WHITEPAPER

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE BUILT ENVIRONMENT

SURVEY RESULTS

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PREFACE

Artificial intelligence (AI) is changing the built environment at pace, altering the ways we design, construct, finance, and insure infrastructure and real estate assets.

A convergence of factors, including substantial anticipated construction investment, persistent productivity hurdles, and the emergence of AI technologies, presents a pivotal opportunity for innovation. Global construction spending is currently projected to hit $10 trillion in 2025, according to Oxford Economics, while industry productivity has remained stagnant for decades.

AI provides robust tools to close this gap by automating intricate tasks, improving decision-making, and facilitating data-driven workflows throughout asset lifecycles.

Leaders in infrastructure, government, finance, and insurance are increasingly acknowledging AI's ability to enhance efficiency, lower costs, improve safety, and promote sustainability in the built environment. AI advancements can result in clear advantages, including shorter project timelines, minimised waste, and proactive risk management. Nonetheless, obstacles like data silos, talent shortages, and integration hurdles may hinder adoption, while concerns remain around data security and model bias, which cannot be overlooked in such a safety-critical sector. Looming above it all are questions of AI's impact on the business model for those operating in the built environment.

Therefore, the importance of strategic governance and a clear sense of purpose when it comes to AI adoption cannot be overstated. This clarity is not always easy in a sector that, by its very nature, is fragmented across different phases, specialties, suppliers, and more. Our hope, through this initial survey, is to further a discussion that is ongoing across the industry by providing a snapshot into the thinking of organisations critical to the success of the built environment. It is incumbent upon all of us participating in the sector to determine how best to effectively leverage AI's potential while addressing its associated risks.

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EXECUTIVE SUMMARY

We surveyed a varied group within the built environment sector, representing contractors, architectural and engineering design firms, project and cost managers, and others regarding their readiness for AI, the risks associated with its adoption, and the potential return they see from its use. Their responses led to a few key takeaways:

READINESS

- **AI use is underway.** Most respondents are either trialling AI applications within a selected part of the organisation or have implemented AI within some day-to-day operations with an intent to widen use across the organisation.
- **Documentation and design and engineering are the main focus.** Most respondents are using or trialling AI for the automation of document-related processes and to improve the productivity of design and engineering processes.
- **Generative AI is a key technology.** A wide majority of respondents have adopted or are trialling the use of generic generative AI systems, bespoke generative AI systems, or both.
- **Data sharing risk hinders adoption.** While the causes vary, including integration complexity and a lack of internal skills, most respondents cited risks related to data sharing as a main challenge to AI adoption.

RETURN

- **AI will impact design, construction, and cost.** While responses varied, respondents primarily anticipate that AI will improve design and engineering process productivity; cost estimate, forecasting, and scheduling; and construction process productivity.
- **AI will increase over the next three years.** Around one-third of organisations predict that more than half of projects will leverage AI for design and engineering and construction in three years.
- **Organisations will invest in people and processes.** While responses varied, respondents will primarily invest in technical capabilities, standardised data and processes, and AI leadership and management to boost AI returns.

RISK

- **AI is a disruptor.** A wide majority of respondents anticipate their current business model to be impacted by AI, with nearly a quarter taking active steps to adapt their business model.
- **AI policies are important.** A wide majority of respondents have either implemented AI policies or plan to do so.
- **Project controls are lacking.** A plurality of organisations have limited or no project controls to manage risk where AI is used for design and construction.
- **AI is permitted across supply chains.** A large majority of organisations permit their service providers, suppliers, and contractors to use AI in project delivery.

INTRODUCTION

Exploring the Impact of AI on the Built Environment

Artificial intelligence (AI) could be the most significant technological advancement of the modern era. In our current global culture and climate, it's the topic that dominates the public conversation, and for good reason. Not only does AI have the power to change lives, it also has the potential to radically transform the industries and organisations that we rely on for critical assets, goods, and services.

Organisations across multiple sectors will face opportunities, challenges, and potential risks as AI capabilities evolve and advance rapidly, disrupting current business models, operations, and ways of working. This reality is especially clear for organisations critical to the built environment, which includes architecture, engineering, and construction.

Historically, organisations in this sector have been conservative in their adoption and implementation of new technology due to the critical nature of their projects and environments. The sector represents a substantial portion of the global economy, as well as the economy of individual countries. It is generally fragmented, with a complex supply chain, and faces considerable risk in the design and construction of complex infrastructure and facilities. Regulations, codes, and standards around the world demand that those designing and constructing infrastructure and buildings take responsibility for the safety and integrity of these critical assets.

In comparison to long-used tools and processes, AI represents a new, and largely untested, set of technical capabilities for the design and construction of infrastructure and buildings. Despite a relative lack of learning and insights across the sector, discussions of AI adoption, usage, risks, and business impact are reaching a critical mass, as organisations look for opportunities to increase their efficiency and effectiveness.

