Architizer + chaos

The State of AI in Architecture

Architizer and Chaos are pleased to share insights gained from a survey of the current use and future possibilities of AI in architectural design.

2024

This report covers the following questions:

Are architects using AI for design? How are architects using AI in projects? How do architects feel AI will affect the profession?
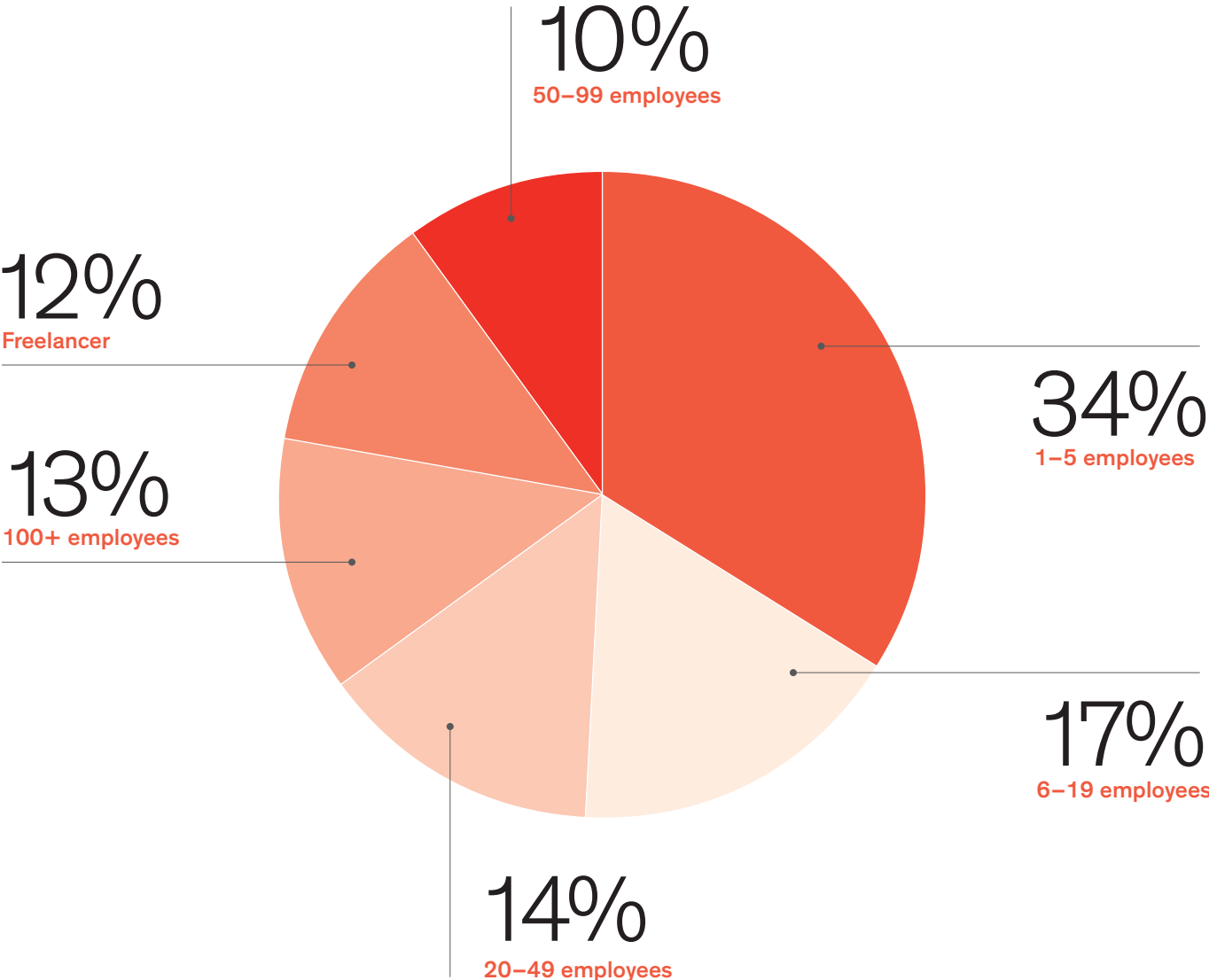
Key Findings

Architizer and Chaos administered a survey gauging current levels of use, types of application, and expectations for the future of Artificial Intelligence (AI) among architects and related design professionals. Key themes that emerged include:

- AI is steadily becoming a part of architect's workflows, with its rise being driven by experimentation and self-learning.
- Designers using AI are most satisfied with its application in early project phases, though some are finding inventive uses for it elsewhere.
- There is concern around the current lack of AI regulation and ethical guidelines within architecture.
- Beliefs about the place of AI in architecture are polarized, but most acknowledge the potential value it can bring to the industry.

