PSMJ | 50 YEARS

AI in AEC Benchmark Survey Report

Current opportunities, challenges, strategies, and use-cases of artificial intelligence in the architecture and engineering industry

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Executive Summary

Artificial Intelligence has broken through as the most intriguing, disruptive, and potentially transformative technology since the adoption of the internet. The questions posed by leaders of AEC firms point to ways in which AI may impact both design and business functions:

How can AI enhance design efficiency without compromising creativity and human judgment?

What's our liability and professional responsibility when using AI-generated designs or analyses?

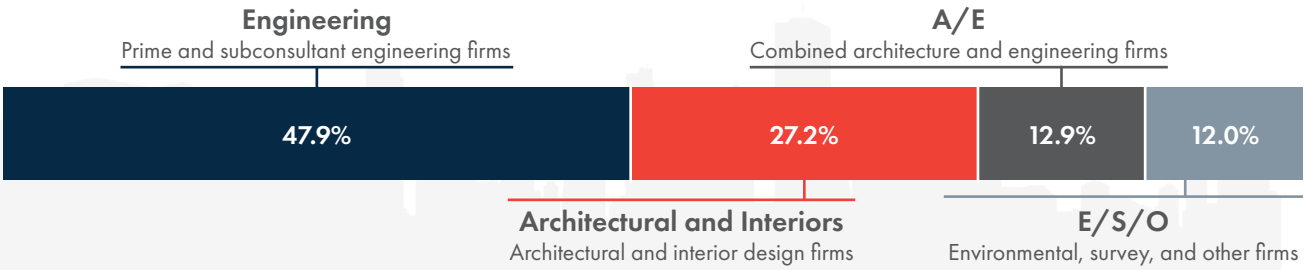
What's the return on investment for AI implementation, and how do we justify the costs?

Which AI tools and platforms should we adopt, and how do we avoid tech fragmentation?

How do we retrain our workforce and manage the cultural shift toward AI-assisted practice?

The purpose of this survey report is to provide AEC firm leaders with benchmarking data for assessing their current and future AI strategy. PSMJ polled **140 architecture and engineering firms** in April 2025 to assess the current state of adoption of artificial intelligence technology in both business and technical project applications.

Distribution of Survey Respondents by Firm Type



Distribution of Firms by Size

Executive Summary: 5 Key Takeaways

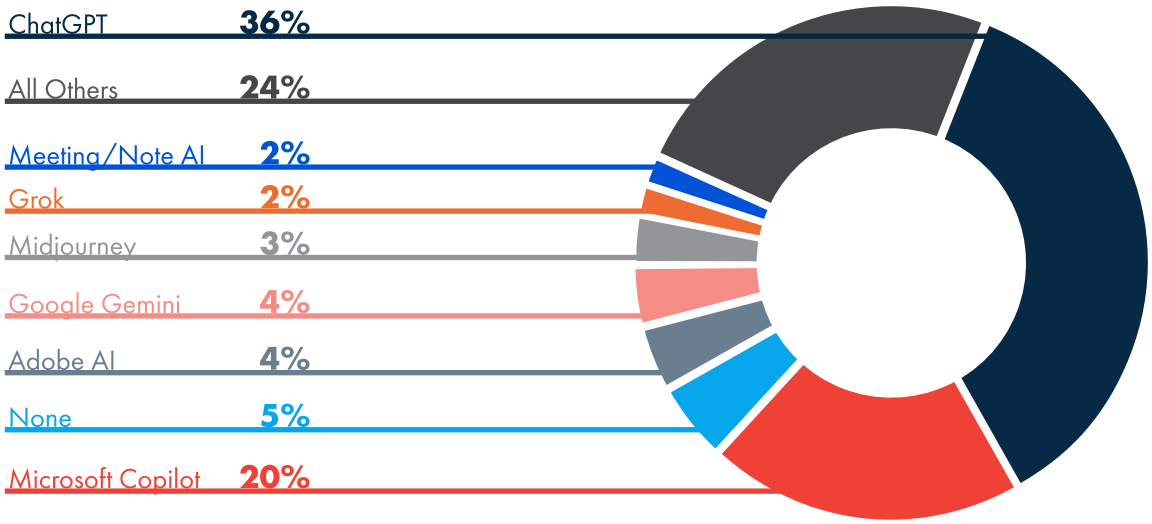
1. Implementation Patterns

The AEC industry remains in the early experimental stages of AI implementation, with 67.9% of firms in PSMJ's 2025 survey just beginning to explore AI applications and only 1.4% reporting advanced integration in core workflows. Nearly half of surveyed firms (46.4%) have established formal AI governance structures through task forces or committees.

- **Limited Workforce Usage: 40.7% of firms report less than 10% of their workforce uses AI tools for essential job functions**
- **Project Integration: 67.1% of firms use AI in less than 10% of their projects**
- **Budget Allocation: 77.1% of firms allocate less than $20,000 annually to AI tech, with 93.6% dedicating less than 10% of their CAPEX budget to new AI applications**

2. Current Applications

AI adoption is concentrated in non-technical business functions:



3. Implementation Challenges

The primary concerns inhibiting wider adoption include:

1. Data security and privacy
   Ranked #1 by 46.4% of respondents
2. Reliability of AI outputs
   Ranked #1 by 25.5% of respondents
3. Staff resistance and adoption challenges (Ranked #1 by 7.8%)
4. Initial investment costs (Ranked #1 by 6.4%)
5. Regulatory compliance (Ranked #1 by 5.7%)

4. Business Impact: Where is AI helping?

A **ROI**
Marketing and Business Development departments show the greatest return on investment

B **Project Delivery**
45% report minimal measurable impact yet, while 30% report modest improvements in efficiency

C **Staffing**
75% of firms report no significant impact on hiring strategy to date

5. AI in AEC Outlook:
The most common themes we hear

Efficiency improvements in project delivery and administrative functions

Staffing model adjustments with evolving role requirements

Service offering expansion including AI-enhanced design capabilities

Business model evolution with potential changes to fee structures

Strategic Recommendations

1. Establish formal governance frameworks and policies
2. Focus initial implementation on high-ROI administrative applications
3. Develop structured staff training programs
4. Implement measurement systems to track efficiency gains
5. Monitor industry-specific AI developments and prepare for strategic shifts

In-Depth Survey Analysis

This report analyzes the findings from a comprehensive survey of over140 architecture and engineering (AEC) firm executives regarding their adoption and implementation of artificial intelligence tools and applications. The survey reveals an industry in the early stages of AI adoption, with firms beginning to recognize potential benefits while navigating significant implementation challenges.

