opportunities to change how we work.

However, technology alone will not deliver the scale of change needed. We need organisations across the industry to develop the capabilities and ways of working needed to work differently — from earlier engagement and better collaboration through to procurement, planning, logistics, manufacture, and assembly. This allows the sector to scale production and deliver the complex infrastructure and homes that society needs.

Building the capability for organisations to change how they work is the backbone of this report. It looks beyond individual technologies or construction methods to consider what organisations need to do differently to support more integrated, standardised, and manufacturing-led approaches to delivery. The framework helps organisations to understand the capabilities and explore how these could be implemented in their own work.

Importantly, this is not about asking every organisation to build a factory, integrate their supply chain, or adopt a specified construction methodology. The opportunity is to strengthen the fundamentals of good business practice, such as communication and collaboration, while building the capability to participate effectively in more industrialised ways of working. A client, a major contractor, a specialist manufacturer, and a small local builder will have different roles and responsibilities, but all have a part to play.

If we are serious about improving how construction is delivered, and improving sector productivity as a driver for growth across the country, we need to invest not only in technology, but in the people, processes, and organisational capabilities that allow that technology to create value.

“Ten years on from *Modernise or Die*, the case for modernising construction is stronger than ever. But modernisation is not simply about adopting new technology or new ways of building; it is about changing how the industry operates to capitalise on the aspects that we have control over. We need to build the organisational capability to make better decisions, work collaboratively and improve continuously, to deliver the productivity and growth the industry needs.

Mark Farmer,

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Modernising construction is not simply about adopting new technologies or methods. It is about building the organisational capability to work differently, creating versatility and adaptability in delivery approaches, and delivering with greater productivity, consistency, quality, and predictability.



EXECUTIVE SUMMARY

Construction is under increasing pressure to deliver more with constrained resources, while improving productivity, quality, and predictability in delivery. Meeting this challenge requires more than new technologies and construction methods, it requires organisations to change how they work as they move towards more integrated, standardised, and manufacturing-led approaches to construction.

This capability challenge applies to organisations across the value chain, from clients and designers to contractors, specialist suppliers, and small and micro firms. Each organisation needs to strengthen the capabilities that enable them to work effectively within a more manufacturing-led delivery system.

This report is intended for organisations across the construction value chain, at any stage of exploring, adopting or developing manufacturing-led approaches or simply seeking to improve productivity and delivery performance. The purpose of this report is to provide a clear framework of the organisational capabilities needed to support business improvement and modernisation so that business leaders can identify where investment in their organisational capabilities and new ways of working is needed to achieve the intended benefits. Many of the capabilities required are applicable to good business practice more broadly, not only in modernising industry processes. This framework helps to identify how these capabilities can be strengthened as well as where new skills are needed.

Transforming the way construction is delivered changes the capabilities required at both organisational and individual levels, with greater emphasis on collaboration, coordination, digital and data capabilities, and integrated processes across design, manufacturing, and delivery. It also challenges established business strategies and delivery models, requiring new approaches to managing the physical and organisational interfaces that become increasingly important in manufacturing-led delivery. This report therefore emphasizes organisational capability as a critical enabler of industry transformation.

This report defines core, cross-sectoral organisational capabilities that support the effective delivery of manufacturing-led approaches, rather than the technical competencies required for specific occupations or roles. It comprises two broad categories: **core transferable competencies**, which establish the enabling conditions for effective implementation of manufacturing-led approaches, and **core technical competencies**, which address requirements associated with different stages of the project cycle and stakeholder roles, while promoting shared understanding across the value chain. The framework can be used by organisations to evaluate their current capabilities as well as to inform the development of specific competency frameworks. The report also considers the implications for small and micro construction firms, providing practical guidance on how they can participate in and benefit from more industrialised ways of working.

A **capability maturity roadmap** is presented to help organisations assess their current position, identify capability gaps, and consider practical steps towards greater maturity. The roadmap is intended as a tool for organisational reflection and strategic planning, rather than an externally monitored benchmark. Organisations can start on their journey by strengthening the capabilities that matter most to their role.

Going forwards, this report can be used as a starting point for action:

- **Organisations:**
Organisations should assess their current capabilities against the framework, identify the areas where gaps or weaknesses may constrain their ability to participate in manufacturing-led delivery, and use the maturity roadmap to prioritise areas for development and investment.
- **Supply chain:**
Organisations can use the framework to discuss shared capability needs, exploring challenges raised such as collaboration outside of individual projects and supporting wider industry transformation.
- **Wider industry and government:**
The findings can inform future work on skills development, training provision, and business support initiatives needed to support wider adoption of manufacturing-led approaches.

This report emphasises that modernising construction is about changing how the industry works to deliver greater consistency, quality, and predictability, which requires new organisational capabilities. This report provides guidance for organisations to build these capabilities throughout the wider value chain.

HOW TO READ:

The report can be read from beginning to end for a broader understanding of the organisational implications of manufacturing-led construction, or used selectively by organisations to focus on the capabilities and actions most relevant to their role, size, and stage of development.

- **Chapter 2** provides an overview of the wider context for manufacturing-led construction, including terminology and definitions, potential benefits and challenges, and considerations around building safety, liability and changing ways of working.
- **Chapter 3** lays out the methodology used for the development of the capabilities whilst **Chapter 4** sets out the core transferable and technical capabilities identified as particularly relevant to manufacturing-led delivery.
- **Chapter 5** describes the Capability Maturity Roadmap, which provides a structured way to consider how these capabilities can develop over time, from awareness through to industrialised delivery.
- **The SME section** in the Appendix considers how the capabilities translate into the context of small and micro construction firms, focusing on practical actions that can strengthen existing ways of working and support participation in manufacturing-led delivery.

Acknowledgements

This report has been published under the Construction Leadership Council People & Skills workstream, by the Skills for a Modernised industry sub-working group.

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Thank you to all those from industry who provided support in guiding, scoping, reviewing, and challenging this work.

OCTOBER 2026

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1 Introduction



Modernising construction means changing how we work, not simply changing how we build.



1 Introduction

The modernisation of the construction industry aims to drive a shift from predominantly traditional, site-based approaches towards more manufacturing-informed methods of design and delivery, supported by standardisation, digital technologies, and greater coordination across the value chain.

The aim is to improve construction project outcomes such as productivity, predictability, and quality by harnessing efficiencies that can be gained through manufacturing-based approaches. The terminology used to describe these approaches is evolving, with increasing use of the term Industrialised Construction (IC) alongside, and in some contexts in place of, Modern Methods of Construction (MMC). To achieve the intended benefits, organisations need to understand and invest in the capabilities needed to support new ways of working and enable effective delivery.

Industry focused research, such as Offsite Alliance's '*Building Capability*'¹ report, highlight that the UK's future skills challenge is not simply one of shortage of supply, but of organisational capability. It argues that construction must develop the competencies needed to operate effectively within increasingly digital, industrialised, and systems-based delivery models, supported by new occupational profiles and more agile approaches to training and competence development. This provides a strong evidence-base for the need to focus on broad capabilities rather than occupations and capacity alone.

The aim of this report is to present the core overarching capabilities needed to achieve the benefit of manufacturing-led approaches within the UK built environment context. This is relevant for stakeholders across the project delivery cycle, from planning and procurement to design and construction and applies to both buildings and infrastructure. The focus is on core transferable competencies at the organisational level, cutting across stakeholder groups, and aims to address the question: "What capabilities do we need to invest in to support manufacturing-led approaches in the delivery of construction projects?"

This work complements the Construction Leadership Council (CLC)'s work on competency within the built environment. While the CLC competency work focuses primarily on the competencies required by individuals within specific roles and functions, this report considers the organisational capabilities needed to support the transition towards more manufacturing-led approaches to construction.

“What capabilities do we need to invest in to support manufacturing-led approaches in the delivery of construction projects?”

¹ Offsite Alliance (2025) '[Building Capability: From insights to impact](#)'

2 Understanding the landscape



Manufacturing-led construction changes how projects are designed, coordinated, and delivered. Realising its benefits requires new ways of working and clear management of interfaces, responsibilities, and risk.



2 Understanding the landscape

The construction industry faces persistent pressures to improve productivity, control costs, reduce waste, increase quality and predictability, and deliver more with constrained resources. These challenges are compounded by issues such as fragmented supply chains and skills shortages. At the same time, advances in AI, robotics, automation, and digital technologies are creating new opportunities to transform delivery across the construction industry.

Changing how construction is designed, procured, manufactured, and delivered creates opportunities to respond to these pressures, but realising that potential requires organisations to develop the capabilities and processes to support more integrated and industrialised approaches. This is not about advocating for a particular construction methodology, but understanding what organisations can do differently to respond to the pressures facing construction.

2.1 Definitions

There are various terms used in the context of modernisation of the construction sector, with the main ones described in Table 1. These terms and definitions can fluctuate over time and context and therefore the overview below is a guideline and should not be seen as definitive.

Table 1: Overview of terminology

Guidance on terminology	
Industrialised Construction (IC)	Application of manufacturing-led processes, promoting standardised systems and repeatability in the design and construction of building and infrastructure projects. ²
Modern Methods of Construction (MMC)	Encompasses all the approaches that aim to optimise the construction process, including pre-manufacturing (manufacturing led fabrication processes conducted away from the final building site) as well as site process innovations and labour improvements. (MHCLG, 2019) ³
Offsite construction (OSC)	A method of construction where components, elements, or modules are constructed in a factory away from the project site and then transported to be installed in position (Gibb and Pendlebury, 2013). ⁴
Design for Manufacture and Assembly (DfMA)	The process of procuring and designing a project so that a significant portion of the works can be constructed in factory conditions and then brought to site for assembly (RIBA, 2016). ⁵

² Terminology and definitions currently being refined in development of draft standard BS EN ISO 25084 Prefabricated building. Terminology and general principles.