About the Respondents

Among 1,227 respondents, a majority of 63% worked in a firm of 20 employees or less. The most represented location was the United States, accounting for about a third of all responses, with a majority of respondents spread across 118 different countries from around the world.
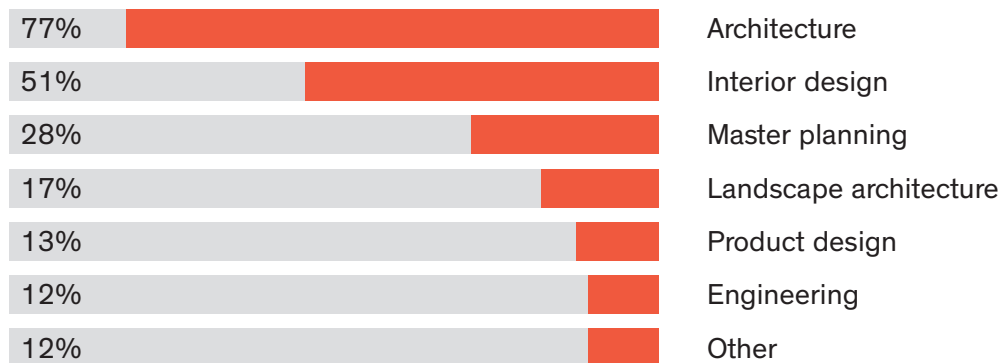
What size is your firm?

10%
50–99 employees

12%
Freelancer

13%
100+ employees

34%
1–5 employees

17%
6–19 employees

14%
20–49 employees

Respondents by country

Where is your firm headquarters located?	Percent
United States	35%
United Kingdom	6%
India	4%
Canada	4%
Italy	3%
Mexico	3%
Australia	3%
Germany	2%
Portugal	2%
Brazil	2%

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The majority of respondents came from the US, but
we had respondents from more than 118 countries.

