

Mapping the AI Landscape in the Built Environment

Summary Version

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Acknowledgements

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Our work supports policy, strategy, service improvement and decision-making to achieve immediate and longer-term change across public, private and third-sector organisations.

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Foreword

This report reveals a sector at a transition point with its use of artificial intelligence, with significant experimentation but uneven adoption. In many cases, individual use is running ahead of organisational policy, professional guidance, client expectations and assurance mechanisms. That creates opportunity, but it also creates risk.

The central message of this report is that AI should augment professional expertise rather than bypass it. The value of built environment professionals will increasingly lie beyond outputs, instead in framing the right questions, understanding the limitations of tools, assessing the quality of data, challenging outputs and making defensible judgements.

AI may support the heavy lifting of some tasks, but responsibility and accountability must remain with competent professionals."

The most immediate risk is unmanaged use. AI systems can produce outputs that are fast, fluent and plausible, but without proper verification, they can also accelerate weak processes, amplify poor data or introduce untested material into decisions that affect safety, cost, compliance or client confidence. Verification, challenge and documentation therefore need to become defining habits of AI-enabled professional practice.

The report also highlights a deeper workforce issue. Some of the tasks AI may speed up are also the tasks through which junior professionals acquire judgement and technical understanding. If the sector automates these learning opportunities without replacing them with better-structured development, it risks weakening the future professional pipeline. This is a particular concern for a sector that already faces persistent pressures around capacity, capability and competence.

As a neutral, cross-sector forum operating at the intersection of education, future skills and professionalism, BEFA can help convene and guide employers, professional bodies, educators, clients, insurers and policymakers around a more coherent response to AI.

We would like to thank Harlow Consulting, the expert interviewees and all those who contributed to this research. We hope this report supports a more practical, informed and coordinated conversation about responsible AI adoption across the built environment.



Mark Farmer
Chair, BEFA

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Aled Williams
Executive Director,
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Executive Summary

The built environment sector has reached a pivotal moment in its adoption of artificial intelligence (AI). AI is no longer a future prospect: it is already being used in day-to-day professional activity across design, engineering, planning, construction, asset management and related disciplines. However, adoption is uneven, often informal and frequently ahead of the governance, assurance and skills frameworks needed to make its use safe, consistent and valuable.

This research finds a sector in transition, where AI is not yet delivering wholesale transformation, but where experimentation is widespread and is accelerating. Individual professionals are using AI – particularly generative AI – for drafting, summarising, coding, analysis, search and productivity, while more established applications such as automation, predictive analytics, computer vision and digital-twin-related tools are developing in specific parts of the sector. Organisational adoption, however, remains fragmented, with limited alignment across supply chains, lifecycle stages, clients, professional bodies and regulatory frameworks.

The central challenge is therefore not whether AI can add value, but whether the sector can integrate it responsibly. AI adoption is not simply a technology

or IT issue, but a professional practice, workforce and governance issue, cutting across skills, liability, data quality, procurement, assurance, commercial models and public trust. In a safety-critical, highly accountable industry, unmanaged adoption represents the most immediate risk, therefore, because AI can produce quick, polished and convincing responses, meaning it should be used with care. Without robust checks, it may embed flawed practice, reinforce weaknesses in the underlying data, bring unverified information into decisions with safety, cost or compliance implications, and encourage unwarranted confidence in the result.

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The opportunity is nevertheless substantial. Used well, AI could improve productivity, support better decision-making, reduce routine administrative burden, strengthen risk management, enhance safety and contribute to more sustainable asset performance. Over time, AI is likely to become increasingly embedded and 'invisible' within professional tools and workflows, much like previous digital technologies such as CAD and BIM.

However, realising this potential depends on addressing foundational weaknesses – particularly in data – which will be exposed if data quality, governance and literacy issues are not addressed. These will need to become core professional areas of competence.

AI is therefore reshaping the nature of professional expertise. It will not remove the need for built environment professionals, but professional value will increasingly lie in framing the right questions, selecting appropriate tools, understanding data quality, interrogating outputs, and making safe, relevant, and defensible decisions. AI can support professional work, but it cannot – and should not – carry professional responsibility.