Alternative source: CLC (2025) Construction Leadership Council website '[Industrialised Construction](#)'

³ MHCLG (2019) Modern Methods of Construction: Introducing the MMC definition framework

⁴ Gibb and Pendlebury (2013) Glossary of terms 2013, Buildoffsite

⁵ RIBA (2016) RIBA Plan of Work 2013: designing for manufacture and assembly



2.2 What are the benefits?

The benefits of approaches for modernising the construction sector, including IC, MMC, OSC and DfMA, have been explored in many previous publications. These approaches are seen as having the potential to address several of the challenges facing the built environment, particularly low productivity and skills shortages. Note that the evidence base for assessing the performance of different construction methodologies remains inconsistent, with differences in the metrics collected, how they are defined, and the availability of comparable project data making it difficult to robustly attribute specific outcomes to construction methodology or make consistent comparisons across projects.⁶ Nonetheless, anecdotal experience suggests that greater use of manufacturing-led approaches to construction provide significant opportunity for improvement in delivery of projects and achieving better outcomes.

Table 2 on the right highlights some of the key benefits to stakeholders, creating a clear ‘business case’ for why it is important as a sector to invest in skills to support modernisation of the sector.

Table 2: Benefits of modernising construction delivery

Industry challenge	How this is addressed
Low productivity in construction sector	Standardised design and repeatable processes enable greater use of manufacturing-based approaches, improving efficiency, reducing variability and increasing certainty in project delivery. Standardised components can also support more efficient operation and maintenance strategies.
Delays and programme uncertainty	Site preparation works can happen concurrently with factory production with less unpredictability, e.g. due to weather. Clarity of design supports more efficient installation.
Skills shortages	Work shifts from site to factory environments, creating more stable, higher-skilled employment. This shifts employment profile to be less reliant on traditional construction skills, promoting diversity of workforce and attracting talent that may not want to work on typical construction site. On-site roles requirements demand greater assembly and logistics skills.
Quality concerns	Factory-controlled conditions support delivery of consistent products that meet specified standards. Needs to be coupled with well-controlled on-site installations to ensure quality of end-product.
Environmental impact	Opportunity to optimise material use and reduce construction waste, while enabling the testing, adoption, and scaling of innovative low-carbon materials or other low-impact approaches through the efficiencies and economies of scale offered by manufacturing processes. Buildings may be able to achieve better energy efficiency if details are addressed through better production quality, e.g. fewer thermal bridges and improved air-tightness.
Regional inequality	Manufacturing components in offsite factories enables the location of jobs and building sites to be decoupled from each other. This facilitates investment in regional manufacturing facilities that support local supply chains, distributing economic activity beyond major urban construction sites. This can be further supported through policy which incentivises local (UK) manufacturing.
Scale up delivery	Repeatable design and standardised components allow rapid replication and can allow for strategic procurement on large scale programmes of works, e.g. hospitals, schools, housing and prisons.

6 Jansen van Vuuren, T. and Middleton, C. (2020) [Methodology for Quantifying the Benefits of Offsite Construction](#). CIRIA [C792]



2.3 How is this different to traditional construction?

Across the UK built environment, there are already established examples of organisations using standardised and repeatable components and processes, from small-scale applications to major projects and programmes. The extent and maturity of these approaches varies across sectors; for example, volumetric modules are used in some areas of housebuilding, while MEP subassemblies are well established in commercial construction. While the specific capabilities required will vary according to project type, organisational role and delivery model, the principles of manufacturing-led delivery are relevant across the construction value chain.

As described above, adopting a manufacturing-led approach to construction is a promising strategy for addressing many of the challenges facing the construction sector. However, scaling up implementation requires a different approach from traditional 'once-off' project delivery thinking that impacts project planning, design and delivery and requires engagement across all project stakeholders. Successful project delivery through this lens depends on early design decisions that address standardisation and workforce capability.

Some key features include:

- **Early engagement:**
Early engagement and collaboration with contractors, manufacturers, and the supply chain enables manufacturing, procurement, logistics, installation, and quality requirements to be considered alongside design, helping to reduce late changes, manage interfaces, and improve cost and programme certainty.
- **Configuration-based design:**
Designers need to have a robust understanding of the products, components, and systems available within the supply chain, including their capabilities, limitations, and interfaces. This shifts the focus from simply designing for repeatability towards configuring elements to meet project-specific requirements.
- **Interoperability and standardisation:**
Manufacturers need to develop products and components that can be readily integrated with other systems and construction activities in the delivery of built environment projects.
- **Design freeze:**
Manufacturing and assembly processes depend on early, fixed specifications which enable production of components according to requirements in time to be installed on site. Late changes disrupt production workflows, increase costs, and undermine the efficiency gains of factory-produced components.

- **Interface management:**
Manufacturing-led construction requires effective management of various interfaces such as physical (on-site and off-site components, tolerance, connections), organisational (roles, responsibilities, information and handovers) and human-technology (how people work alongside, and interact with digital tools, automation, robotics, etc).
- **Robust pipelines:**
Economies of scale and clear pipelines of work provide confidence to manufacturers to invest in facilities to deliver the products required and invest in workforce capacity and skills.
- **Procurement and contracts:**
Traditional procurement approaches and contract forms may not readily support the early engagement and collaboration across the supply chain required for successful manufacturing-led construction, which means that these need to be considered and established upfront to create the right project environment.

These aspects highlight the importance of upskilling organisations in the built environment to be able to navigate the requirements of delivering projects with manufacturing-led approaches. If this does not happen, the anticipated benefits are not achieved.



Spotlight on understanding interfaces and liabilities

Adopting manufacturing-led approaches to construction is not simply about a different construction technique, it requires transformation of business-models and ways of working. The scale and nature of the change required means that organisations cannot transform effectively through individual projects alone. Clients, designers, manufacturers, contractors, and the wider supply chain need to engage earlier and work together beyond individual contractual relationships to develop the processes, relationships, and capabilities required across the wider system.

A key implication to consider is how responsibility and liability are allocated across the delivery system. As delivery happens across design, manufacture, and assembly, there may be gaps in responsibilities that were traditionally held within a single project team, as illustrated in the table below. Whilst manufacture and assembly are relatively clear, the interfaces between these stages become more important. For example, a window system may be manufactured correctly and installed correctly, but the overall solution can still fail if the wrong window system was selected for the building's performance requirements or if the opening and surrounding construction were not designed appropriately.

Transforming industry requires a shift in how value is created, challenging established ways of working. The opportunity is to recognise where new approaches can create value, for example, through collaboration, improved productivity, reduced waste, and new commercial opportunities.

Thanks to Ron Lang, Technical Director of the Industrialising and Digitalising Construction Challenge for his commentary which provided the basis for this section.

Stage	Key responsibility
Manufacture	Ensuring that the manufactured product meets specified quality, performance, and compliance requirements.
Assembly	Ensuring that components are correctly installed, connected and assembled in accordance with requirements.
Configured solution	Ensuring that the selected components and systems are appropriate for the intended application and work together as a compliant solution.
Interface with physical site	Ensuring that the manufactured and configured solution is correctly integrated with the site and wider project requirements.

2.4 ‘Myth-busters’

Historic experience with legacy pre-fabricated systems creates a range of commonly held beliefs about the implementation of approaches such as MMC and IC. The table below addresses some of these concerns.

Table 3: Common misconceptions about modernised approaches

Concern	Reality	Skills implication
“MMC buildings are all blocks that look the same” and “MMC limits customisation”	Association with early-era pre-fabrication drives this perception, however, modern approaches can incorporate a wide range of facades, layouts or finishes whilst retaining a standardised structural system. Many systems are ‘kit-of-parts’, and not identical boxes. If considered early in the project planning, variation can be provided in the project design through customised configuration of standard elements.	Designers and consultants should be well-equipped to create designs that promote standardisation of components whilst enabling architectural customisation. This is most effective when considered from earliest project stages.
“You can’t make changes once production starts”	Late-stage changes are more difficult, therefore manufacturing -led approaches encourage design discipline and a shift in design culture. This incentivises better upfront design coordination and avoids costly site rework.	All stakeholders should support early client engagement and effective use of digital technologies for defining clear, coordinated design requirements from the outset.
“You get locked into one manufacturer”	Concerns about proprietary systems create uncertainty about the risk to the project due to insolvency or delivery challenges if selecting a particular supplier or manufacturer. This can be mitigated through use of interoperable components, such as panels or elements with standard dimensions and clear interface specifications, and creating a platform approach that provides open access to the platform.	Create designs that support common dimensions, performance standards, and the use of interoperable components to strengthen design resilience and support more consistent project delivery.
“it’s difficult to get a warranty and/or mortgage on home built with MMC”	Historic caution from lenders caused these challenges, however the market has since matured. Warranties for pre-manufactured systems can be obtained through providers such as BOPAS, NHBC Accepts, and LABC. This gives mortgage providers the necessary confidence about the durability, lifespan, and performance of MMC homes.	Develop capability and confidence across all stakeholders about evidence-based assurance frameworks rather than relying on historic perceptions, ensuring informed decisions on the durability, lifespan, and performance of non-traditional systems.