With this in mind, *Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend* have combined resources and expertise to conduct a global survey to explore and better understand how AI impacts organisations across the sector.

Survey objectives

The growth and use of AI for the built environment is starting to reveal a host of issues, including technical readiness, risk management, business transformation, and more. To better understand the current impact of AI on the built environment, we designed a survey to collect data and insights that explore and examine issues pertaining to AI readiness, risk, and anticipated return on investment, such as:

- How are organisations currently using AI and what are the challenges to adoption?
- How disruptive will AI be to the current business model of design and construction?
- How are organisations handling risk management and governance?
- Where will AI make the most impact and where will organisations invest?

Survey respondents

The global survey collected the views of a select group of over 130 infrastructure and buildings professionals, consisting of:

- **Chief Technology Officers, Chief Digital Officers, Chief Executive Officers, Senior Executive Directors, Commercial Directors, Data and Technology Managers, Development Directors, Operations Directors**
- **Representatives from Financing Investors, Asset Owners, Developers, Engineering Design Consultants, Delivery Partners (Contractors), Cost Management Consultants, and Project Management Consultants**
- **Organisations of differing sizes, with 45% of the survey respondents representing organisations with revenues of $1 billion or more**
- **A comprehensive global representation of leaders from Australia, Korea, Japan, India, Hong Kong, China, South Africa, France, Spain, the Netherlands, the United Kingdom, Canada, and the United States of America**

SURVEY FINDINGS

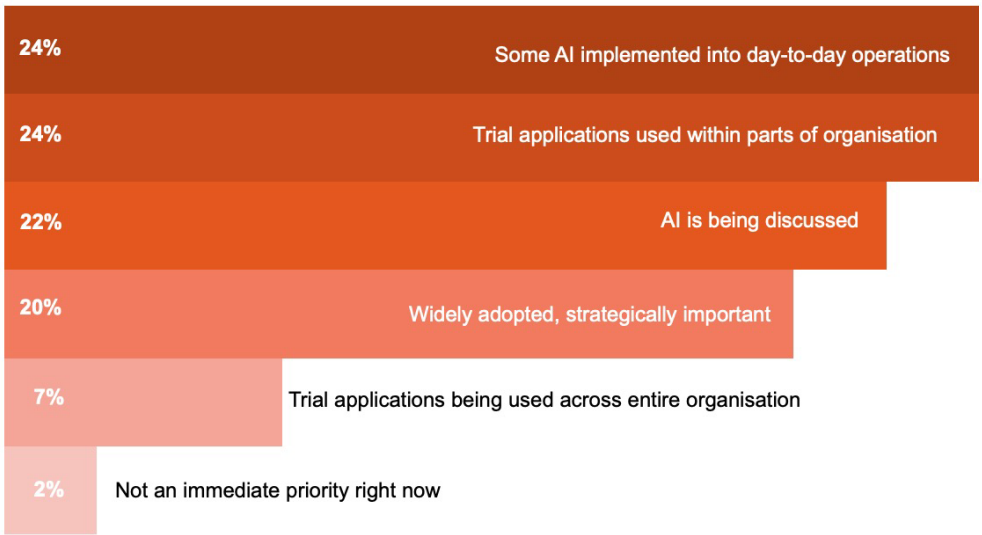
READINESS

How would you describe the readiness and maturity of your organisation in adopting and using AI as a strategic business tool?

The built environment sector tends to be conservative in the adoption of new technologies. This relates at least partly to the highly fragmented nature of the sector's ecosystem; the localised nature of project delivery and the standards, codes, and regulations that govern the assets and the work; and the sector's overall safety-critical nature. Therefore, we wanted to examine the readiness and maturity of organisations in adopting and using AI. Among the top responses:

- **Most respondents are either trialling AI applications within a selected part of the organisation (24%) or have implemented AI within some parts of day-to-day operations with a view to widening use across their organisation (24%).**
- **AI is being discussed in general terms, but with limited active steps being taken in 22% of organisations.**
- **20% indicated that AI is strategically important and already widely used with plans for organisation-wide adoption and expansion.**

Readiness and Maturity of Organisations in the Built Environment in Adopting and Using AI