Key findings include:

Adoption Status

The majority of firms **(67.9%)** are in the early experimental stage of AI implementation, with only **1.4%** reporting advanced integration in core workflows.

Current Applications

Client communication tools **(60.7%)** and proposal development **(50.7%)** represent the most common AI applications, with minimal usage in technical design functions.

Budget Allocation

77.1% of firms allocate less than **$20,000** annually to AI technologies, with **93.6%** dedicating less than **10%** of their CAPEX budget to new AI applications.

Primary Concerns

Data security/privacy and reliability of AI outputs emerged as the top concerns for AEC firms implementing AI.

Limited Workforce Usage

40.7% of firms report that less than **10%** of their workforce uses AI tools for essential job functions.

Outlook

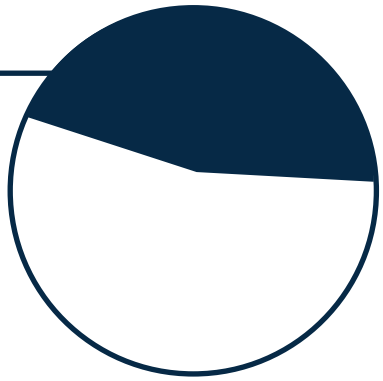
Firms anticipate AI implementation will lead to increased efficiency, reduced project timelines, and potential staffing model changes over the next **3-5 years**.

Industry Profile
& Current AI Adoption Status

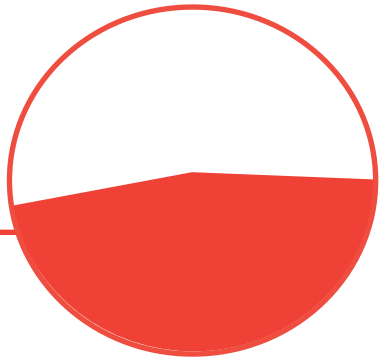
AI Adoption Governance

Nearly half of firms have formalized their AI adoption approach:

46.4%
have established AI applications task forces or adoption review committees



45.7%
have implemented formal AI Use Policies

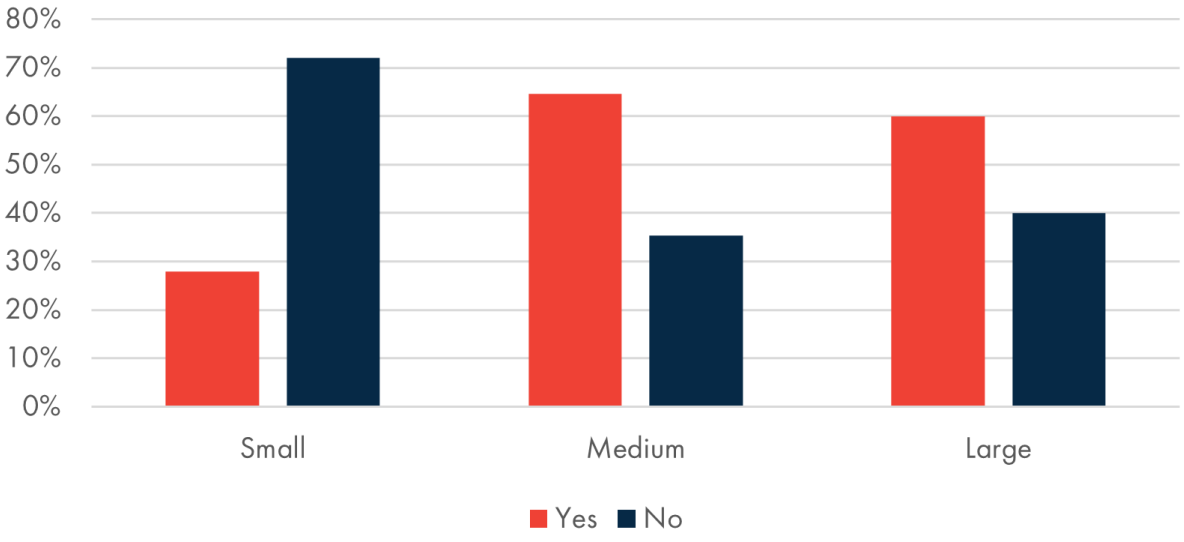


Most firms without either of these cite being in early evaluation stages

AI Task Force Creation by Firm Size

(Small:1 - 50 employees, Medium: 51 - 200 employees, Large: 200+ employees)

Does your firm have an AI applications task force or adoption review committee?



Current Implementation Maturity

Firms self-reported their AI implementation maturity as follows:

67.9%

STAGE 1: Early experimental

Initial exploration and testing phase

26.4%

STAGE 2: Limited deployment in specific areas

Focused use in select departments

4.3%

STAGE 3: Moderate implementation across multiple departments

Broader adoption across departments

1.4%

STAGE 4: Advanced integration in core workflows

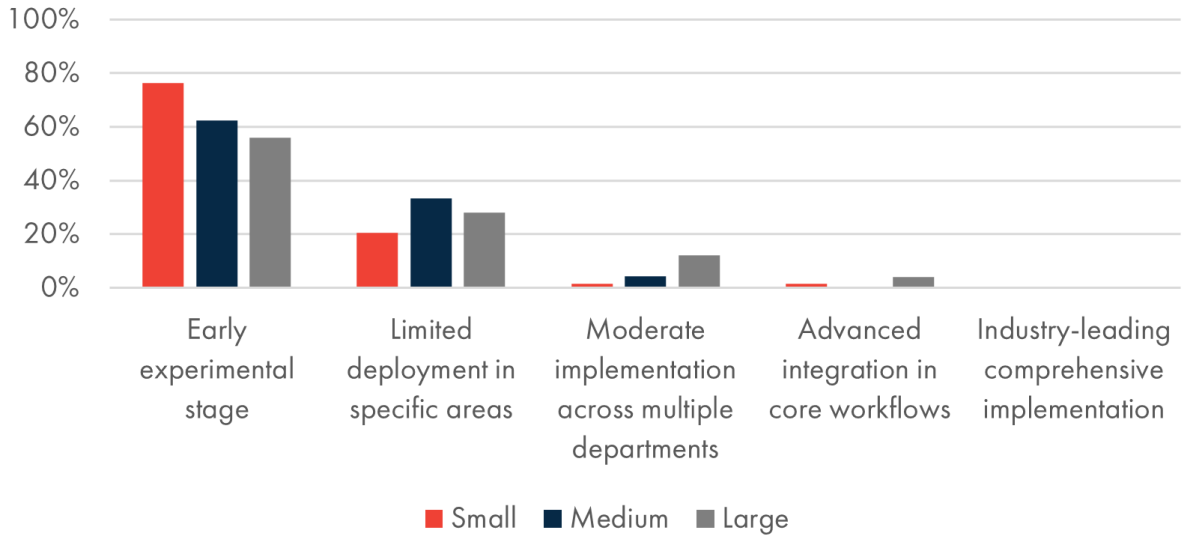
Deep integration into key processes

0.0% STAGE 5: **Full-scale adoption**

Implementation Stage by Firm Size

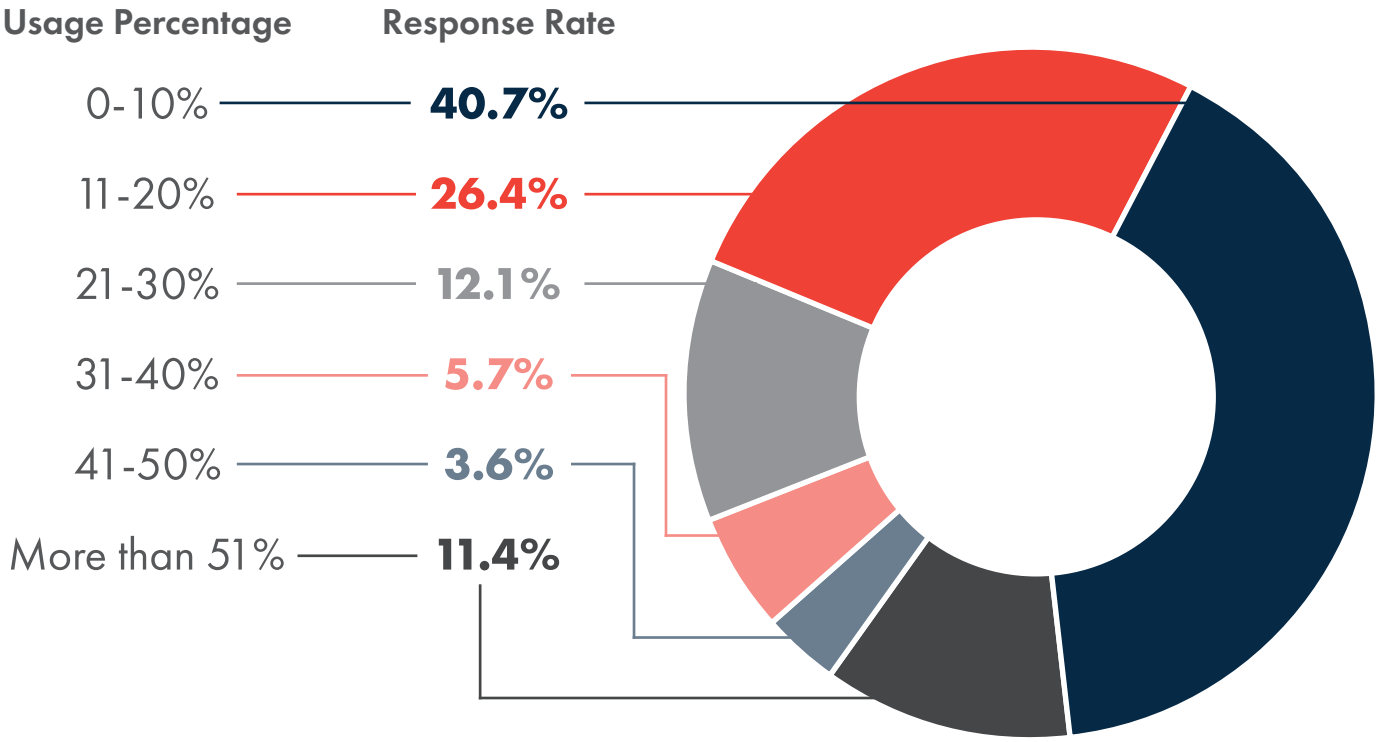
(Small:1 - 50 employees, Medium: 51 - 200 employees, Large: 200+ employees)

How would you rate your firm's overall AI implementation maturity?



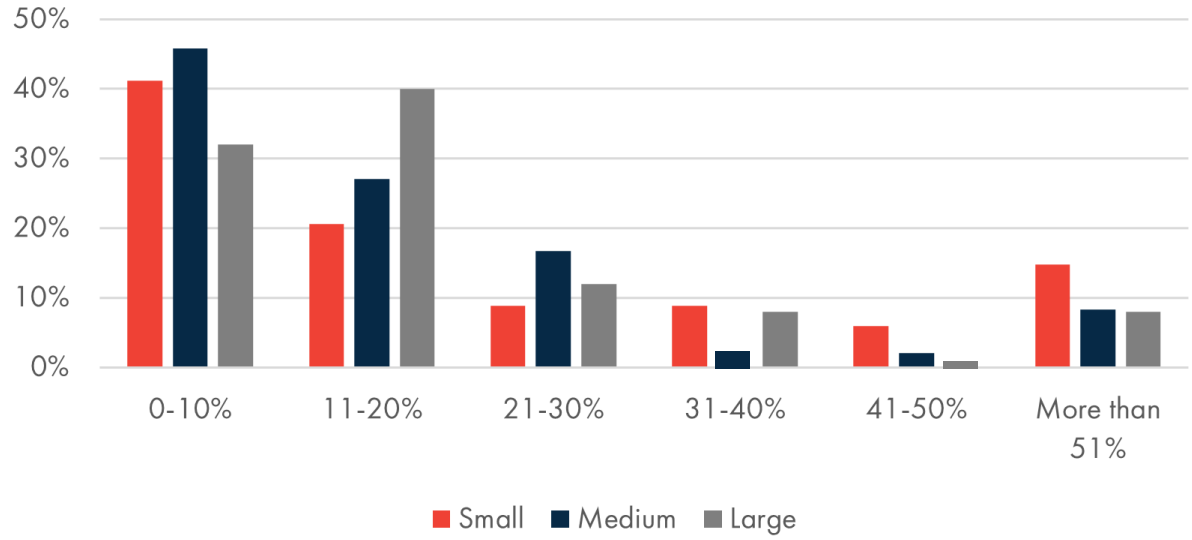
Workforce Utilization

The percentage of the workforce using at least one AI tool in essential job functions:



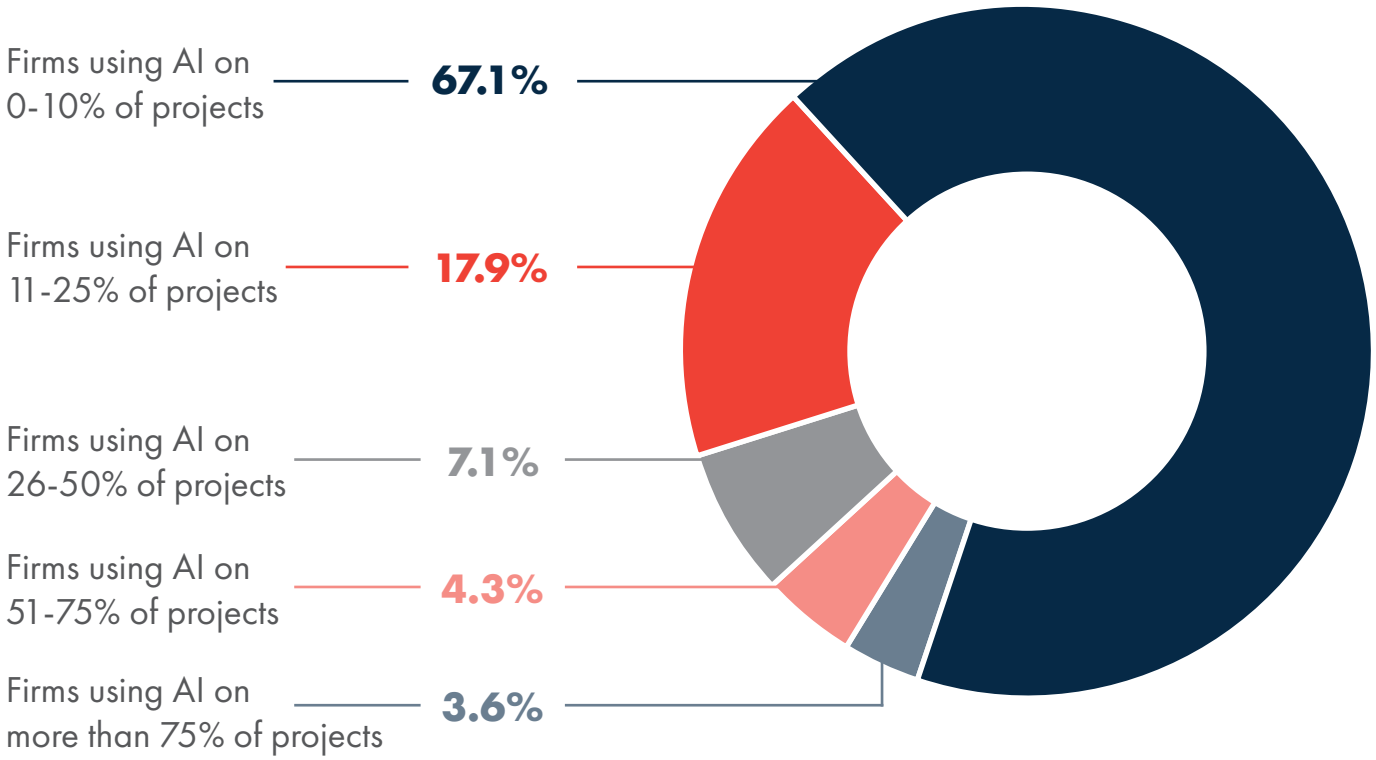
Workforce Utilization by Firm Size

What percentage of your workforce currently uses at least one AI tool in essential job functions?



Project Utilization

The percentage of projects utilizing AI tools in some capacity:



Project Utilization by Firm Size

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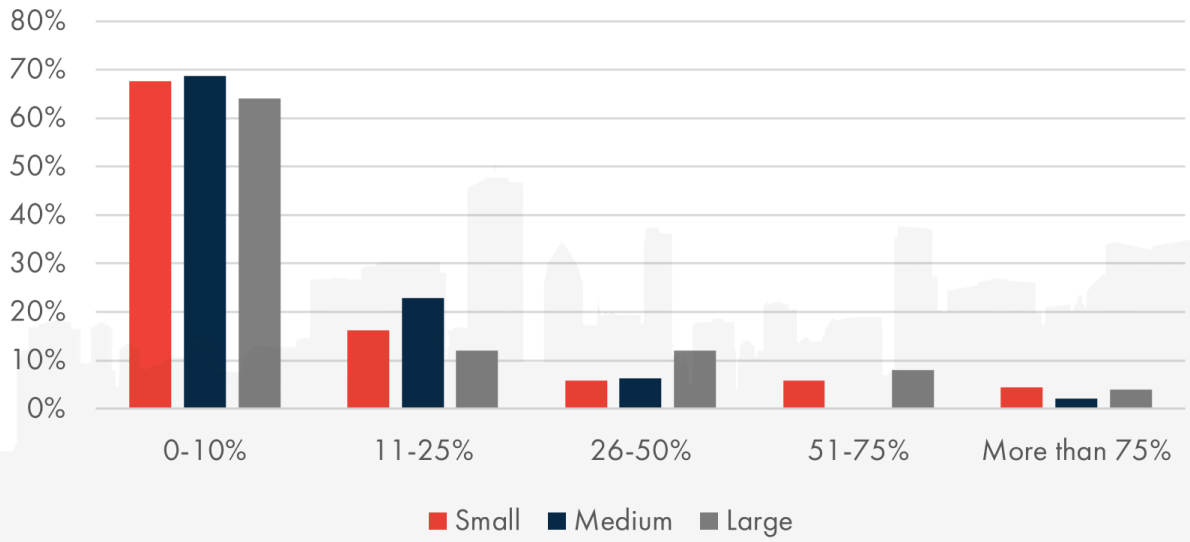