The sector will require practical AI competency frameworks, role-specific training and stronger assurance norms. Baseline AI literacy will be needed across the workforce, alongside more advanced capability for those procuring, reviewing, governing or approving AI-supported work. Generic AI awareness will not be enough because engineers, architects, planners, surveyors, project managers, cost consultants, contractors, asset managers, public clients and educators will use AI in different ways and face different risks.

Another particularly important issue is early-career development. Many of the tasks AI can most readily accelerate, such as drafting, basic analysis, data handling and routine problem-solving, are the same tasks through which junior professionals traditionally build technical understanding, judgement and confidence. If these learning opportunities are reduced or bypassed without being replaced by new, structured development

 **The sector will require practical AI competency frameworks, role-specific training and stronger assurance norms.”**

pathways, the sector risks hollowing out its future talent pipeline. To safeguard long-term sector resilience, employers, educators and professional bodies will need to redesign apprenticeships, graduate schemes, vocational learning, professional formation and CPD so that AI supports learning rather than bypassing it.

The sector must also address important structural and workforce implications. For example, AI could widen existing capability gaps, with larger organisations and digitally mature firms benefiting first, while others may struggle to keep pace. Responsible adoption should not become something only large firms with dedicated digital teams can manage. Shared policies, risk assessment tools, training materials, case studies, procurement questions and safe environments for testing low risk use cases would help support proportionate and inclusive adoption.

Procurement will be an important lever for responsible use, with clients and procurement teams increasingly needing to understand not only whether suppliers are using AI, but how they are using it, with what data, under what controls and with what assurance. Procurement should reward transparency, accountability, evidence of checking and good information management, rather than vague claims about AI capability.

Despite the challenges, disruption is expected to be cumulative rather than sudden. For example, in the near term, AI will primarily optimise existing workflows rather than replace them, with deeper structural changes emerging over time.

AI will become embedded in professional tools and workflows whether the sector coordinates its response or not. Adoption could remain fragmented and reactive, or it could become deliberate, governed and aligned with professional values. BEFA's distinctive contribution should be to help define what responsible AI-enabled professional practice looks like for the built environment. The path forward requires a shift from experimentation to disciplined adoption, underpinned by:

- **a people-first approach**, where AI augments rather than replaces professional judgement;
- **clear governance and assurance frameworks**, including verification, accountability and risk management;
- **investment in data quality and interoperability** as critical enablers;
- **protection of early-career development via new pathways** to ensure AI adoption does not fully erode practical learning experiences that build judgement, technical competence and professional confidence;
- **sector-wide collaboration** to avoid fragmentation and support SMEs; and
- **new skills and training models** that embed AI literacy while safeguarding professional development.

Ultimately, responsible AI adoption is not a technology challenge but a leadership challenge. The sector's ability to coordinate its response – across industry, academia, professional bodies and government – will determine whether AI enhances professional practice and delivers better outcomes for people and places or simply accelerates existing inefficiencies and risks.



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Key findings

Transition from fragmentation to coherence

1 AI is already in use across the built environment, but adoption is uneven and often informal.

The sector is not waiting for a future wave of AI adoption; many professionals are already using AI for drafting, summarising, analysis, coding, search and productivity. However, use is fragmented, with practice often running ahead of organisational policy, client expectations and professional guidance.

2 The sector is at a transition point: experimentation now needs to become disciplined adoption.

AI is moving from individual experimentation into professional workflows. The critical issue is no longer whether AI can be useful, but whether the sector can use it safely, consistently and accountably.

3 AI may widen existing gaps across the sector.

Larger organisations with stronger digital infrastructure and governance capacity may benefit first, as well as AI native micro start-ups. This has the potential to leave a 'squeezed middle' where SMEs, local authorities and under-resourced organisations risk being left behind unless practical, proportionate support is developed.

Leadership and oversight

4 The sector needs coordinated leadership before adoption becomes vendor-led by default.

AI will become embedded in tools and workflows whether the sector takes a strategic approach or not. The choice is between fragmented, reactive adoption and a more deliberate approach that strengthens professional practice, lifecycle outcomes and sector capability.