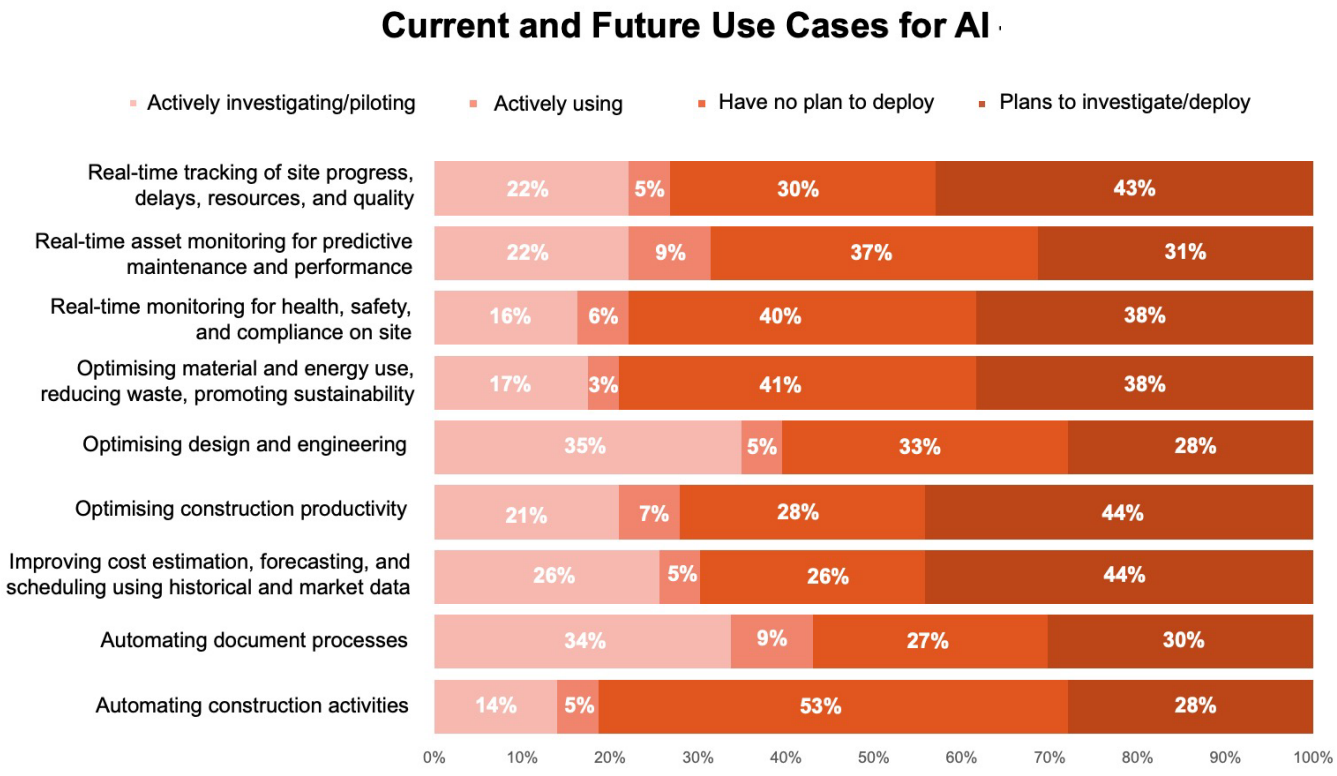


Source: Artificial Intelligence – Impact on the Built Environment, Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend, September 2025

What does your organisation currently use AI for?

Knowing that organisations have moved, to various degrees, to deploy AI for the built environment across a wide range of uses cases, we wanted to understand where organisations have been investing their time and resources. Among the top responses:

- **43% are using or trialling/investigating AI for the automation of document-related processes, such as contract production, change request processes, and compensation events.**
- **40% are using or actively trialling/investigating AI to optimise and/or improve the productivity of design and engineering processes, such as generative design and multi-factor design optimisation.**
- **31% are using or trialling/investigating AI for real-time monitoring of operational data from built assets to predict when maintenance is needed and to optimise and/or improve performance. The same percentage applies to improving cost estimation, forecasting, and scheduling.**



Source: Artificial Intelligence – Impact on the Built Environment, Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend, September 2025

If you have adopted or are trialling generative AI systems, what type are they?

With the widespread use and interest in generative AI, which produces new content based on underlying patterns and structures of training data, we asked about the types of AI systems in use—specifically, the use of bespoke versus generic generative AI systems. We found that:

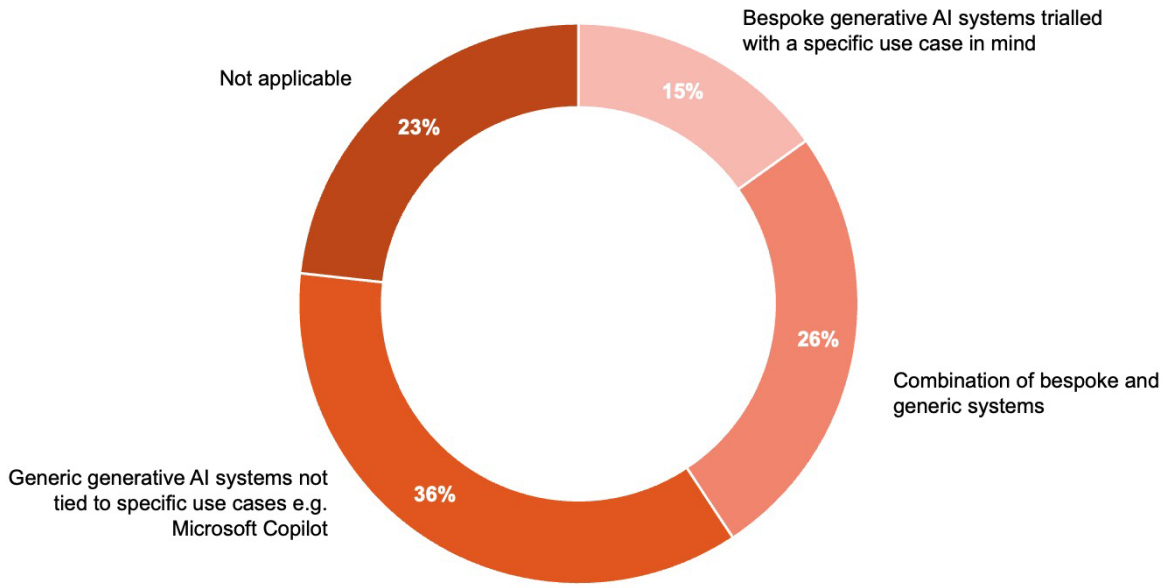
- **36% have adopted or are trialling the use of generic AI systems, such as Microsoft Copilot.**
- **15% have adopted or are trialling bespoke AI systems.**
- **26% have adopted or are trialling both.**
- **The question was not applicable to 23%, who are not engaged in the use of generative AI.**