Current AI
Applications & Technologies

Technologies in Regular Use

The most frequently mentioned AI technologies and applications include:

General-purpose AI tools:

- Microsoft Copilot/Microsoft 365 AI features
- ChatGPT/OpenAI platforms
- Google Gemini
- Claude
- Meeting assistants (Zoom AI, Teams Premium)

Industry-specific tools:

- Testfit.io
- Architures
- BIM-based AI optimization tools
- ESRI Machine Learning Models

Creative tools:

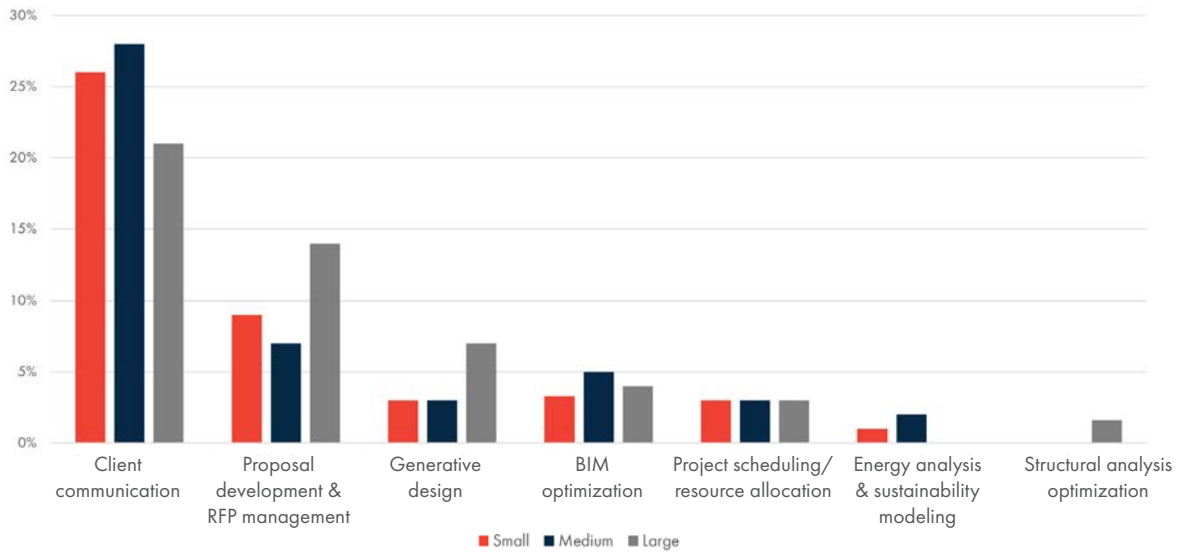
- Midjourney
- Adobe AI features
- Runway
- DALL-E

Business Areas Leveraging AI

	Adoption Rate
Client communication	60.7%
Proposal development and RFP management	50.7%
Generative design	18.6%
BIM optimization	7.9%
Project scheduling/resource allocation	6.4%
Energy analysis and sustainability modeling	6.4%
Structural analysis optimization	1.4%
Construction sequencing simulation	0.7%
Other applications	43.6%

Business Areas by Firm Size

Areas of design practice and business management in which firms are currently using AI



Other Applications Mentioned

- **Marketing content generation (most common)**
- **Meeting notes and transcription**
- **Administrative tasks and HR functions**
- **Code compliance research**
- **Report writing**
- **Data analysis and research**

Project Manager Applications

Write marketing copy for proposals

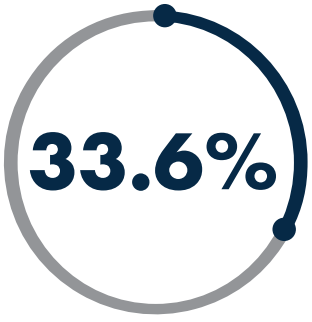
Write internal reports to management

Write client reports on project progress

Develop budgets and schedules

Monitor earned value on projects

Other (meeting notes, content creation)



Departments Showing Greatest ROI

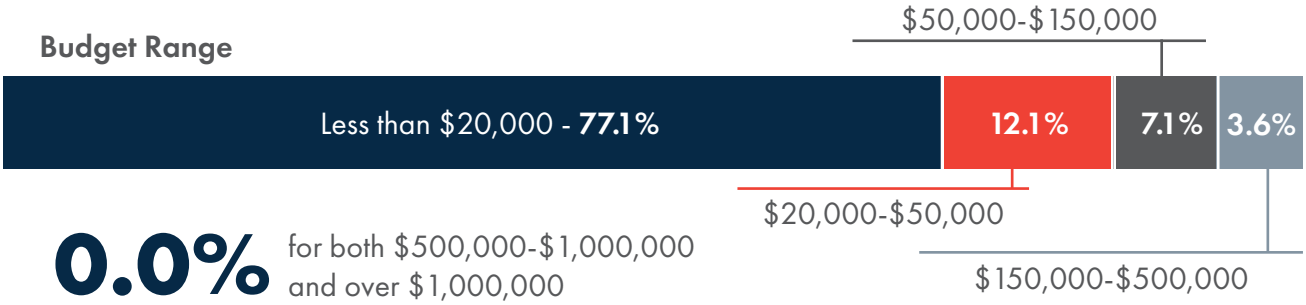
Respondents identified the following departments as showing the greatest return on investment from AI implementation:

1. Marketing and Business Development (most frequently mentioned)
2. Administration and Project Management
3. Design
4. Information Technology
5. Human Resources

25% of respondents indicated it was too early to measure ROI or that they had not implemented AI extensively enough to determine ROI by department.