5 The greatest near-term risk is unmanaged use, change and adoption, not mass job loss.

The most accessible AI tools are fast and fluent, which makes them useful, but also risky. Without verification, AI could accelerate weak processes, amplify poor data and allow untested material to influence important decisions.

6 Procurement and insurance will shape responsible adoption.

Regulatory bodies, insurers, clients and procurement teams will increasingly need to understand not just whether AI is being used, but how it is being used, with what data, under what controls and with what human review.

7 Verification needs to become a core professional habit.

In a safety-critical and highly accountable sector, AI outputs should be treated as drafts or decision support, not authoritative conclusions. The key skill is not just prompting AI, but checking, challenging, documenting and deciding.

Data and infrastructure

8 AI will expose the sector's long-standing data problems.

Fragmented information, inconsistent standards, weak interoperability and unclear data ownership will limit the value of AI. Whilst AI will help to facilitate information management, it cannot be solved wholly by AI and will still require professional judgement. Poorly managed data used by AI will make its consequences more visible, as will the implementation of the 'Golden Thread' which has introduced a more stringent regime around information management.

9 Data capability is becoming a mainstream professional competency.

Data literacy, information quality, provenance, BIM, asset information and interoperability can no longer be treated as specialist digital concerns. They are increasingly central to safe and effective professional practice.

Practice

10 The central challenge is to define responsible AI-enabled practice.

The built environment does not need to chase every new tool. It needs shared expectations about competence, verification, data quality, accountability and the appropriate role of human judgement.

11 AI adoption is a professional practice issue, not simply a technology issue.

The implications cut across skills, liability, data quality, procurement, assurance, commercial models and public trust. Treating AI as an IT matter risks underestimating both its value and its risks.

12 AI will not replace built environment expertise, but it will change what expertise looks like.

Professional value will increasingly depend on the ability to frame good questions, select appropriate tools, understand data quality, challenge outputs and make defensible judgements. AI can support professional work, but responsibility must remain with competent humans.

13 AI could disrupt how early-career professionals learn.

Some of the tasks AI can speed up are also the tasks through which junior professionals build judgement, technical understanding and confidence. The sector will need to redesign learning pathways so efficiency gains do not weaken future capability.

Conclusions and recommendations

The overall conclusion is that the sector has reached a point where coordinated leadership is essential and will shape what happens next. AI will become embedded in professional tools and workflows whether the sector takes a coordinated approach or not.

The choice is therefore not between adopting AI and avoiding it. The choice is between fragmented, vendor-led and largely reactive adoption, or a more deliberate approach in which AI is used to support better professional practice, better lifecycle outcomes and greater sector capability.

AI is already being used across the built environment sector, but adoption is uneven, often informal and moving faster than the governance, skills and assurance systems needed to support it. The sector is not resistant to AI, nor has it been fully transformed by it. Rather, it is experimenting at pace whereby individuals use AI for drafting, summarising, searching, coding and analysis, while more advanced applications such as automation, predictive analytics, computer vision and digital twins are developing in specific parts of the sector.

The key conclusion is that AI is no longer a future issue: it is already part of professional practice. The challenge is not simply whether AI can be useful, but whether the sector can use it safely, securely and effectively. AI adoption therefore needs to be treated as a workforce, governance and professional practice issue, not just a technology issue.

Actions for industry



1. A clearer shared direction is now needed.

The sector should move from experimentation to alignment around a simple principle: AI should augment professional judgement, not bypass it. AI can support professional work, but it cannot and should not carry professional responsibility. This principle should shape guidance, training, assurance and engagement with clients, regulators and professional bodies. AI will not remove the need for built environment expertise, but it will change what competent expertise looks like. Professional value will therefore increasingly lie in knowing how to frame the right question, judge whether a tool is appropriate, assess the quality of the data being used, challenge outputs, recognise gaps and decide whether results are safe, relevant and defensible.



2. Verification should therefore become central to AI-enabled professional practice.

AI-assisted outputs should be treated as drafts or decision support, not authoritative conclusions. Professionals should be expected to use, challenge, verify, document and then decide, particularly where outputs may influence design, planning, cost, procurement, compliance, safety, carbon or asset performance.