What does your organisation consider to be the main challenges in adopting and using AI for projects?

AI is still nascent within the sector, and there are many unknowns regarding how AI capabilities will evolve and what business requirements will entail. Knowing the interest in AI adoption, but also the conservative nature of the sector, we wanted to explore the challenges facing organisations interested in the adoption and use of AI. Among the top responses:

- **Risks associated with data sharing, such as intellectual property, privacy, cybersecurity, and commercial information, was a concern with 19% of organisations.**
- **16% cited the complexity of integrating AI solutions into existing systems and processes within design and construction.**
- **15% noted a lack of internal skills and/or capability to apply AI solutions or develop proprietary ones.**

Generic AI versus Bespoke AI in the Build Environment



Source: Artificial Intelligence – Impact on the Built Environment, Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend, September 2025

Which areas of support are likely to be required by your organisation in relation to the use of AI in the development or design and construction of built assets?

As the sector is generally fragmented, with a complex supply chain, and faces considerable risk, and as the use of AI is largely in early stages, we inquired about the support that organisations may need to further the use of AI. Top responses included:

- **Organisational and/or business model development – 14%**
- **Implementation of commercially available AI technologies – 14%**
- **Risk management in relation to design and/or construction contracts – 11%**

Key takeaways

- **AI use is underway.** Most respondents are either trialling AI applications within a selected part of the organisation or have implemented AI within some day-to-day operations with an intent to widen use across the organisation.
- **Documentation and design and engineering are the main focus.** Most respondents are using or trialling AI for the automation of document-related processes and to improve the productivity of design and engineering processes.
- **Generative AI is a key technology.** A wide majority of respondents have adopted or are trialling the use of generic generative AI systems, bespoke generative AI systems, or both.
- **Data sharing risk hinders adoption.** While the causes vary, including integration complexity and a lack of internal skills, most respondents cited risks related to data sharing as a main challenge to AI adoption.

RISK

To what extent will AI impact current business models?

Across the built-environment value chain, the prevailing model remains largely siloed and fragmented, with analogue hand-offs between disciplines and phases. By "business model," we mean the way firms create, deliver, and capture value across an asset's lifecycle. AI accelerates a shift toward integrated, digitally connected, automated, and data-driven delivery—linking design, construction, and operations on shared data foundations and enabling new outcome-based service offerings.

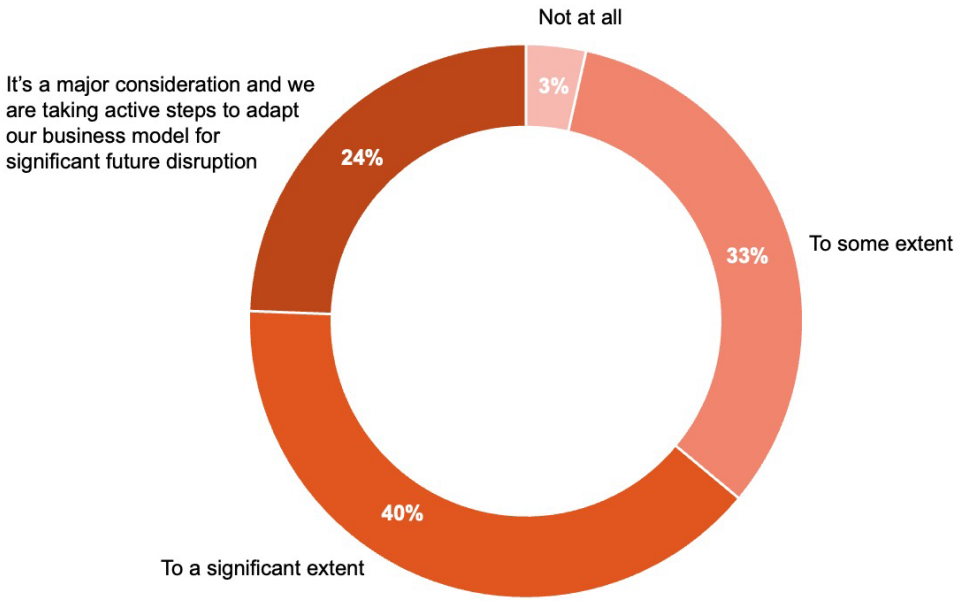
What we heard from respondents

- **40% anticipate a significant impact on their current business model.**
- **33% anticipate a moderate impact.**
- **For 24%, AI is already a major consideration, and they are taking active steps to adapt their model for significant future disruption.**