Investment & Resource Allocation

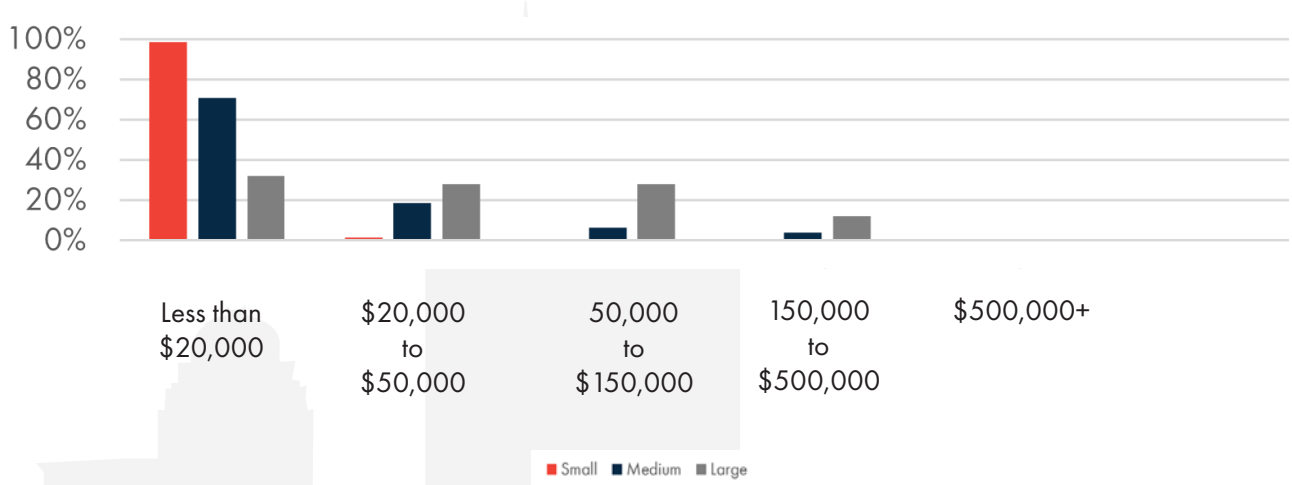
Current Annual Budget Allocation for AI Tools & Technologies



0.0% for both $500,000-$1,000,000 and over $1,000,000

By Firm Size

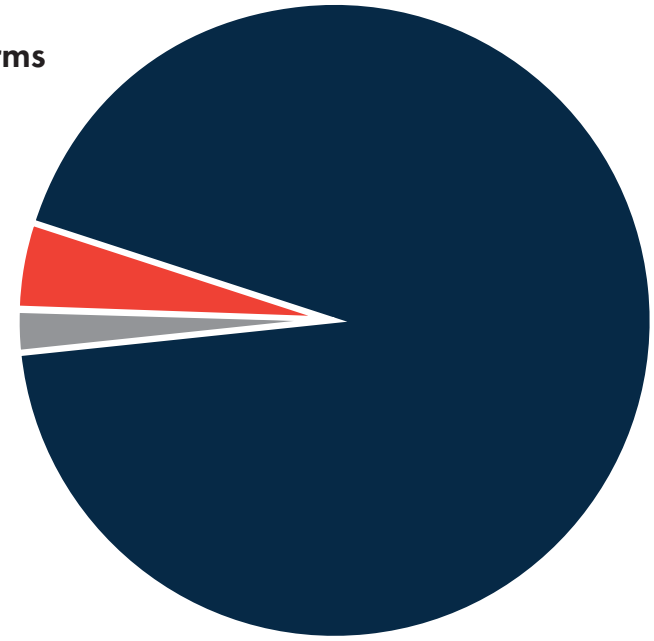
What is your current annual budget allocation for AI tools and technologies?



CAPEX Allocation

Percentage of CAPEX budget allocated to new AI applications:

CAPEX Percentage	Percentage of Firms
0-10%	93.6%
11-15%	4.3%
16-20%	2.1%
21-30%	0.0%



Investment Priorities

Top investment priorities for the next 12-24 months include:

1. Efficiency tools and administrative process automation

2. Training and education for staff

3. Exploring generative design capabilities

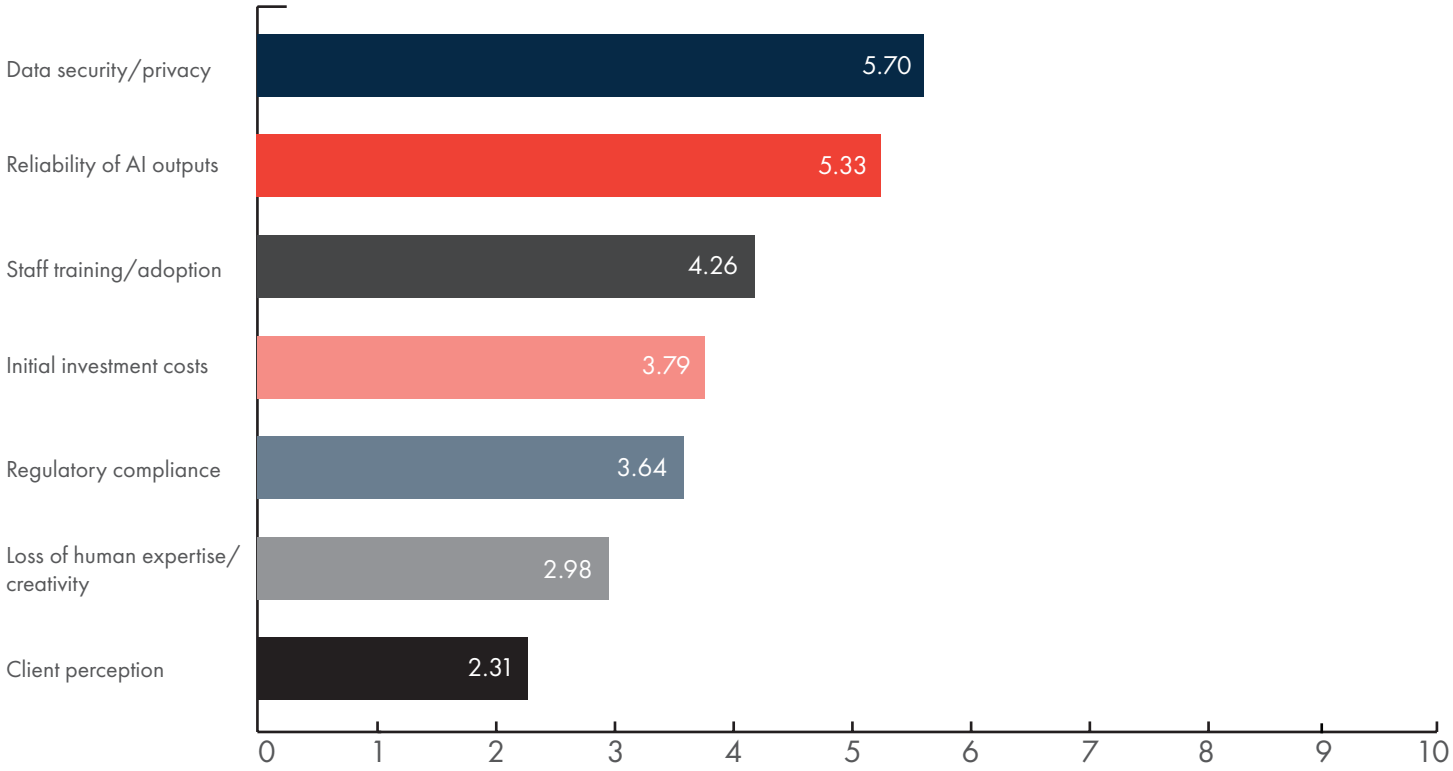
4. Data analytics and reporting improvements

5. Client-facing communication tools

Many firms (approximately 30%) indicated they are still in the evaluation phase, focusing on identifying where AI can provide the most benefit before significant investment.