# What types of work does your firm specialize in?

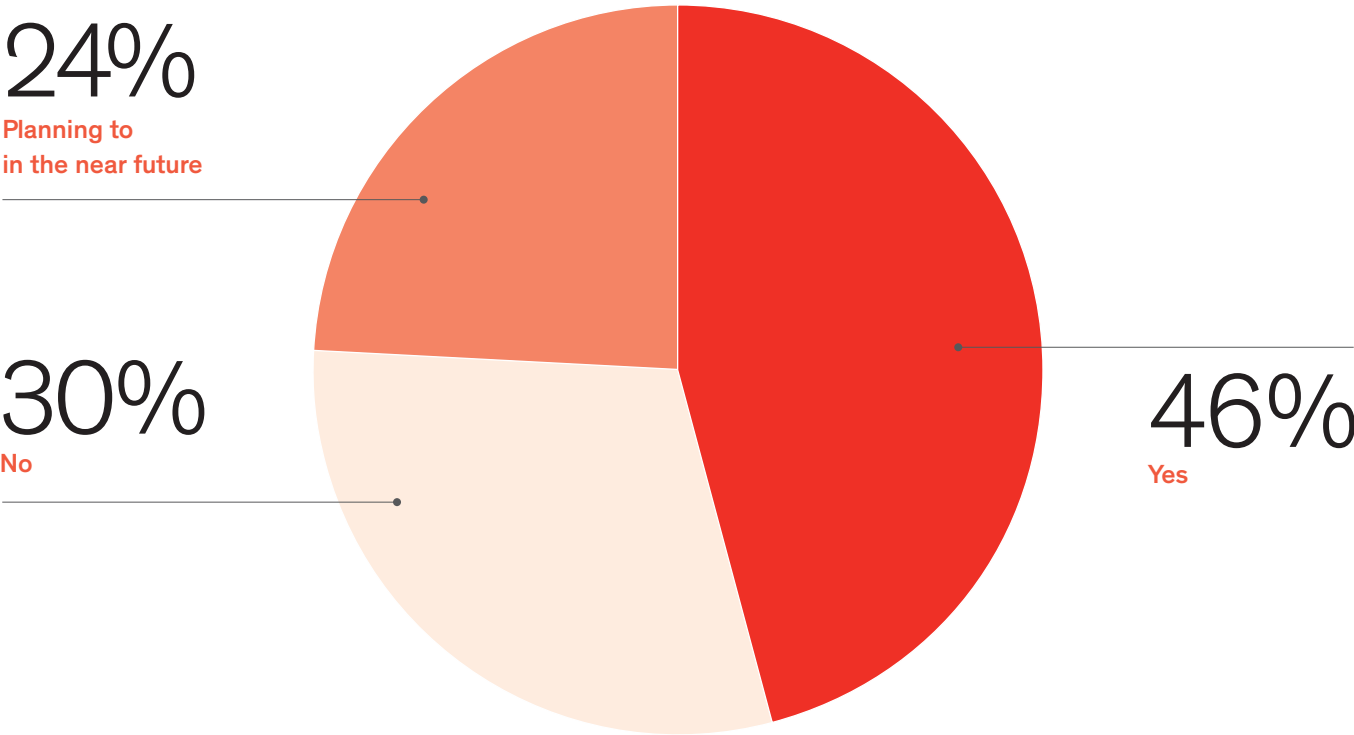| Percent	Type
77%	Architecture
51%	Interior design
28%	Master planning
17%	Landscape architecture
13%	Product design
12%	Engineering
12%	Other

Most respondents (77%) worked in a practice offering architectural design, though interior design and master planning were also well-represented, with adjacent AEC disciplines such as engineering or landscape architecture having a small but notable presence.