Why this matters

- **Revenue mix will change** from hours and variations toward value-priced, data-enabled services (e.g., automation, analytics, digital twins) and performance/outcome contracts.
- **Delivery will reconfigure** to tighter design–construction–operations integration, more automation of document and engineering workflows, and expanded use of shared data environments.
- **Risk, IP, and data governance** will be central as competitive advantage will hinge on data stewardship, model provenance, and clear guardrails for AI use across supply chains

Impact of AI on Current Business Model



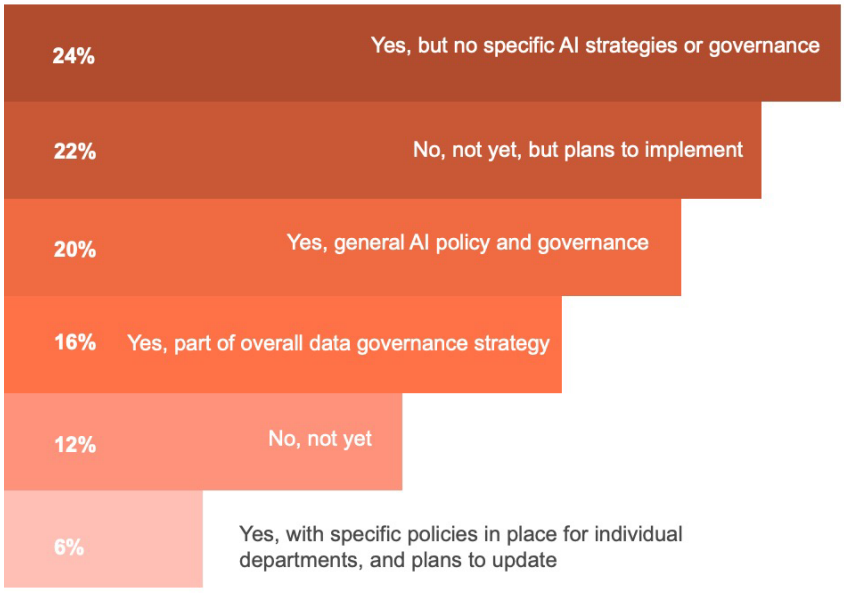
Source: Artificial Intelligence – Impact on the Built Environment, Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend, September 2025

Has your organisation implemented an AI policy?

A key issue for a safety-critical and highly fragmented sector is governance at a corporate and project level. This only gets more complex when joint ventures (JVs) or special purpose vehicles (SPVs) are used for project development, financing, delivery, and sometimes operation of the completed asset. Therefore, we inquired about the implementation of organisational AI policies. Top responses:

- **24% have a policy, but do not yet have specific AI strategies or governance.**
- **22% do not have a policy, but plan to implement one.**
- **20% have a general AI policy that includes guidelines for use, governance, ethical implications, safety measures and related aspects.**

Organisational AI Policies in the Built Environment



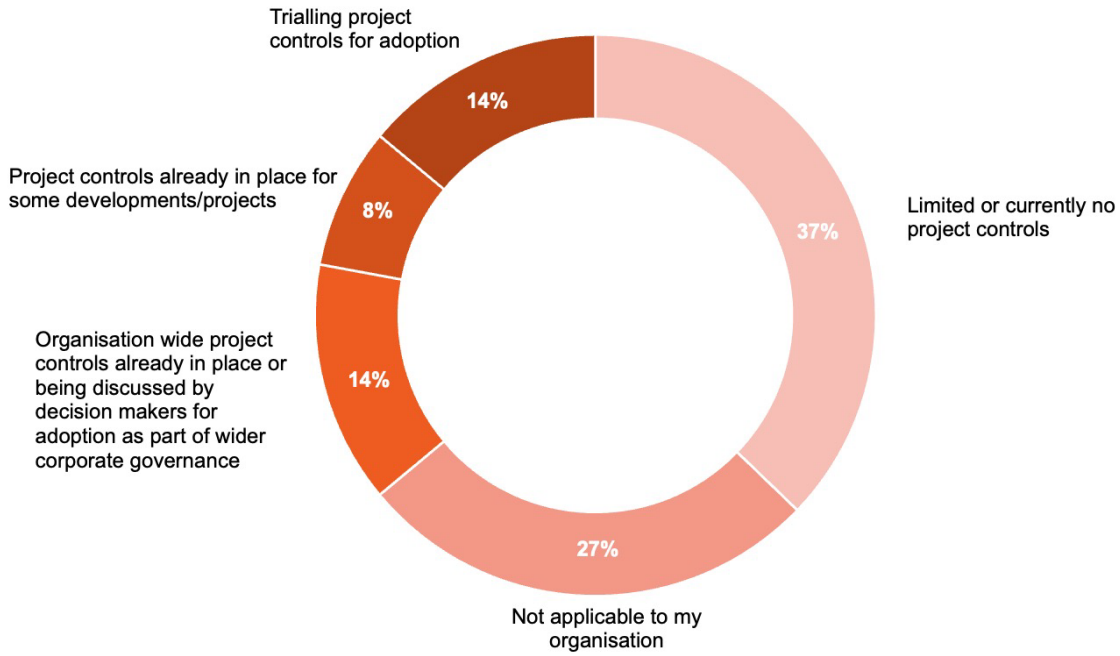
Source: Artificial Intelligence – Impact on the Built Environment, Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend, September 2025