Implementation Challenges & Concerns

Average rankings of AI implemenation concerns, on a scale of 1-10, with 1 being the least concerning and 10 the most concerning:



Join your colleagues at The Aria in Las Vegas for AEC INNOVATE and hear ACTUAL examples of how your firm can take advantage the latest applications and get FIRST-HAND answers to your questions from the developers and analysts leading the way on AI. It's the MUST ATTEND deep-dive for senior AEC executives, Principals, and digital application and integration professionals.
More information at www.PSMJ.com/INNOVATE

Implementation Barriers

The most frequently mentioned barriers to AI implementation include:

1. Staff resistance and adoption challenges

- Generational differences in technology adoption
- Fear of job displacement
- Skepticism about AI capabilities

2. Technical and resource limitations

- Lack of industry-specific AI solutions
- Difficulty integrating with existing workflows
- Limited time and resources for evaluation

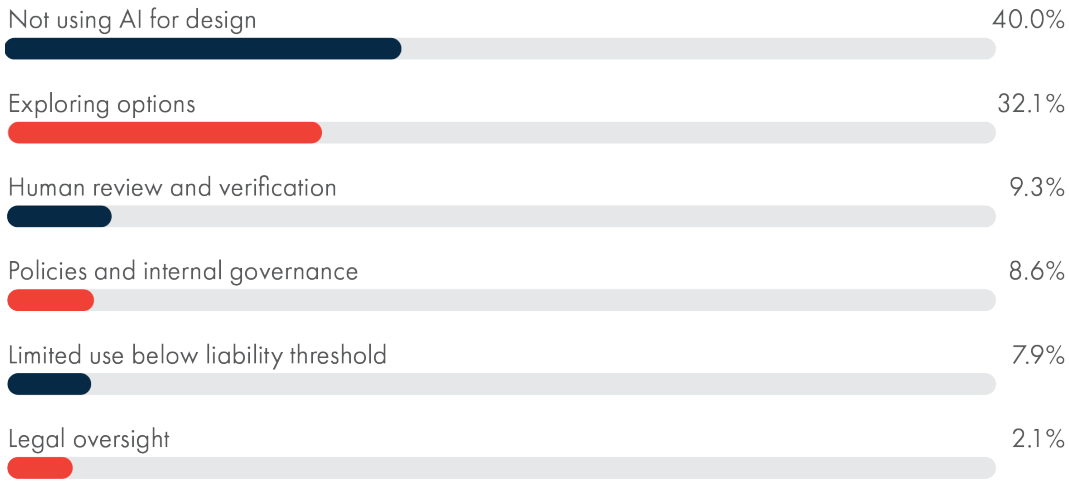
3. Knowledge and expertise gaps

- Lack of internal AI expertise
- Limited understanding of potential applications
- Uncertainty about implementation best practices

4. Trust and reliability concerns

- Output quality and consistency issues
- Data security and privacy concerns
- Intellectual property protection

Liability concerns with AI-generated designs



Common liability management strategies include:

- **Treating AI like an intern requiring thorough professional review**
- **Implementing strict verification protocols**
- **Avoiding use of AI in high-liability areas until more mature**
- **Clear disclosure policies with clients**

Impact & Results

Success Measurement Approaches

Firms are measuring the success of AI implementation through:

Efficiency

- Time savings on tasks
- Acceleration of project delivery
- Reduced labor hours for specific functions

Financial

- ROI calculations
- Project profitability improvement
- Cost savings

Feedback and adoption

- User satisfaction
- Frequency of AI tool usage
- Staff productivity improvements

20% of survey respondants indicated they do not yet have formal measurement systems in place.

Cost Savings Areas

Areas with most significant potential for cost savings:

1. Administrative and marketing functions

- Proposal writing
- Content generation
- Research and reporting

2. Project delivery efficiency

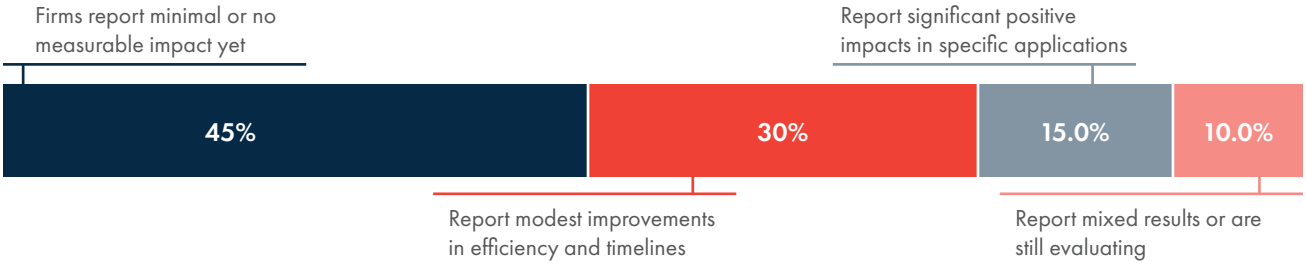
- Design development acceleration
- Code compliance verification
- Quality assurance processes

3. Communication and collaboration

- Meeting efficiency
- Client reporting
- Internal knowledge sharing

Project Delivery Impact

Slightly more than half of firms see competitive advantages from AI implementation



Among firms reporting positive impacts, common benefits include:

- Faster client response times
- Improved proposal quality
- More efficient administrative processes
- Enhanced quality control