Some 46% of respondents are currently using AI tools or features in their architectural projects, with an additional 23% planning to use AI in the near future.
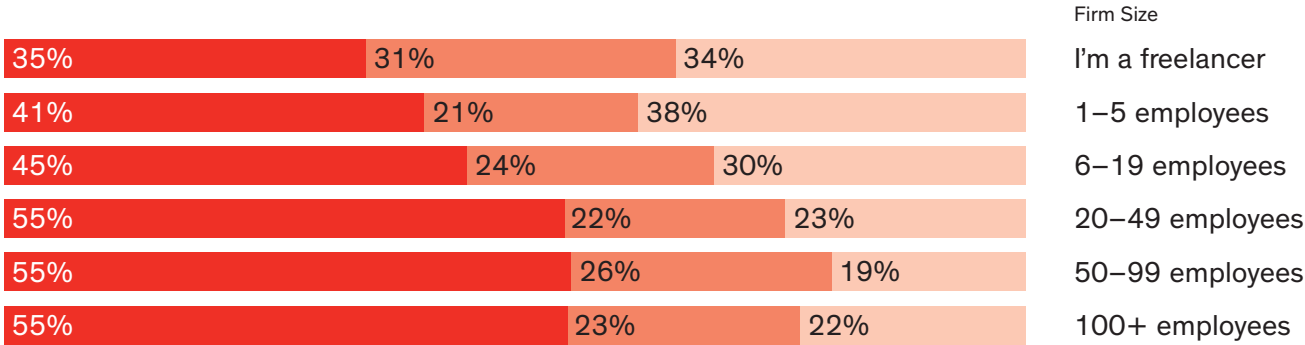
Have you received any formal training in using AI tools for architectural design?
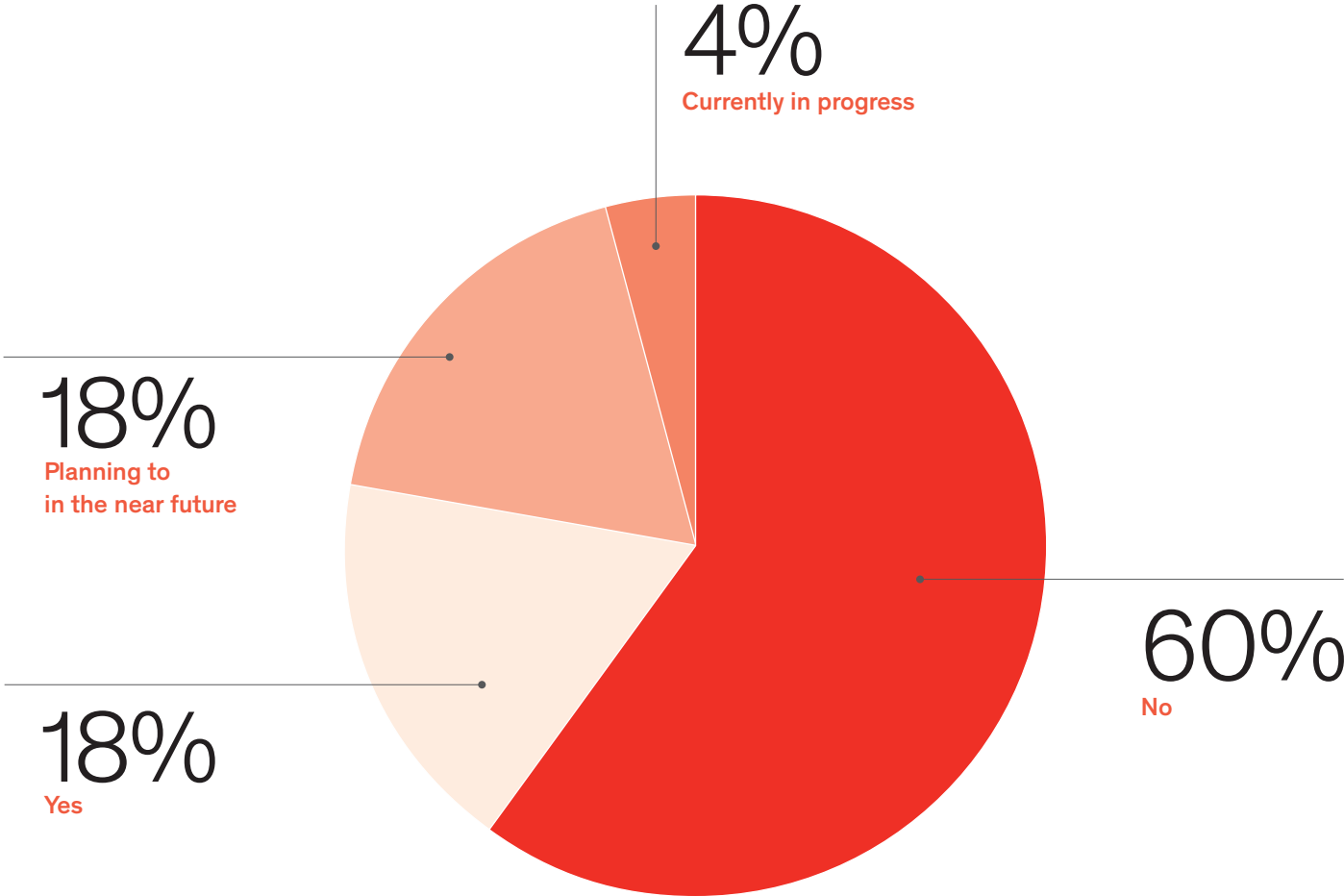
4%
Currently in progress

18%
Planning to
in the near future

18%
Yes

60%
No

Are you currently using AI tools or features in your architectural projects?

24%
Planning to in the near future

30%
No

46%
Yes

Are you currently using AI tools or features in your architectural projects?

Firm Size

35%	31%	34%	I'm a freelancer
41%	21%	38%	1–5 employees
45%	24%	30%	6–19 employees
55%	22%	23%	20–49 employees
55%	26%	19%	50–99 employees
55%	23%	22%	100+ employees

■ Yes
■ Planning to in the near future
■ No

Early AI: Experimental and Evolving

AI use in architecture is being driven by self-learning.