Does your organisation have project controls to manage risk where AI is used for the design and construction of built assets?

Equally important is cascading corporate-level governance down to robust project controls. Currently, many organisations across the sector are making sizeable provisions in their balance sheets, impacting annual revenue and earnings, due to significant claims arising from project delivery. We explored the use of projects controls to manage risk related to the use of AI for design and construction. The top responses were:

- **37% of organisations currently have limited or no project controls to manage risk where AI is used for design and construction.**
- **Only 14% of respondents have organisation-wide project controls in place or planned for adoption as a part of wider corporate governance.**

Project Controls for AI in Design and Construction in the Built Environment



Source: Artificial Intelligence – Impact on the Built Environment, Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend, September 2025

Does your organisation allow its service providers, suppliers, or contractors to use AI in the delivery of services and/or projects to you?

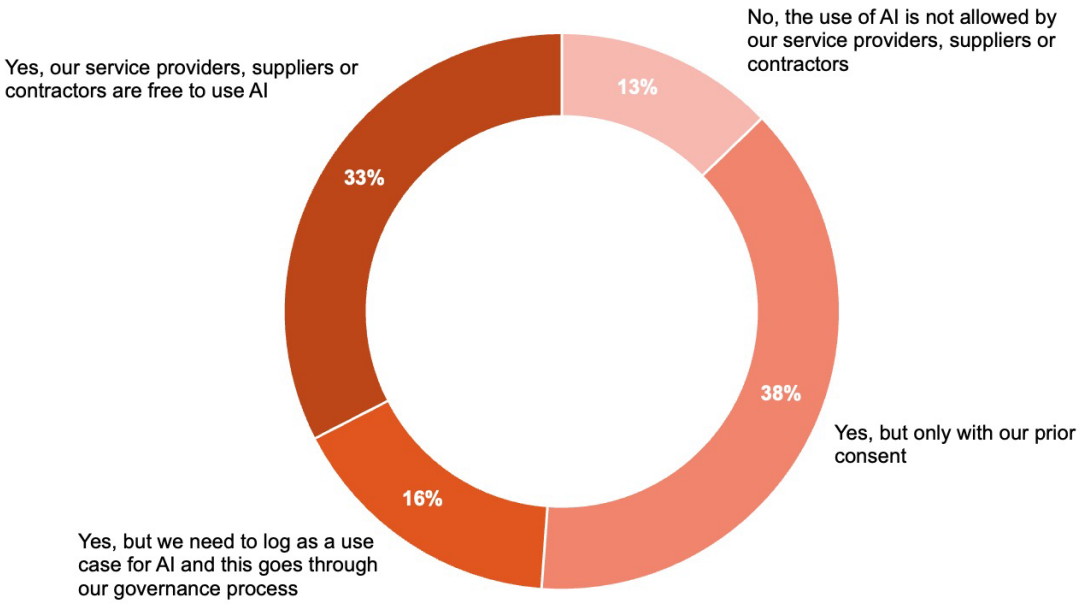
Another critical area for governance and project controls in the design and construction of infrastructure and buildings is how AI is used by the sector's complex supply-chains of service providers, suppliers of manufactured components and equipment, and layers of specialist contractors who are often responsible for detailed design development and construction. We explored the use of AI by the supply chain, finding that:

- **38% can use AI with prior consent.**
- **33% are free to use AI.**
- **16% can use AI, but it must be logged and managed through a governance process.**

Key takeaways

- **AI is a disruptor.** A wide majority of respondents anticipate their current business model to be impacted by AI, with nearly a quarter taking active steps to adapt their business model.
- **AI policies are important.** A wide majority of respondents have either implemented AI policies or plan to do so.
- **Project controls are lacking.** A plurality of organisations have limited or no project controls to manage risk where AI is used for design and construction.
- **AI is permitted across supply chains.** A large majority of organisations permit their service providers, suppliers, and contractors to use AI in project delivery.