Table 3: Common misconceptions about modernised approaches (continued)

Concern	Reality	Skills implication
“Transporting modules is inefficient and carbon-intensive”	This is heavily dependent on the type of component, with concerns particularly aimed at volumetric modules, which can be mitigated through use of 2D panels. Whilst deliveries are often larger due to the scale of components, there are typically fewer deliveries needed. Care should be taken to ensure that the reduced material waste, improved quality and performance outweighs any extra emissions from transportation.	Build capability across all stakeholders in logistics planning, carbon assessment, and regional supply-chain coordination to ensure transportation constraints (including accounting for emissions impact) are adequately considered.
“MMC reduces jobs”	This stems from increased automation and reduced on-site labour, however, manufacturing-led approaches change jobs rather than removing them. There is a shift in both the work location and the skills profile required, with manufacturing operatives and assembly specialists being key to successful project delivery.	Support workforce transition toward factory-based manufacturing operatives and on-site assembly specialists, while prioritising reskilling pathways and attracting new talent into the industry.
“MMC is only beneficial at scale”	Although large programmes can maximise the benefits of standardisation and factory production, manufacturing-led construction is not dependent on scale. SMEs and specialist housing providers routinely use offsite systems and pre-manufactured assemblies to improve quality, performance, and productivity.	Clear pipelines of work support supply chain stability and capacity building. Engage with stakeholders to support strategic pipeline planning, cross-sector coordination, and procurement for example by aggregating demand across portfolios (e.g. housebuilding, commercial, and schools) and creating regional hubs.
“It’s a binary choice – projects are either ‘MMC’ or ‘traditional’”	Manufacturing-led construction should not be viewed as a binary choice between traditional and offsite methods. Rather, it represents a spectrum of approaches that progressively shift value-adding activities from the construction site into controlled manufacturing environments, while retaining elements of traditional construction where appropriate.	As organisations and project delivery move along this spectrum, the skills required evolve towards greater emphasis on design coordination, manufacturing, logistics, assembly, and systems integration.



2.5 Building safety

The requirements for building safety as per the Building Regulations and Building Safety Act are method-agnostic, meaning that buildings must meet the relevant statutory requirements whether they are constructed using traditional or more industrialised approaches. When adopting a manufacturing-led approach to construction, it is important to understand how this can create different risks and interfaces that organisations need to understand and manage effectively.

Research into potential risks to safety and performance posed by volumetric construction has highlighted potential risks, including issues associated with design, manufacturing quality, interfaces, inspection, and clear allocation of responsibility.⁷ It is important to note, however, that in investigating defects linked to the in-occupation safety of buildings constructed using volumetric construction, the evidence reviewed is insufficient to assess the relative safety of permanent volumetric modular construction compared with other construction methods.⁸

For organisations adopting manufacturing-led approaches, it is therefore important to understand both the applicable regulatory requirements and the standards and guidance available to support their application. Standards such as PAS 8700⁹ provide additional guidance on the effective deployment of MMC and may become increasingly relevant as approaches and regulatory requirements evolve.

⁷ Brennan et al. (2024) [Volumetric Modular Construction research](#). Ministry of Housing, Communities & Local Government

⁸ Cruise and Lloyd (2024) [The impact of Permanent Volumetric Modular Construction \(PVMC\) on building safety \(RR1203\)](#). Health and Safety Executive

⁹ [See Section 7](#): Further Resources, for more information



3 Skills Landscape



Manufacturing-led construction does not require an entirely new set of organisational capabilities, but a different emphasis on how existing capabilities are developed and applied alongside the development of some specialised capabilities.



3 Skills Landscape

Adopting manufacturing-led approaches reconfigures and redistributes construction skills requirements, with greater emphasis on factory production, logistics, digital coordination, and precision assembly¹⁰. Existing competency frameworks, such as Offsite Ready's 'Competency Framework'¹¹ describe the key concepts to upskill the built environment workforce with core and role-specific competencies described across several technical modules. This report builds on existing work by addressing the core, cross-sectoral organisational capabilities that enable the successful implementation of manufacturing-led approaches. This supports organisations in moving beyond viewing this as a technical or procurement choice and instead understanding it as a strategic transformation that requires new ways of creating and delivering value.

3.1 Building on the foresighting capabilities

The foundation for this report is the foresighting work commissioned by the Workforce Foresighting Hub (WFH) which explores the future organisational capabilities and role profiles needed to deliver a manufacturing-led approach to construction¹². Offsite Alliance published a report '*Building Capability: From Insights to Impact*' which provides an accessible overview of this work, highlighting the mismatch between existing occupational standards and the capabilities required for modern construction approaches.¹³

The foresighting process involves workshops and surveys across several relevant sector experts, including industry and education to evaluate organisational and workforce capabilities. The findings highlight the shifts in capabilities required in construction sector with an emphasis on the need for both product and process development across the entire supply chain. That output represents the first stage of the work and further engagement with industry was recommended to test the outputs and to ensure they are reflective of changes in the sector.

3.2 Exploring the organisational capabilities

The organisational capabilities developed in the WFH report centered on how organisations will need to update current capabilities to adopt a more manufacturing-led approach to construction and how capabilities would need to evolve to align with future requirements. This requires both the adoption of new capabilities as well as shifting priorities and distribution of capabilities along the value chain. A total of 140 capabilities were defined across the functional areas where the most significant organisational changes are expected (for example, design, logistics, and enterprise processes). These organisational changes inform how occupations and associated competencies for each stakeholder ("value chain partner") will need to be updated¹⁴. Note that allocation of capabilities is not mutually exclusive, with the same statement able to be assigned to multiple stakeholders.

¹⁰ Ernst & Young Business Advisory Services (2024) *Skills for Modern Methods of Construction: An Assessment of the Current and Future Skills Requirements for the Transition to Modern Methods of Construction*. Commissioned by the Expert Group on Future Skills Needs

¹¹ Offsite Ready (2020) *COMPETENCY FRAMEWORK* by Mark Milne, Carola Calgano, Dr Melanie Robinson and Dr Mila Duncheva

¹² Innovate UK (2024) '*Building new opportunities: future skills to support manufacturing led construction*'

¹³ Offsite Alliance (2025) '*Building Capability: From insights to impact*'

¹⁴ At time of publication, the Workforce Foresighting Hub have an [interactive webpage](#) to explore the data and capability statements in each of the functional areas and domains, as well as applicability across value chain partners.



3.3 Prioritising the capabilities

Many of the organisational capability statements that are defined in the Workforce Foresighting Hub report are relevant across projects with different construction approaches. For example, complying with environmental/sustainability requirements, using digital tools and processes, strategic workforce planning, analysing project performance data, monitoring progress, and implementing quality control systems are relevant for all projects, traditional or more industrialised. Whilst the application may differ, the underlying organisational capabilities remain broadly applicable.

The purpose of this report is therefore not to identify an entirely new set of capabilities, but to explore which of these capabilities require particular attention when implementing a manufacturing-led approach to construction. As discussed in Section 2, manufacturing-led approaches change the emphasis, timing or interdependencies associated with existing capabilities, as well as introducing more specific requirements.

Previous UK government research into volumetric modular construction supports this focus, highlighting the importance of aspects such as early engagement, clear ownership, DfMA capability and effective management of interfaces across the design, manufacturing, logistics and site delivery processes.¹⁵ Although this research is specific to offsite manufactured volumetric construction, many of the risks and principles described apply to other forms of offsite construction.

The framework therefore focuses on the capabilities where manufacturing-led approaches are likely to require greater strategic focus, new ways of working or adaptation of existing practices, while recognising that broader organisational capabilities remain important to successful project delivery.



¹⁵ Brennan et al. (2024) [Volumetric Modular Construction research](#). Ministry of Housing, Communities & Local Government

4 Defining the competency statements



Successful delivery depends on both core transferable capabilities that enable effective collaboration and core technical capabilities that support specific stages of the project cycle.



4 Defining the competency statements

Manufacturing-led construction requires organisations to adapt existing capabilities as well as develop new ones to support more integrated approaches to project delivery. Understanding these capabilities enables organisations to identify gaps in their current ways of working and determine where changes may be needed to effectively deliver manufacturing-led projects.

The capability statements from the Workforce Foresighting Hub research were reviewed together with industry guidance about Industrialised Construction, Modern Methods of Construction and related concepts. The original statements were used as much as possible, however, where appropriate, additional supporting statements were developed to illustrate how key competencies, such as communication and collaboration, apply within an industrialised construction context.

The statements were categorised into two broad groups:

- Core transferable competencies – these about creating an enabling environment for successful delivery of projects and effective interpersonal relationships. Whilst these are applicable in all parts of the built environment, the statements aim to detail how these apply in adopting manufacturing-led approaches.
- Core technical competencies – these evaluate the requirements relevant to specific aspects of the project cycle and are likely to be more relevant to specific stakeholders in the value chain. Nonetheless, a basic awareness of these across all stakeholders supports stronger understanding of project constraints and successful delivery.

Prompt for reflection

As you read through this section, we invite you to ask yourself: “What does this capability mean for your organisation?” Consider what is changing, why it matters, and what you could do differently to strengthen your organisation’s ability to deliver.



4.1 Core transferable competencies

As has been described throughout this report, successful implementation of a manufacturing-led approach to construction requires particular capabilities that support digital, industrialised, and systems-based delivery models. This demands clear communication and collaborative engagement to understand constraints and interfaces in the delivery of

projects and support a more standardised, manufacturing-led approach to construction. These core transferable competencies are cross-cutting capabilities that underpin successful implementation across all sectors.