At the heart of the survey is the finding that more than two thirds of respondents are either currently using AI or planning to in the future. A consistent pattern is seen when cross-referenced against firm size, with increasing AI use clearly visible as firm size increases from freelancers, to small, then to medium-sized firms. This level of use peaks and remains at 55% for firms of at least 20 to 100+ employees, a consistency that suggests that human resources are critical to the risk-reward calculation when considering the utility of AI in architecture.

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Of those currently using AI, just over a third cited integration issues with existing software, a lack of time to test and implement, and a lack of suitable training resources as challenges they've faced in adopting AI tools for architectural projects.

Strikingly, 60% of respondents have not received any formal training in using AI tools for architectural design. With an additional 18% indicating they plan to in the near future, this brings a lack of formal training among respondents to over three quarters, illustrating widespread experimentation and self-learning among those currently using AI. These figures are likely due to a lack of established guidelines specific to AI in architectural design, but they also suggest future best practices for AI in architecture will be developed by today's experimenters.

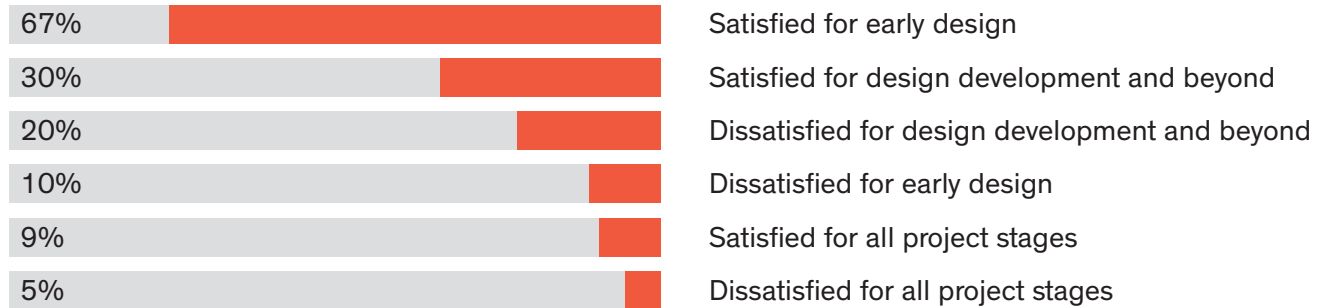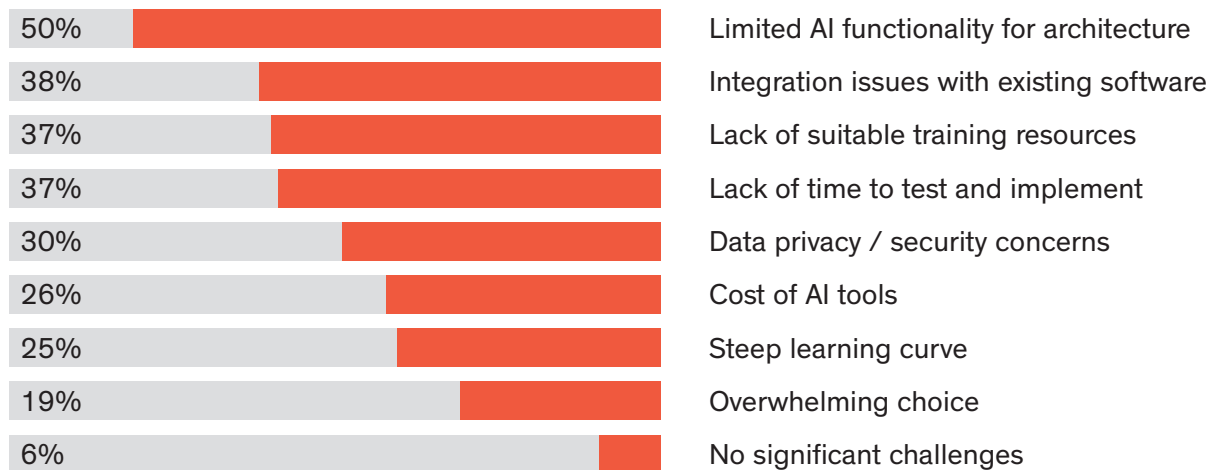These early adopters also illuminated some of the limitations with AI in its current state. Of those currently using AI, just over a third cited integration issues with existing software, a lack of time to test and implement, and a lack of suitable training resources as challenges they've faced in adopting AI tools for architectural projects.