Use of AI by Service Providers, Suppliers, or Contractors in Project Delivery in the Built Environment



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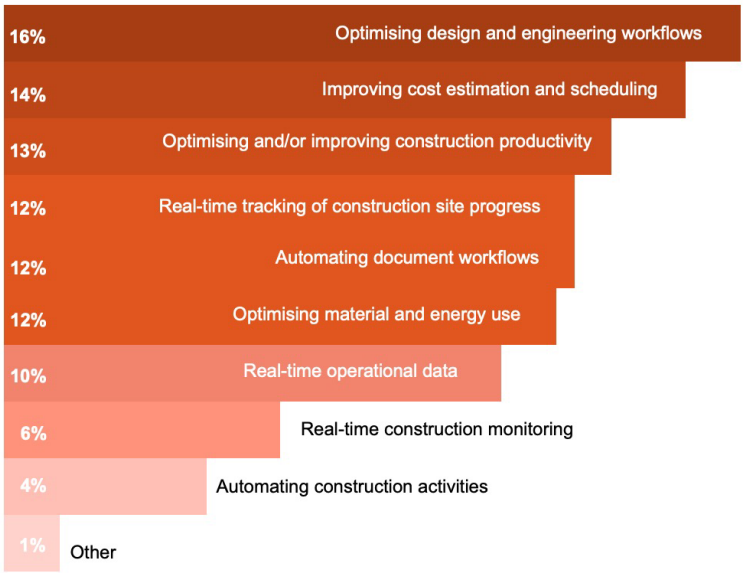
RETURN

Where do you see AI making the most significant impact or improvement to construction and the built environment?

Improving the inherent complexities of the project delivery lifecycle and supply chain can be a difficult and daunting process. As part of the survey, we wanted organisations to identify the most significant impact or improvement that might be made through the deployment of AI. Results were varied, with the top responses being:

- **Optimising and/or improving the productivity of design and engineering processes, including generative design and multi-factor design optimisation (16%).**
- **Improved cost estimation and forecasting, and scheduling through analysing historical data, market intelligence, and other data sets (14%).**
- **Optimising and/or improving the productivity of construction processes, including through programming and planning of construction activities (13%).**

Impact of AI on Build Environment Sector



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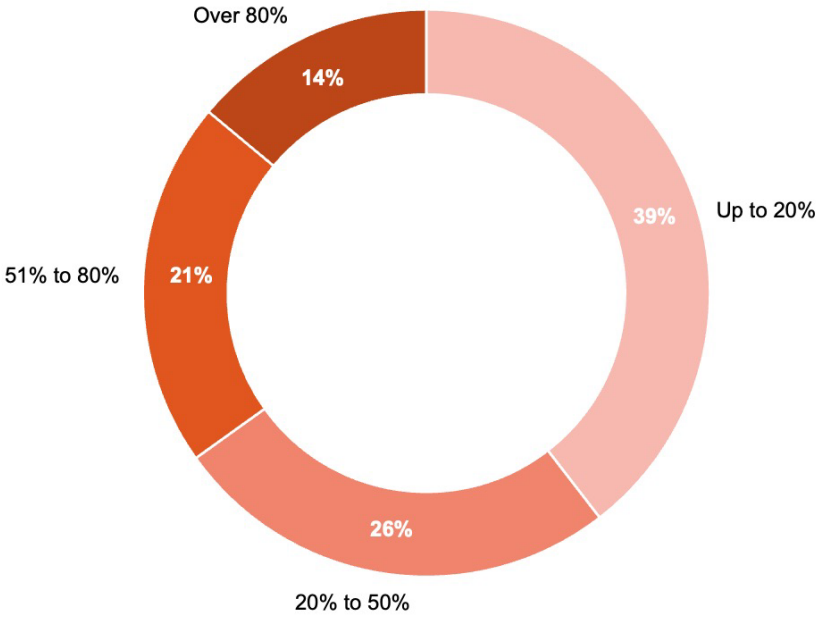
In three years, what percentage of projects in which your organisation is involved would you expect to be significantly leveraging AI in project design and engineering?

Looking to the near future, we asked organisations what percentage of their projects would be significantly leveraging AI in project design and engineering. The survey found that:

- **39% anticipate that up to 20% of projects will leverage AI.**
- **26% anticipate that between 20% to 50% of projects will leverage AI.**
- **35% anticipate that more than half of projects will leverage AI.**

Percentage of Projects Significantly Leveraging AI in next Three Years – Project Design and Engineering