Underpinning these four categories is the principle of continuous improvement, which is a fundamental feature of manufacturing environments. This refers to the capability to learn and improve the system over time. Continuous improvement is applicable to each category identified in table 4:

Table 4: Core Transferable Competencies

Category	Why it Matters
Communication ¹⁶	Effective communication enables organisations to align stakeholders, develop a shared understanding of project requirements, and supports coordinated decision-making throughout the project delivery cycle.
Collaboration	Collaboration enables organisations to establish the partnerships, shared objectives, and integrated ways of working across project and organisational boundaries.
Systems-thinking ¹⁷	Systems-thinking enables organisations to understand and manage the relationships and interdependencies across processes, organisations, physical systems, and emerging technologies across the construction lifecycle, supporting better decision-making and delivery of project outcomes.
Digital and data ¹⁸	Digital and data capabilities are essential for connecting design, manufacturing, logistics, and assembly activities through accurate, timely, and interoperable information. The increasing use of AI, robotics, and automation is likely to further change how organisations work and execute projects.

- **Communication:**
feedback is captured and shared.
- **Collaboration:**
organisations learn collectively rather than repeatedly solving the same problems.
- **Systems thinking:**
lessons from one part of the system inform improvements elsewhere.
- **Digital and data:**
data provide the evidence for improvement opportunities.

¹⁶ To support effective communication and collaboration, PAS 8700 provides clear details about the information needed at various stages of a typical MMC project (see section 0.7). An overview of PAS 8700 is included in [Section 7](#) of this report.

¹⁷ While “systems-thinking” is a broad and sometimes loosely defined concept, it was retained as a core competency as it provides a useful way of capturing the need for holistic thinking across the interconnected elements of manufacturing-led construction. Alternative terminology, such as “systems engineering” was considered, however, since systems thinking is about the mindset (taking a holistic view of an entity or system, understanding connections and interdependencies to other systems, and identifying relationships and feedback loops), and systems engineering is a more defined technical discipline, this category has been kept as systems-thinking to emphasize that this is a capability that is relevant across all organisations and the value chain, not a specialist technical expertise. See for example: International Council on Systems Engineering (INCOSE) [‘What is systems engineering?’](#)

¹⁸ Detailed data and digital competency statements for the built environment are provided in the CLC report [‘Developing Digital Competency in the Built Environment’](#)



Table 5: Capability Statements for Core Transferable Competencies

Category	Capability statements	Bringing it to life: prompts to consider or key challenges
Communication	Establish clear communication processes to communicate project requirements, constraints, and decisions across the project lifecycle and across stakeholders	Effective communication can prevent costly delays, for example if a fault in a manufactured product is only identified once delivered to site (e.g. dimension or quality), this can be difficult to address and may need to be sent back to the factory for correction, potentially impacting project costs and programme.
	Promote shared understanding of project objectives, responsibilities, and dependencies.	
	Capture and disseminate lessons learned to support continuous improvement.	
Collaboration	Collaborate with clients, vendors, staff, and management personnel regarding purchases, product and production specifications or manufacturing capabilities.	A key challenge to address in facilitating collaboration is addressing the mechanisms and incentives for collaboration outside of individual projects boundaries. The benefits of investing in collaborative approaches may not be achievable in a single project contract and are more likely to accrue across a programme and wider supply chain engagement. Clients should consider how they could collaborate to create the necessary market environment. This is closely linked to procurement and contractual processes.
	Engage stakeholders early to support informed decision-making and coordinated delivery.	
	Establish integrated ways of working and coordinated decision-making across organisational and supply-chain boundaries	
Systems-thinking	Identify and manage interdependencies across the project lifecycle.	When evaluating systems and interdependencies, consider how different business models influence interdependencies across the value chain. For example, the use of open-source product platforms versus proprietary in-house manufacturing systems can create different capability requirements, collaboration opportunities, and strategic dependencies.
	Align organisational processes to support integrated project delivery.	
	Evaluate implications of decisions on design, manufacturing, logistics, assembly, and operation.	
Digital and data	Establish processes for the effective management and sharing of project information, using appropriate tools across the design, manufacturing, logistics, and assembly activities.	Technology enables better, more integrated and industrialised ways of working, but the underlying process needs to work first. Digital tools can be used to create data-driven and responsive approaches commonly used in manufacturing environments. As automation and robotics become more prevalent, organisations will need to consider how these tools and technologies change the capabilities required. This includes understanding the interface between people and technology, including how roles, workflows, coordination and safety practices adapt to new ways of working.
	Maintain accurate, consistent, and interoperable project data throughout the project lifecycle that can be used to evaluate various aspects of project performance.	



4.2 Core technical competencies

The core technical competencies relate to specific stages and functions that are most impacted in adopting a manufacturing-led approach to construction. While individual competencies may be more relevant to particular stakeholders within the value chain, a broad understanding across all organisations supports more effective

decision-making, improved coordination, and a greater appreciation of the constraints and interdependencies that influence successful project delivery.

Of the total 140 capabilities defined in ‘*Adopting Manufacturing Led Construction*’, 30 were identified as being of particular importance for delivering manufacturing-led

construction approaches, aligning with the core competencies outlined above. Statements that were largely similar were combined resulting in a final count of 23 statements used from the WFH report. These have been categorised into the six areas of core technical competencies. New statements were written in the few cases where there were no capability statements to address a core category.

Table 6: Core Technical Competencies

Category	Why It Matters
DfMA and Configuration-Based Design	Design processes need to consider manufacturing and assembly requirements from the outset, including the assessment and selection of appropriate construction systems and the configuration of standardised products, components, and systems to meet project-specific requirements and outcomes.
Procurement and commercial strategy ¹⁹	Procurement and commercial strategies need to create the conditions for early engagement, supply-chain integration, and the effective adoption of industrialised solutions, including through appropriate specification, contracting, and risk allocation.
Project planning	Project planning requires earlier procurement decisions and close coordination with the supply chain to align manufacturing outputs and site activities with project requirements.
Logistics	Logistics planning requires early and detailed consideration of transportation constraints and coordination of factory output, delivery, and site readiness for installation.
Manufacturing and Production Management	Construction product firms need manufacturing-style approaches to workflows, quality control, and throughput planning to deliver manufactured outputs for assembly on site.
On-site assembly	On-site roles increasingly focus on the assembly, integration, and commissioning of pre-manufactured systems rather than primarily traditional in-situ construction. Management of construction processes and interfaces is essential to ensure that the as-built product meets the requirements.

¹⁹ ‘Procurement’ in this category refers to how the client structures the project, appoints the team and establishes contracts/specifications in a way that enables an industrialised approach. This is different to procurement of the project solution, which has been included in ‘Project planning’.



Table 7: Capability Statements for Core Technical Competencies

Category	Capability statement	Bringing it to life: prompts to consider or key challenges
DfMA and configuration-based design	Assess available construction methods, products and systems against project requirements, site constraints and desired outcomes to identify appropriate solutions. ²⁰	DfMA approaches emphasize up-front consideration of manufacturing processes and capacity as well as compatibility between components during the design phase. This requires exploring how to maximise use of standard and repeatable elements and proactively consider the interfaces. Note that it is not necessarily about generating bespoke designs, and then considering how these can be manufactured, but more emphasis should be placed on using available components and elements from manufacturers.
	Identify opportunities and develop processes for efficient integration of manufactured elements into traditional construction projects.	
	Explore the use of digital design tools to optimise the layout and structural integrity of facilities and structures, e.g. using generative design or AI tools.	
	Utilise technology to evaluate the technical feasibility of manufactured elements in designs using Virtual Reality and Immersion (Virtual Reality)	
Procurement and commercial strategy ²¹	Engage and appoint the organisations and expertise needed to form an integrated delivery team early in the project.	Procurement and contractual arrangements are essential for enabling collaboration, influencing the sharing of knowledge and information as well as how risk and reward are distributed across the project team and supply chain.
	Establish contractual arrangements that enable collaboration, appropriate risk allocation and shared value across the delivery team.	
Project planning	Plan, schedule, or coordinate construction project activities to meet deadlines.	A key challenge in project planning is creating clearly defined connected workflows that integrate the design with the manufacture so that it is produced at the right time for delivery and installation on site. Strict adherence to defined project timelines with a clear design freeze allows for sufficient lead time in manufacturing according to project requirements.
	Utilise process simulation software to assess and improve construction workflow efficiency.	
	Alter workflow schedules according to production operations.	
↓		

20 New capability statement (not from WFH) included to align with PAS 8700 requirement that “competence shall include an understanding of MMC that is appropriate for the scope and complexity of the project or programme” (see section 4.1 of PAS 8700)

21 The WFH capability statements for procurement primarily addressed the downstream side of procuring project solutions. These capability statements were written to address the upstream side of client engagement and contracting.