How satisfied are you with the quality of AI-generated renderings compared to traditional methods?

67%	Satisfied for early design
30%	Satisfied for design development and beyond
20%	Dissatisfied for design development and beyond
10%	Dissatisfied for early design
9%	Satisfied for all project stages
5%	Dissatisfied for all project stages

What challenges have you faced in adopting AI tools for architectural projects?

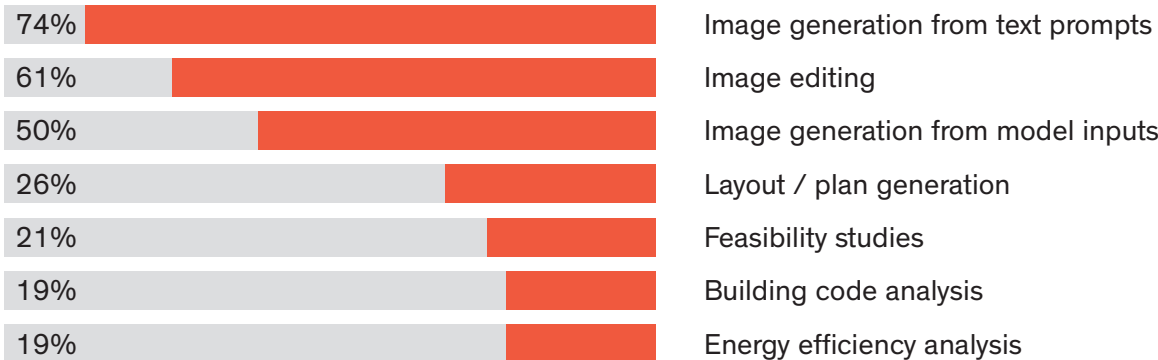|	
50%	Limited AI functionality for architecture
38%	Integration issues with existing software
37%	Lack of suitable training resources
37%	Lack of time to test and implement
30%	Data privacy / security concerns
26%	Cost of AI tools
25%	Steep learning curve
19%	Overwhelming choice
6%	No significant challenges

AI is currently viewed as being best suited to early design phases.

By some distance, the most common current application for AI in architectural design is image generation from text prompts, with image editing and image generation from model inputs both also proving to be popular use cases. All other uses, such as layout/plan generation, feasibility studies, and building code and energy efficiency analyses, were reported at rates of 25% or less.
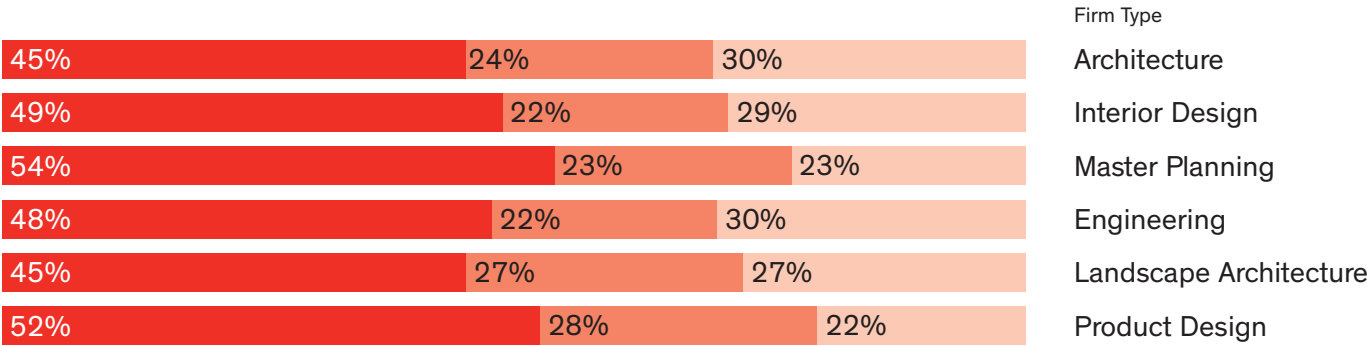
Which of the following project stages do you think has the most potential to be improved or enhanced by AI technology?