Responsible adoption will also depend on proportionate assurance. Organisations need practical guardrails covering approved tools, sensitive data, human review, audit trails, disclosure, sign-off responsibilities and escalation where uncertainty remains. These norms should be developed with professional bodies, employers, insurers, clients and regulators, so that responsible innovation is supported without creating unnecessary bureaucracy.

AI will also expose the sector's longstanding data problems. Fragmented information, inconsistent standards, weak interoperability and unclear data ownership are central barriers to effective AI use. AI will not compensate for poor information management; in many cases, it will make its consequences more visible.



3. Data and information capability should therefore sit at the centre of the AI agenda.

Data quality, provenance, interoperability, BIM, asset information, common data environments and handover information should be treated as core workforce and competence issues, not just technical systems issues.

There is also a major workforce development challenge. Many tasks that AI can speed up are also the tasks through which junior professionals learn. The sector should not preserve inefficient processes for their own sake, but it must protect the learning, judgement and confidence those processes help develop.

Actions for industry in partnership with education and professional bodies



4. This shift requires a practical AI competency framework for the built environment.

This should define baseline AI literacy for all professionals, role-specific competencies for different disciplines, and higher-level assurance and leadership capabilities for those procuring, reviewing or governing AI-supported work. The aim should not be to turn built environment professionals into AI specialists, but to ensure they can use AI responsibly and know when human judgement or deterministic methods are required.

The greatest near-term risk is not mass job loss, but unmanaged adoption. AI tools can produce outputs that are fast, fluent and plausible, but also wrong, incomplete or inappropriate. Productivity gains are only valuable if they are underpinned by effective checking.



5. Early-career learning will need to be redesigned for AI-enabled workflows.

Apprenticeships, graduate schemes, vocational learning and professional formation should combine supervised AI use with technical review, comparison between human and AI-generated outputs, and structured opportunities to understand why an output is right or wrong. Existing professionals will also need CPD to maintain and adapt their skills.

Generic AI training will not be enough. Engineers, architects, planners, surveyors, project managers, cost consultants, contractors, asset managers, public clients and educators will use AI in different ways and face different risks.



6. Training should become more role-specific and grounded in real built environment scenarios.

This would help the sector move beyond broad awareness and towards practical, defensible competence.

There is a risk that AI widens existing capability gaps. Larger organisations with stronger digital infrastructure may benefit first, while some SMEs, local authorities, smaller contractors and under-resourced organisations may struggle to keep pace. At the same time, some smaller firms are moving quickly and creatively, so the picture is uneven rather than linear.



7. Practical shared support will be important for less digitally advanced organisations.

Template policies, risk assessment tools, model governance wording, procurement questions, case studies, short training materials and safe environments for testing low risk use cases could help reduce risk and build confidence without imposing disproportionate burdens. Clients and procurement teams will also need to adapt. They will increasingly need to understand not just whether suppliers use AI, but how they use it, with what data, under what controls and with what assurance.



8. Procurement and insurance should help drive responsible AI adoption.

This means rewarding transparency, accountability and evidence of checking, rather than vague claims about AI capability. Over time, it could help improve data standards, lifecycle information requirements and consistency across the supply chain.

In particular, the parameters of AI use that professional indemnity insurers are prepared to underwrite will also very likely become the 'guardrails' that guide AI adoption.

Finally, AI will affect value, commercial models and long-term sector outcomes. It may reduce the time required for some professional tasks, especially document production, analysis and routine processing. This will challenge business models based heavily on time spent rather than value delivered, and raise questions about pricing, liability, training, client expectations and the role of junior staff.



9. A wider sector conversation is needed about AI's impact on professional value, responsibility and commercial models.

BEFA does not need to resolve these issues alone, but it can help the sector confront them and shape a more deliberate response.



10. Taken together, these recommendations point towards a people-first approach to AI in the built environment.

The sector does not need to chase every tool or predict every use case. It does need to build the competence, confidence and governance required to use AI well. BEFA's distinctive role should be to help define what responsible AI-enabled professional practice looks like, ensuring adoption is shaped by the needs, responsibilities and public value of the built environment sector rather than by technology alone.



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