Table 7: Capability Statements for Core Technical Competencies (continued)

Category	Capability statement	Bringing it to life: prompts to consider or key challenges
Manufacturing and Production Management 	Develop manufacturing methods that promote efficient use of time, resources and facilities, enhancing construction efficiency and reducing waste	Manufacturing-led approaches enable consistent quality and performance through repeatable production processes, while providing a platform for continuous improvement and innovation in sustainable construction practices, from waste reduction and resource efficiency to circularity and new materials. Consider what opportunities AI, robotics and automation create in improving manufacturing and production processes. These technologies can be used in different ways in production environments to enhance productivity, quality, safety and resource efficiency.
	Identify opportunities to improve manufacturing processes, products or to reduce costs	
	Develop or validate product-specific test protocols, acceptance thresholds, or inspection tools for quality control testing or performance measurement.	
	Establish manufacturing sequences and lead times	
	Interpret and communicate manufacturing capabilities, production schedules, or other information to facilitate production processes.	
	Coordinate and implement quality control objectives, activities, or procedures to resolve production problems, maximise product reliability, or minimise costs.	
	Implement innovative construction materials and techniques for sustainable building practices	
	Research production specifications, costs, production materials, and manufacturing methods and provide cost estimates and itemised production requirements.	



Table 7: Capability Statements for Core Technical Competencies (continued)

Category	Capability statement	Bringing it to life: prompts to consider or key challenges
Logistics	Transport materials, tools, or machines to installation sites, manually or using conveyance equipment.	Whilst every construction project needs to consider the logistics of transporting materials, the size, complexity, and sequencing requirements of manufactured components make logistics a critical success factor. Effective scheduling helps minimise storage requirements and ensure components are available when needed for installation.
	Plan the management of construction projects using scheduling of material deliveries and digital tools and software	
	Schedule deliveries based on production forecasts, material substitutions, storage and handling facilities, and maintenance requirements.	
On-site assembly	Develop and implement standardised processes for construction using Lean principles to improve efficiency and quality in operations and products	The interface between on-site and off-site elements is highly critical and a key source of failure. This also applies to the joining up of elements or components on site with the assembled system needing to meet the necessary requirements (such as air-tightness and waterproofing). ²² Another aspect to consider is how manufacturing-led approaches can fundamentally reshape health and safety on site. By moving significant portions of construction into factory settings, this changes where risks occur, as well as how they are managed. Whilst there may be a reduction in common on-site risks, such as working at height or weather-related risks, these are replaced with challenges associated with transporting and installing large, pre-manufactured components.
	Develop guidelines for integrating offsite manufactured components with traditional construction processes.	
	Recommend workplace changes to improve health and safety, using knowledge of potentially harmful factors, such as heavy loads or repetitive motions.	
	Provide upskilling and reskilling programmes on safety procedures, best practices and live environments to enhance safety and security in the construction industry.	

²² See for example Brennan et al. (2024) [Volumetric Modular Construction research](#). Ministry of Housing, Communities & Local Government. Although this research is specific to offsite manufactured volumetric construction, many of the risks and principles described apply to other forms of offsite construction.



4.3 Understanding SME perspectives

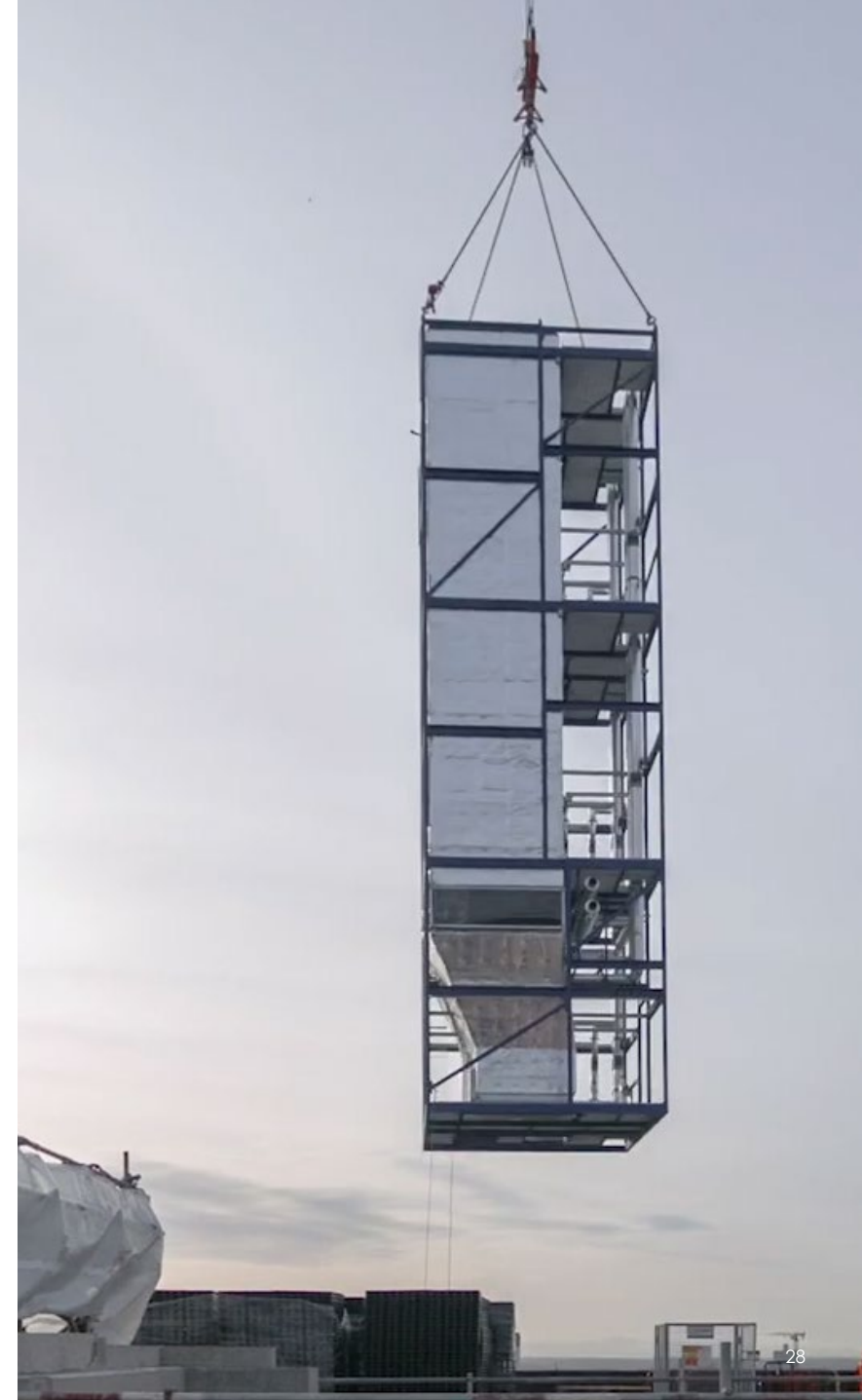
Industrialised Construction (IC) and Modern Methods of Construction (MMC) are often discussed in the context of larger organisations. However, it is equally important to consider what these approaches mean for small and micro construction firms, and to provide practical guidance on how they can engage with and benefit from the transition towards more industrialised ways of working.

To illustrate how the capability statements and principles outlined in this report can be applied in an SME context, we have developed a Guide to Industrialised Construction for Small and Micro Construction Firms, included as an Appendix. The guide aims to help SMEs understand what industrialised construction means for their business, where opportunities exist for them to participate, and what practical steps they can take to build their capabilities.

Importantly, moving towards a manufacturing-led approach to construction does not necessarily require SMEs to develop entirely new capabilities or invest in their own manufacturing facilities; rather, it builds on capabilities that successful firms already need. SMEs therefore have an opportunity to recognise, strengthen and build on these existing capabilities to position themselves to participate effectively in industrialised construction markets.

4.4 Stakeholder- specific skills requirements

Different stakeholders play distinct but interconnected roles in the successful delivery of manufacturing-led approaches to construction. Each stakeholder in the value chain requires different capabilities appropriate to their role and the specific competencies required will vary across clients, designers, manufacturers, and contractors. To illustrate how manufacturing-led approaches can change project priorities from the client's perspective, a case study from the NHS New Hospital Programme is presented. This highlights the critical role that clients play in creating the enable environment that facilitates industrialised delivery.



CASE STUDY: Client capability and collaboration in the NHS New Hospital Programme

Implementing a manufacturing-led approach to the delivery of the NHS New Hospital Programme (NHP) brings together the project stakeholders, from clients to contractors and the supply chain, to work together towards the delivery of shared vision. The scale and value of the programme provide the certainty and commitment needed to invest in new ways of working and build the capabilities required to deliver them.



In a discussion about how industrialised construction impacts clients, Emily King highlighted several key skills implications, which align with the core transferable capabilities described in this report:

- **Communication** – Manufacturing-led delivery requires more open and direct communication across organisational boundaries. This is particularly challenging in the construction sector, where communication historically is done through a contractual lens. On the NHP, supply chain working groups allowed for clear and direct communication about the vision and exploring potential benefits and challenges of changing the way of working.
- **Collaboration** – This approach challenges the traditional role of the client, moving towards shared problem-solving and solution development across the project team and supply chain. Rather than simply defining requirements and passing responsibility down the supply chain, the client becomes an active participant in developing and testing solutions.
- **Systems-thinking** – The client needs to understand and manage how systems interact across the whole delivery process. This includes robust design testing, understanding physical interfaces between offsite and on-site activities, and ensuring that the final project serves the purpose it is intended for. It also requires a broader view of workforce requirements across the programme and asset lifecycle, recognising how decisions made at one stage can affect delivery and operation later.