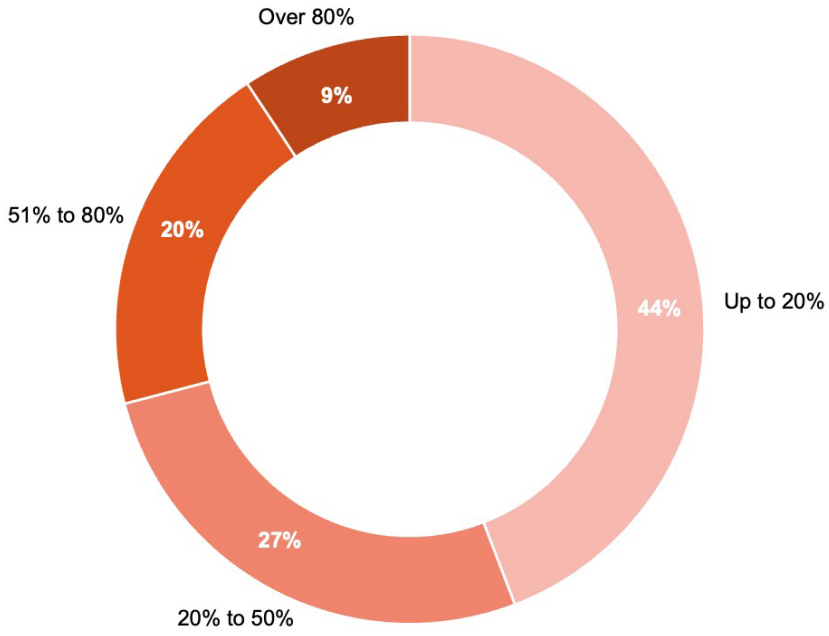
Source: Artificial Intelligence – Impact on the Built Environment, Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend, September 2025

In three years, what percentage of projects in which your organisation is involved would you expect to be significantly leveraging AI to deliver the construction works on the project?

We asked a similar question regarding the use of AI in construction. The survey found that:

- **44% anticipate that up to 20% of their projects will leverage AI.**
- **27% anticipate that between 20% to 50% of their projects will leverage AI.**
- **29% anticipate that more than half of their projects will leverage AI.**

Percentage of Projects Significantly Leveraging AI in next Three Years – Construction Delivery



Source: Artificial Intelligence – Impact on the Built Environment, Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend, September 2025

Where is your organisation planning to invest to boost use of AI over the next three years?

Finally, we explored the areas where AI organisations will invest to enable the anticipated impact and future return across these use cases. Top responses were:

- **Technical capability, people and workforce skills, and capability to train and use AI (24%).**
- **Development of standardised data and processes (20%).**
- **Leadership and management in relation to AI (15%).**

Key takeaways

- **AI will impact design, construction, and cost.** While responses varied, respondents primarily anticipate AI will improve design and engineering process productivity; cost estimate, forecasting, and scheduling; and construction process productivity.
- **AI will increase over the next three years.** Around one-third of organisations predict that more than half of projects will leverage AI for design and engineering and construction in three years.
- **Organisations will invest in people and processes.** While responses varied, respondents will primarily invest in technical capabilities, standardised data and processes, and AI leadership and management to boost AI returns.

Where are Organisations Planning to Invest to Boost the Use of AI over the Next Three Years

The percentage of responses that identified the following as one of their top three investments

Source: Artificial Intelligence – Impact on the Built Environment, Pinsent Masons, Bentley Systems, Mott MacDonald, and Turner & Townsend, September 2025

WHAT LEADERS SHOULD DO NEXT

Following the survey, Pinsent Masons and Bentley Systems convened a group of 40 senior executives to discuss the impact of AI on the Built Environment sector's business model and to discuss what leaders should do next. The group included leaders from across government, investors, legal experts, technology solutions providers, project and cost managers, engineering designers, contractors, and clients of the sector.

The consensus view was that AI will have a largely incremental impact on the Built Environment to start with, but that significant disruption should be anticipated when the benefits of AI become more widely felt across the sector. Substantial levels of investment will be needed to change a siloed and heavily fragmented industry to a more integrated, digital data-driven, and modernised alliance of different capabilities. Additionally, the global tech sector may cause additional disruption as it invests trillions of dollars into AI infrastructure that will continue to reshape all sectors of the global economy.

So, what should leaders do now to ensure that their businesses are ready for significant future change? There are five key areas that leaders should consider:

- Develop a clear vision of how AI might disrupt the way built assets are developed and operated. This would also require developing a roadmap for change, and keeping the roadmap under review as the pace of change accelerates.
- Develop clear governance and risk management, particularly around data standards, ethics, and data sharing protocols, which are essential. This should include consideration of cybersecurity, business resilience, and protection of intellectual property assets.
- Ensure that data is standardised, machine-readable, and actionable with common data environments that enable project data to be shared, similar to other advanced manufacturing industries.
- Focus on talent acquisition. People and talent will be crucial in all aspects of AI development and adoption. Attracting the right talent can help to modernise a conservative and change-averse sector.
- Create environments for exploring the benefits of AI without impacting operational delivery. Exploration and learning will be required to enable new ideas to be safely implemented. Safety is critical in the sector, so it is difficult to trial new technologies and approaches on live projects.