Workforce
& Organizational Changes

Workforce Planning Impact

75.3% report no significant impact yet on hiring strategy

15.8% are beginning to seek different skill sets in new hires

4.6% express concerns about retention and role adaptation

4.3% report positive impacts enabling growth and additional hiring

Training Programs

Training approaches for AI upskilling:

New Roles Created

New roles established to support AI initiatives:

70.2% have not created any new dedicated roles

14.8% have established AI or technology committees

10.1% have assigned existing staff members to lead AI initiatives

4.9% have created new positions (Director of AI, AI Officer, Data Specialists)

Outlook
& Strategic Direction

Industry Transformation

Respondents believe AI will transform the AEC industry over the next 5-10 years by:

1. Automating routine tasks

- Reducing time spent on documentation
- Streamlining administrative functions
- Accelerating preliminary design work

2. Enhancing design capabilities

- Enabling more design iterations and options
- Improving sustainability and performance analysis
- Facilitating more customized solutions

3. Changing workforce composition

- Shifting roles toward more creative and strategic functions
- Reducing need for certain technical positions
- Creating new specialized technology roles

4. Transforming business models

- Changing fee structures and service offerings
- Enabling new revenue streams
- Creating competitive differentiation

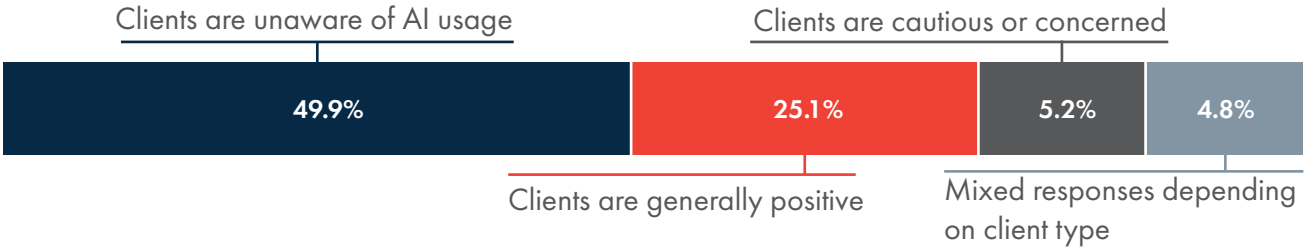
Competitive Advantage Areas

Areas of greatest competitive advantage from AI implementation:

1. **Speed and efficiency in project delivery**
2. **Enhanced quality and reduced errors**
3. **Staff productivity and job satisfaction**
4. **Innovative design capabilities**
5. **Data-driven decision making**

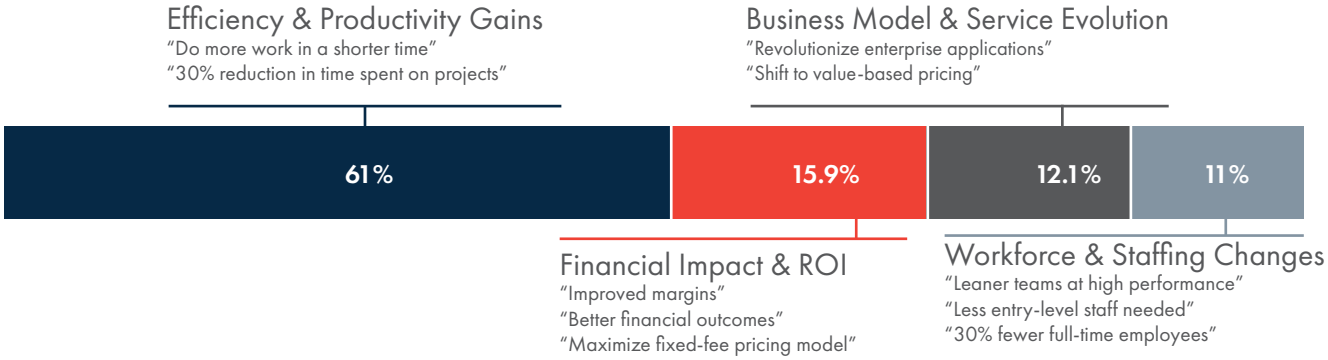
Client Response

Client response to firms' AI use:



Business Model Evolution

Anticipated business model impacts in next 3-5 years:



AEC Executive Insights:

- **"AI will shift our business model toward higher-value consulting by automating routine tasks, enabling data-driven insights, and allowing us to deliver faster, more customized solutions to clients. We will also deliver more projects per FTE than we currently do. It will make us more effiecent allowing us to lean into our client experience even more as our differentiator."**
- **"We will stop calculating fees based upon hours of labor to produce 2D construction documents and begin setting fees based upon the value we deliver."**
- **"I expect to shift to a fixed-fee pricing model, improve multipliers, and execute more projects with less people."**

Emerging Technologies Monitored

Technologies being monitored for future implementation:

1. Design-specific AI tools

- Generative design enhancements
- BIM-integrated AI
- Visualization technologies

2. Project analytics

- Predictive analytics for project performance
- Resource optimization
- Risk assessment tools

3. AEC-specific apps

- Code compliance automation
- Energy modeling and sustainability analysis
- Construction sequencing optimization

Conclusion & Recommendations

Current State Assessment

The AEC industry is clearly in the early adoption phase of AI implementation, with most firms taking cautious, exploratory approaches. The focus is primarily on enhancing administrative functions and client communications rather than transforming core design or engineering processes.

Key observations:

- **Implementation is variable across firm sizes**
- **Budget allocations remain modest**
- **Primary barriers involve culture and expertise**
- **Most firms lack formalized measurement**

Recommendations

Based on survey responses and industry trends, firms should consider:

1. Establish governance frameworks

Create AI use policies and review committees
Develop liability mitigation strategies
Implement data security protocols

2. Focus on high-ROI applications first

Target administrative and proposal functions
Implement meeting note automation
Enhance research and content capabilities

3. Develop staff

Implement structured training programs
Identify and support AI champions
Create knowledge-sharing mechanisms

4. Measure and communicate results

Establish baseline metrics
Track efficiency and quality improvements
Share success stories internally

5. Prepare for strategic shifts

Monitor industry-specific AI developments
Reassess service offerings and fee structures
Evaluate potential business model evolution

This report was prepared based on survey responses from 140 architecture and engineering firm executives collected in March-April 2025. All percentages and statistics reflect the responses provided and may not represent the entire AEC industry.