One of the clearest benefits of the manufacturing-led approach on the NHP to date has been the focus on standardisation. This is not only about physical project design details, but also more strategically in language, relationships and processes. For example, standardising naming conventions across all of the hospitals has helped to streamline the design and reduce duplication in procurement, demonstrating how standardisation can reduce waste and improve efficiency across the wider delivery system. Even something as simple as standardised naming conventions for doors has proven to be beneficial. Previously, each project's architect would specify something slightly different for doors, resulting in suppliers providing bespoke doors each time even for similar situations.

One of the challenges is knowing when to standardise, and when not to. Standardisation allows for greater clarity and certainty in project requirements and delivery. This frees up resource to address aspects that are genuinely different and opportunity for innovation in that, instead of approaching each project as a blank slate requiring bespoke design and detailing.

5 Supporting organisational upskilling



Capability maturity is a journey: understand where you are, identify the gaps and focus on the next practical step.



5 Supporting organisational upskilling

5.1 Capability Maturity Roadmap

As organisations seek to be future-ready, they will need to develop the technical and organisational capabilities to operate flexibly across a spectrum of construction approaches and delivery models.

A capability maturity roadmap has been created to support organisations in engaging with the capabilities laid out in this report and understanding what needs to change as they investigate manufacturing-led approaches. Using and developing this maturity evaluation, organisations can assess their current capability, and implement targeted actions to progress towards more integrated, digitally enabled, and industrialised delivery models.

To show how an organisation can progress from basic capability to more advanced integration, the roadmap is structured around four proposed levels of organisational maturity. These maturity levels describe how organisations typically progress from initial awareness of products and processes towards integrated industrialised delivery capability, following a pattern of recognise, trial, embed, and coordinate. This illustrates possible routes to maturity, representing a progression in capability without assuming organisations can move directly to an “end-state”. Furthermore, the maturity model recognises that different organisations may be at different starting points and therefore provides a mechanism for evaluating current status as well as achievable next steps to progress.

Four proposed levels of organisational maturity

Level 1	Level 2	Level 3	Level 4
Awareness Understood primarily as a product or procurement option, Limited organisational understanding; isolated pilots; traditional delivery mindset dominates.	Experimentation Early use through pilot projects; trialling collaborative approaches with early engagement; learning through demonstration projects.	Adoption Principles becoming more embedded into project planning and delivery; cross-functional coordination established; repeatable processes developing with gains in productivity and other benefits.	Industrialised Delivery Organisation operates using manufacturing-led approach; standardised and interoperable systems; data-driven management and delivery; significant productivity gains and variability reduction.

Note that the roadmap is not advocating or prescribing a single path nor suggesting that organisations should aim for the highest level across every capability. Furthermore, ‘Level 4’ is not necessarily the pinnacle of achievement with no further progression possible. Maturity should be understood relative to an organisation’s size, role, project portfolio and strategic objectives.

A small specialist manufacturer does not necessarily need the same organisational maturity as a large Tier 1 contractor. The roadmap’s purpose is to help organisations identify where they are today, recognise gaps and consider practical next steps.



Table 8: Capability Maturity for Core Transferable Competencies

	Communication	Collaboration	Digital skills	Systems thinking
Level 1 – Awareness	Build awareness and shared terminology across teams	Build awareness of how teams work together across supply chain and programmes, not just individual projects	Build foundational digital literacy	Build understanding of integrated delivery systems instead of isolated products/technologies, including sequencing, interfaces and supply-chain dependencies
Level 2 – Experimentation	Develop structured communication protocols for engaging supply chain	Trial collaborative procurement approaches with early engagement between client, designer, contractor, manufacturers, and specialist suppliers	Develop digital coordination capability and structured information management	Introduce systems-based project delivery processes and lessons learned reviews
Level 3 – Adoption	Embed cross-disciplinary communication in projects through shared digital platforms and common data environments (CDEs)	Align incentives, risk-sharing, and decision-making across stakeholders	Integrate data across the supply chain e.g. BIM, manufacturing data, and production planning systems	Embed platform thinking and standardisation strategies into organisational and project decision-making
Level 4 – Industrialised Delivery	Develop sector-wide knowledge-sharing networks and continuous learning systems	Develop strategic supplier partnerships and aggregate demand using programme pipelines	Use approaches such as digital twins to operate data-driven industrialised delivery systems	Manage projects as integrated delivery systems, reflecting whole-life and whole-system thinking

Table 9: Capability Maturity for Core Technical Competencies

	DfMA and configuration-based design	Procurement and commercial strategy	Project Planning	Logistics	Manufacturing and Production Management	On-site Assembly
Level 1 – Awareness	Build awareness of DfMA principles and manufacturing constraints.	Recognise how procurement and contracts can enable or constrain effective early engagement or supply chain integration.	Build awareness of supply-chain dependencies and lead times, identifying how manufacturing, logistics and assembly may affect project planning.	Build awareness of logistics constraints as crucial to successful project delivery.	Introduce lean manufacturing and production management principles. Move towards a quality assurance mindset rather than just quality control.	Build awareness of assembly requirements, tolerances and interface management
Level 2 – Experimentation	Promote standardisation and address manufacturing constraints and buildability in concept and detailed designs.	Trial early engagement and alternative commercial approaches on pilot projects.	Trial earlier integration of manufacturing, logistics and assembly requirements into project planning and sequencing.	Encourage consideration of transport requirements and installation in early stage design and planning.	Develop interoperable components with quality assurance, testing and production sequencing to align with procurement and delivery.	Develop capabilities in interface and workflow management to boost efficiency and support high-quality installation
Level 3 – Adoption	Implement structured design freeze and interface management processes.	Embed early engagement and supply-chain integration into procurement and contractual processes.	Develop integrated project planning and production sequencing capability across design, manufacturing, logistics and site delivery.	Align transport, storage, and installation sequencing with production outputs, considering interfaces and workflows.	Promote use of standardised, repeatable products and processes including quality assurance in the whole cycle.	Creating predictable workflows, clear responsibilities, and integrated quality assurance.
Level 4 – Industrialised Delivery	Develop configurable product platforms and interoperable components for standardised and repeatable delivery.	Contractual arrangements and sustainable financing enable integrated, repeatable manufacturing-led delivery.	Aggregate demand pipelines and establish long-term frameworks to support coordinated production and delivery.	Implement digitally coordinated logistics and route optimisation.	Optimise processes and reduce variation using performance data and standardisation.	Embed digitally enabled installation processes with real-time performance monitoring and continuous improvement.



5.2 Exploring workforce implications

The transition towards manufacturing-led construction has important implications for the workforce, changing the individual level skills requirements and creating demand for new roles. In their *'Insights to Impact'* report, Offsite Alliance explore 19 new 'Future Occupational Profiles' that support the industrialisation of construction and reflect cross-sector integration. One of these is the 'Construction manufacturing Operative', which is a new entry level role (level 2-3) that focuses on integrating lean manufacturing, automation, and digital fabrication technologies as well as incorporating process optimisation into construction manufacturing.

This shift in skills needed in construction site operatives is already evident in changes that are happening in entry level courses to support industry needs. The 'Assembly Specialist' apprenticeship at Barnsley College provides a case study on one example of training that supports industry change.

CASE STUDY: Assembly Specialist – New career in construction delivery



The Assembly Specialist is a new career pathway designed to equip people with the practical, technical and digital skills needed to assemble construction systems manufactured offsite. This provides an example of how industrialised construction is creating new occupational profiles and career pathways alongside evolving existing roles.

Beginning in 2019, a trailblazer group of industry peers, led by Laing O'Rourke, has taken this occupation from developing a new future occupational standard and Level 2 Apprenticeship in Construction Assembly Installation, approved by Skills England, to a purpose-built Modern Methods of Construction Training Centre at Barnsley College

launched in November 2024. The programme provides training across various construction approaches, with apprentices able to train in different routes, such as concrete and timber-based systems, depending on which sector they work in.

The pathway responds to changing workforce requirements while offering an alternative route into construction, with greater emphasis on technology, teamwork and offsite manufacturing and assembly. Creating this new career pathway demonstrates how industry-led development of occupational standards and training provision can help build the workforce capabilities needed to support manufacturing-led construction.

CASE STUDY

6 Next steps – taking this forward



Progress starts by turning capability into action: assess what needs to change, prioritise investment and work differently across the supply chain.



6 Next steps – taking this forward

A focus on organisational capabilities helps organisations understand manufacturing-led construction as a strategic transformation that changes the ways of working and is not simply a construction methodology. This is a high-level overview of how different organisations are affected:

- **What this means for clients:** Earlier decisions, different procurement strategies, greater engagement with the supply chain.
- **What this means for designers:** Designing within systems, configuring existing products, and understanding interfaces and manufacturing constraints.
- **What this means for contractors:** Earlier coordination, stronger planning, tighter variation control, and integration with manufacturing and logistics.
- **What this means for SMEs:** Strengthening existing commercial and operational disciplines to work effectively within a more structured and coordinated delivery system.

Going forwards, this report can be used as a starting point for action, for example organisations can:

- Clarify what capabilities are needed to deliver a manufacturing-led approach and how this may differ from their current operating model and processes;
- Assess their current capabilities against the framework, identifying the areas where there are gaps or weaknesses;
- Use the maturity roadmap to prioritise areas for development and investment;
- Evaluate business strategy and delivery model to explore opportunities for transformation (e.g. procurement that supports early integration of manufacturers, or organising project teams differently to support collaboration);
- Engage with the supply chain to discuss shared capability needs, exploring challenges raised such as collaboration outside of individual projects and supporting wider industry transformation.

For the wider industry and government, the findings can inform future work on skills development, training provision, and business support initiatives needed to support wider adoption of manufacturing-led approaches.

In summary, enabling industry to deliver the growth that is needed across sectors will not be achieved through technology alone. It will require organisations across the value chain to strengthen existing capabilities, develop new ones and change how they work. The framework provides a starting point for organisations to understand where they are today, identify where change is needed and take practical steps towards more productive, coordinated and predictable delivery.

“Manufacturing-led construction is not simply a new method of building; it is a transformation in how organisations plan, collaborate and deliver.”

7 Further resources



Building capability is an ongoing process. The right guidance, knowledge and industry connections can help organisations turn understanding into action.



7 Further resources

There are a wide range of existing organisations and resources that can support further investigation into the concepts covered in this report. These range from broad industry-wide associations to advocates for specific structural solutions. A selection of these is listed below.

Sector bodies:

- [Industrialised Construction](#) – advisory board to support the further development of the industry with resources including knowledge hub
- [Buildoffsite](#) – an industry wide association to promote, support and increase the adoption of offsite & pre-manufactured solutions for the built environment
- [Offsite Alliance](#) – a membership organisation supporting action and long-term impact across the sector
- [Offsite Hub](#) – showcases developments in the sector with news, case studies and industry opinions
- [Modular & Portable Building Association](#) (MPBA)
- [Structural Timber Association](#) (STA)
- [Light Steel Frame Association](#) (LSFA)
- CLC MMC Group
- [Built Environment Smarter Transformation](#) (previously the Construction Scotland Innovation Centre)

Skills and training:

- [Supply Chain Sustainability School](#): created 'Offsite for everyone' training developed which provides free learning resources cross-referenced by both job function and offsite construction process.
- [Offsite Ready](#): Competency framework with training materials to support each module – includes slide decks, infographics, videos, and detailed booklets.

Research & innovation:

- [UKRI Industrialising and Digitalising Construction Challenge](#) – “An £85 million national challenge to modernise how the UK delivers social housing and public infrastructure, starting with the first regional pilot in Liverpool”.

Standards & assurance²³:

- Buildoffsite Property Assurance Scheme (BOPAS) – Industry-recognised assurance route for homes built from non-traditional methods and materials
- BBA (British Board of Agrément) – Certifies many offsite systems and components.
- NHBC Accepts – Major warranty provider assessing and approving MMC systems.
- BSI (British Standards Institution) – Produces PAS documents, codes, and MMC-specific guidance. Particularly relevant is PAS 8700, which provides a process framework for using MMC in residential development. See below for more information.
- LABC (Local Authority Building Control) Warranty – Provides technical guidance and system approvals for MMC.

Spotlight on PAS 8700: 2025

PAS 8700:2025 – Modern methods of construction for new-build residential properties – Specification

PAS 8700:2025 sets out requirements and processes for the effective deployment of Modern Methods of Construction (MMC) in new-build residential projects, covering how projects should be established, designed and managed to support successful MMC delivery. It is intended to coordinate with, rather than duplicate, existing technical standards, regulations and assurance schemes.

The PAS covers project set-up, including establishing a competent delivery team, as well as design, manufacture, delivery, assembly, testing and inspection. In relation to organisational capability, it emphasises early design and planning, supply-chain engagement and effective management of interfaces between pre-manufactured and site-based elements. These areas closely align with the capabilities identified in this report and reinforce the importance of organisational processes and ways of working alongside the adoption of MMC technologies.

Note that the aim of this report is to identify the core capabilities that are particularly important for manufacturing-led construction, rather than reproduce the specific requirements described in PAS 8700.

²³ For a more detailed overview of standards, warranties, accreditation, and certification relevant to MMC, see Chapter 12.2 of the report commissioned by MHCLG: [Volumetric Modular Construction research](#)

APPENDIX: Guide to Industrialised Construction for Small and Micro Construction Firms



For small builders, modernisation starts with the basics: better planning, tighter control and more consistent, repeatable ways of working.



APPENDIX: Guide to Industrialised Construction for Small and Micro Construction Firms

The SME appendix was developed with the support of Maria Coulter, Construction Coach, drawing on her extensive experience coaching and supporting small and micro construction businesses to strengthen business performance, improve efficiency and support sustainable growth.

A.1 Why small firms matter

In this appendix, the focus is on how small and micro firms can be using more planned, repeatable, and coordinated ways of working so that projects are delivered with greater certainty, quality, and control. For a small builder, this might mean better variation control, clearer scopes, earlier ordering, tighter tolerance checks, better record-keeping and more reliable communication with clients, subcontractors, and suppliers.

This section is intended to highlight what an industrialised approach to construction means in the context of small and micro construction firms. Given that a large part of the UK construction industry and its supply chain is made up of small and micro businesses, it is important that these firms are supported in understanding how the principles described in the main report apply to them and the impact it can have.

In small businesses, estimating, planning, procurement, site management and customer communication are often carried out by one or two people. Whilst the capabilities described in the main report remain relevant to SMEs, these responsibilities may sit with one or two people rather than across separate functions or departments, as is more common in larger organisations.

Given their time and resource-constraints, SMEs need clear, practical ways to understand how they can strengthen their existing capabilities and work effectively within a more manufacturing-led delivery system.

For small firms, a shift towards a manufacturing-led approach to construction is about strengthening the fundamentals of how work is designed, coordinated, and delivered. SME's do not necessarily need to become manufacturers or build their own facilities, instead, they can build on their existing processes and capabilities to adopt industrialised ways of working. The opportunity is to improve how projects are delivered, with greater emphasis on quality, precision, and control. This includes clear scopes, early decision-making, controlled changes, realistic lead time planning, tolerance checks, and repeatable ways of working.



Discussing the relevance of industrialisation with small builders at the FMB National Conference in 2026

A.2 Variation control: a foundational capability

One of the most critical aspects of an industrialised approach to construction is early engagement and design decisions. Once components enter the manufacture stage, there is significantly less scope for late change, and delayed decisions can undermine the efficiency and productivity benefits of manufacturing-led approaches.

For a small builder, the equivalent skill is variation control. Formalising how changes are proposed, priced, recorded, and communicated creates the decision certainty required to support the more structured processes of industrialised construction. This was highlighted in a workshop with Federation of Master Builders (FMB) members at the FMB National Conference in 2026, where variations were identified as a significant commercial risk for builders. A simple, practical workflow for managing variations was proposed: describe the change, price it, send it to the client, get approval or refusal, and make sure the team knows that changed work does not start until approval is in place.

This illustrates an important point: adopting manufacturing-led approaches do not necessarily require SMEs to develop an entirely new set of capabilities. Instead, it increases the importance of existing commercial and operational disciplines, with greater emphasis on decision certainty, controlled change and getting things right before work progresses.

A.3 A practical route for small firms

The steps below provide some ideas of practical actions that can be implemented to support better project delivery. Each can be adopted by a small firm without significant investment, while strengthening capabilities that improve performance on traditional projects and build readiness for future manufacturing-led construction. These steps are ordered by what is most practical to implement first, not by what matters most.

For small builders

The quickest way to use this section is to ask: what do we already do, what causes us the most delay or cost, and what one process could we improve on the next job? The aim is not to become a different type of business overnight, but to make everyday project control more consistent, visible and repeatable.



Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Map one job, end to end. Take one recent or live project. Map it from first enquiry to final payment. Mark every delay, every piece of information that had to be chased, every decision that arrived late and every cost that was absorbed rather than recovered. Why this matters: manufacturing-led delivery requires a known process. You cannot standardise what you have not made visible.	Control change. Introduce one variation workflow: describe the change, price it, send it, obtain approval or refusal, and only then release the work. Apply it to every change with no exceptions. Why this matters: this is design freeze discipline. It is the single capability most transferable to industrialised delivery, and it is immediately beneficial, regardless of type of project.	Plan around real lead times. Record both quoted and actual lead times for manufactured components (e.g. roof trusses, joinery, steel beams, staircases, windows, doors, worktops, insulated panels etc.) Build the programme around those timings and place orders against the programme. Why this matters: manufactured components only work efficiently when site readiness and factory output are aligned. That alignment starts with reliable lead-time data.	Evidence quality as you go. Agree with the client, in writing and before work starts, what finished and acceptable means at each stage. Capture photographs, inspection records and approvals as work proceeds, including hidden work before it is covered. Why this matters: factory production is accepted because it is evidenced. The same expectation applies at the installation interface, and increasingly to warranty and assurance routes.	Standardise what repeats. Document the five essentials: enquiry questions, scope and quotation template, variation approval, payment schedule, and completion and snagging record. Create a template and standard procedure for conducting these on every job. Improve them after each job. Why this matters: standardisation and repeatability are the defining features of manufacturing-led delivery.	Check dimensions twice. Before ordering any manufactured component, verify the opening or interface on site. Before installing, verify again. Why this matters: tolerance control is the practical difference between traditional and manufactured construction, and the most common cause of benefit loss at the interface.



A.4 Diving Deeper: Translating organisational capabilities for small firms

The table below translates the core capability statements identified in the main report into what they might look like in a small construction firm. While some capabilities may not translate directly to smaller organisations, the underlying principles often do. This For SMEs, adopting manufacturing-led construction is less about developing entirely new capabilities and more about strengthening the commercial, planning, communication, and operational capabilities they already use. Building maturity means developing clear and consistent processes and being able to work effectively with manufactured products across design, procurement, and delivery.

Table 10: Capability Statements for Core Transferable Competencies - SME translation

Category	Capability statements	What this looks like in a small builder firm
Communication	Establish clear communication processes to communicate project requirements, constraints, and decisions across the project lifecycle and across stakeholders	Agree at the start of the job who communicates with whom, how information and decisions will be shared, how often people communicate, where information is held, who can make decisions and how decisions are recorded. This could be captured in a simple project start-up checklist, job folder or project management system.
	Promote shared understanding of project objectives, responsibilities, and dependencies.	Brief everyone involved on the communication and management process that has been agreed. Make sure the client, team, subcontractors and consultants understand what is being delivered, the key objectives, who is responsible for what and what other work or decisions they depend on
	Capture and disseminate lessons learned to support continuous improvement.	Review the job when it finishes. What affected time, cost and quality? What affected the client relationship or the team? What worked well and what needs to change next time? Record the learning and use it on future jobs.
Collaboration	Collaborate with clients, vendors, staff, and management personnel regarding purchases, product and production specifications or manufacturing capabilities.	Working with a stable group of subcontractors and suppliers whose capacity and lead times you know, rather than whoever is free that week.
	Engage stakeholders early to support informed decision-making and coordinated delivery.	Identify the people you need input from early, particularly key subcontractors, suppliers, designers and specialists. Be clear about what information they need, when they need it and what decisions depend on it. Put those information dates and key decisions into the programme so they do not get left until the work is already under way.
	Establish integrated ways of working and coordinated decision-making across organisational and supply-chain boundaries	Have agreed ways of working rather than everyone doing their own thing. This could include weekly rhythms, site meetings, checklists, subcontractor coordination, ordering processes, client updates, decision-making and escalation.



Table 10: Capability Statements for Core Transferable Competencies - SME translation (continued)

Category	Capability statements	What this looks like in a small builder firm
Systems-thinking	Identify and manage interdependencies across the project lifecycle.	Understand how everything fits together. When a decision, delay or change occurs, consider what it affects further down the job, including design, orders, deliveries, subcontractors, access, cost and the client's expectations.
	Align organisational processes to support integrated project delivery.	Use consistent processes to keep the whole project coordinated. Have repeatable ways of tracking progress, allocating actions, coordinating subcontractors, managing information and keeping the client informed.
	Evaluate implications of decisions on design, manufacturing, logistics, assembly, and operation.	Before making or agreeing a decision or change, understand the knock-on effect on design, cost, programme, procurement, deliveries, other trades, installation and the finished job.
Digital and data	Establish processes for the effective management and sharing of project information, using appropriate tools across the design, manufacturing, logistics, and assembly activities.	Keep project information organised and up to date. Make sure current drawings, specifications, approvals, variations, programmes etc. are easy to find and clearly identified so everyone is working from the latest information.
	Maintain accurate, consistent, and interoperable project data throughout the project lifecycle that can be used to evaluate various aspects of project performance.	Use project data to understand performance. Keep information current and record what is actually happening. Track progress, costs, programme, changes, delays, quality issues, lead times and other useful information so decisions are based on evidence from the job.



Table 11: Capability Statements for Core Technical Competencies - SME translation

Category	Capability statements	What this looks like in a small builder firm
DfMA and configuration-based design	Assess available construction methods, products and systems against project requirements, site constraints and desired outcomes to identify appropriate solutions	Compare different ways of delivering the work. Consider design requirements, site constraints, access, cost, programme, lead times, performance, available skills and installation, including whether an element is best built on site or sourced as a manufactured component.
	Identify opportunities and develop processes for efficient integration of manufactured elements into traditional construction projects.	The core SME capability. Treat purchased components such as trusses, joists, steels, staircases, windows and pods as manufactured items with lead times and fixed dimensions, rather than as materials that turn up.
	Explore the use of digital design tools to optimise the layout and structural integrity of facilities and structures, e.g. using generative design or AI tools.	Does not translate directly at this scale. The related capability is knowing which manufactured products exist for the work you do, and being able to tell a client or architect where an element could be made off site instead of built in place.
	Utilise technology to evaluate the technical feasibility of manufactured elements in designs using Virtual Reality and Immersion (Virtual Reality)	Does not translate directly at this scale. The related capability is helping the client see and agree the finished result before work starts, using 3D visuals, samples or mock-ups, so late changes are less likely.
Procurement and commercial strategy	Engage and appoint the organisations and expertise needed to form an integrated delivery team early in the project.	Get the right team around the job early enough. Bring in engineers, designers, key subcontractors, specialist suppliers and other expertise where needed. Make sure availability, responsibilities, lead times and decision points are understood before the job is committed.
	Establish contractual arrangements that enable collaboration, appropriate risk allocation and shared value across the delivery team.	Make the commercial arrangements support the project. Be clear about scope, responsibilities, price, programme, changes, approvals, payment and risk, with arrangements that support collaboration.



Table 11: Capability Statements for Core Technical Competencies - SME translation (continued)

Category	Capability statements	What this looks like in a small builder firm
Project planning	Plan, schedule, or coordinate construction project activities to meet deadlines.	A written programme for the job that the client and the team can both see, rather than a sequence held in the owner's head. Knowing which items sit on the critical path.
	Utilise process simulation software to assess and improve construction workflow efficiency.	Does not translate directly at this scale. The related capability is knowing how long your own sequences actually take, from what you have recorded on past jobs rather than from optimistic estimates.
	Alter workflow schedules according to production operations.	Sequencing site work around supplier and fabricator lead times, rather than expecting suppliers to work around the site.
Manufacturing and Production Management	Develop manufacturing methods that promote efficient use of time, resources and facilities, enhancing construction efficiency and reducing waste	Standardising the work that repeats. If you do loft conversions, having one way of doing a loft conversion rather than starting fresh each time
	Identify opportunities to improve manufacturing processes, products or to reduce costs	A review at the end of each job: what took longer than priced, what came back, and what would we do differently. Recorded, not just discussed.
	Develop or validate product-specific test protocols, acceptance thresholds, or inspection tools for quality control testing or performance measurement.	A written standard for what "finished and acceptable" means at each stage, agreed with the client before work starts rather than argued over at the end.
	Establish manufacturing sequences and lead times	Knowing the real current lead times for steels, windows, joinery and specialist items, and ordering against the programme rather than when the need becomes urgent.
	Interpret and communicate manufacturing capabilities, production schedules, or other information to facilitate production processes.	Being able to explain to a client or architect, in plain terms, what can be made off site, what it costs, how long it takes and what has to be decided by when.
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Table 11: Capability Statements for Core Technical Competencies - SME translation (continued)

Category	Capability statements	What this looks like in a small builder firm
Manufacturing and Production Management <i>continued</i>	Coordinate and implement quality control objectives, activities, or procedures to resolve production problems, maximise product reliability, or minimise costs.	Photographs, inspection records and approvals captured as work proceeds, including evidence of hidden work before it is covered up.
	Implement innovative construction materials and techniques for sustainable building practices	Being able to discuss fabric, insulation, airtightness and energy performance credibly and without overpromising, and to price the work properly.
	Research production specifications, costs, production materials, and manufacturing methods and provide cost estimates and itemised production requirements.	Reusable pricing content and a standard scope and quotation template, so each quote starts from a known base rather than a blank page.
Logistics ↓	Transport materials, tools, or machines to installation sites, manually or using conveyance equipment.	Planning access and delivery before ordering. On a domestic site this means the driveway, the crane position, the skip, the road, the neighbours and the parking restrictions.
	Plan the management of construction projects using scheduling of material deliveries and digital tools and software	A delivery schedule tied to the programme, with clearly defined responsibilities for who manages it.
	Schedule deliveries based on production forecasts, material substitutions, storage and handling facilities, and maintenance requirements.	Knowing what can be taken early and stored safely, and what cannot. Protecting components on site so they are not damaged before installation.



Table 11: Capability Statements for Core Technical Competencies - SME translation (continued)

Category	Capability statements	What this looks like in a small builder firm
On-site assembly	Develop and implement standardised processes for construction using Lean principles to improve efficiency and quality in operations and products	Five documented essentials: enquiry questions, scope and quotation template, variation approval process, payment schedule, and completion and snagging record.
	Develop guidelines for integrating offsite manufactured components with traditional construction processes.	Ensure site activities have appropriate setting out and tolerance control. Manufactured components have limited tolerance for site variations. Checking dimensions before ordering and again before installation.
	Recommend workplace changes to improve health and safety, using knowledge of potentially harmful factors, such as heavy loads or repetitive motions.	Reviewing lifting, handling and craneage when components arrive as large single units rather than as loose materials.
	Provide upskilling and reskilling programmes on safety procedures, best practices and live environments to enhance safety and security in the construction industry.	Making sure the team is trained for the work coming, including installation of systems they have not handled before, rather than for the work they did last year.

A.5 Limitations and testing

This translation draws on the capability statements in this report, published workshop findings and practical coaching experience with SME builders. The next step would be to test these ideas with a cohort of small builders and develop a practical SME readiness framework covering scope definition, variation control, lead-time planning, quality evidence, tolerance management and repeatable project processes. The testing should assess whether the framework helps firms strengthen commercial control, improve day-to-day project delivery and build confidence to participate in industrialised projects. The findings could inform future training, funding and business support.

It is likely that SMEs may benefit from relatively small but targeted interventions, such as DfMA awareness, digital coordination, manufacturing quality processes, logistics planning or specialist assembly training, rather than broad organisational transformation. This makes accessible and modular training particularly important for SME adoption.





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