%	Stage
68%	Conceptualization and Pre-Design
42%	Feasibility Studies
35%	Interior Design and Space Planning
34%	Design Development
29%	Construction Documentation
19%	Planning and Review
13%	Construction Administration
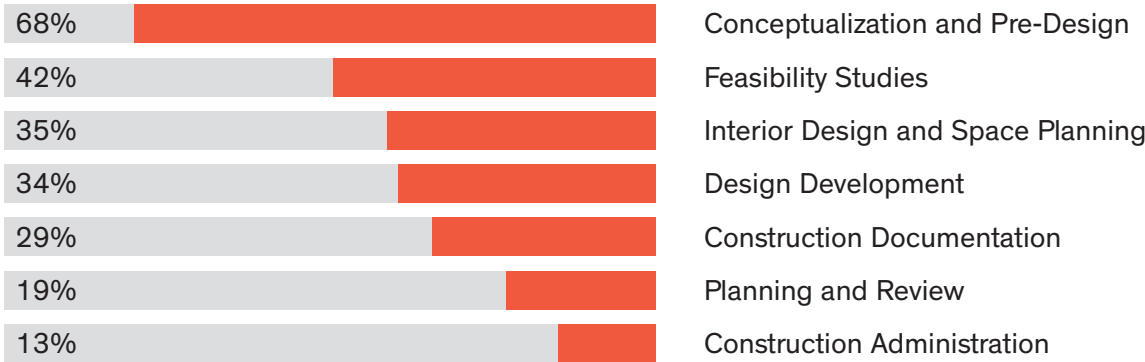
How have you experimented with AI tools in your design workflow?

%	Tool
74%	Image generation from text prompts
61%	Image editing
50%	Image generation from model inputs
26%	Layout / plan generation
21%	Feasibility studies
19%	Building code analysis
19%	Energy efficiency analysis

Are you currently using AI tools or features in your architectural projects?

Firm Type

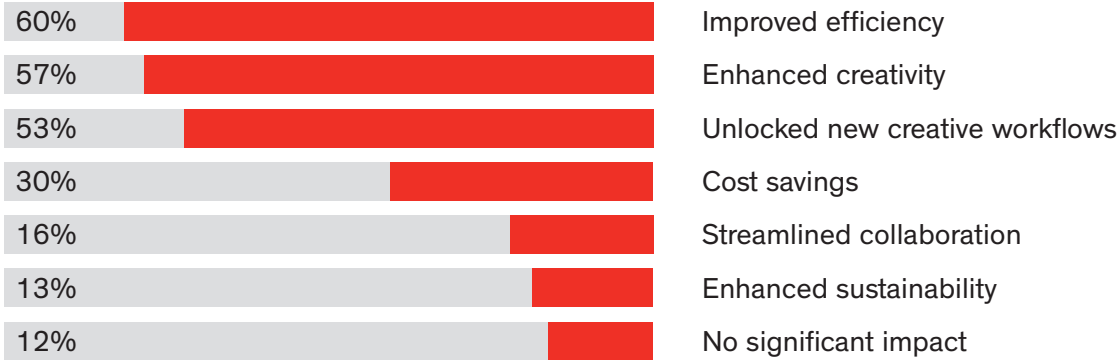|			
45%	24%	30%	Architecture
49%	22%	29%	Interior Design
54%	23%	23%	Master Planning
48%	22%	30%	Engineering
45%	27%	27%	Landscape Architecture
52%	28%	22%	Product Design

■ Yes
■ Planning to in the near future
■ No

"

…it's no surprise architects would embrace them for the more flexible early phases of design, while being more cautious around their use for the more documentary later phases.

The survey found broad satisfaction with the quality of AI-generated renderings for early design phases, as indicated by just over two-thirds of respondents. The rate of satisfaction drops off sharply for subsequent design phases, however, with less than a third of respondents accepting AI-generated rendering quality for design development and beyond. Given the current capabilities of AI image generation tools and their limitations in terms of control and precision, it's no surprise architects would embrace them for the more flexible early phases of design, while being more cautious around their use for the more documentary later phases.
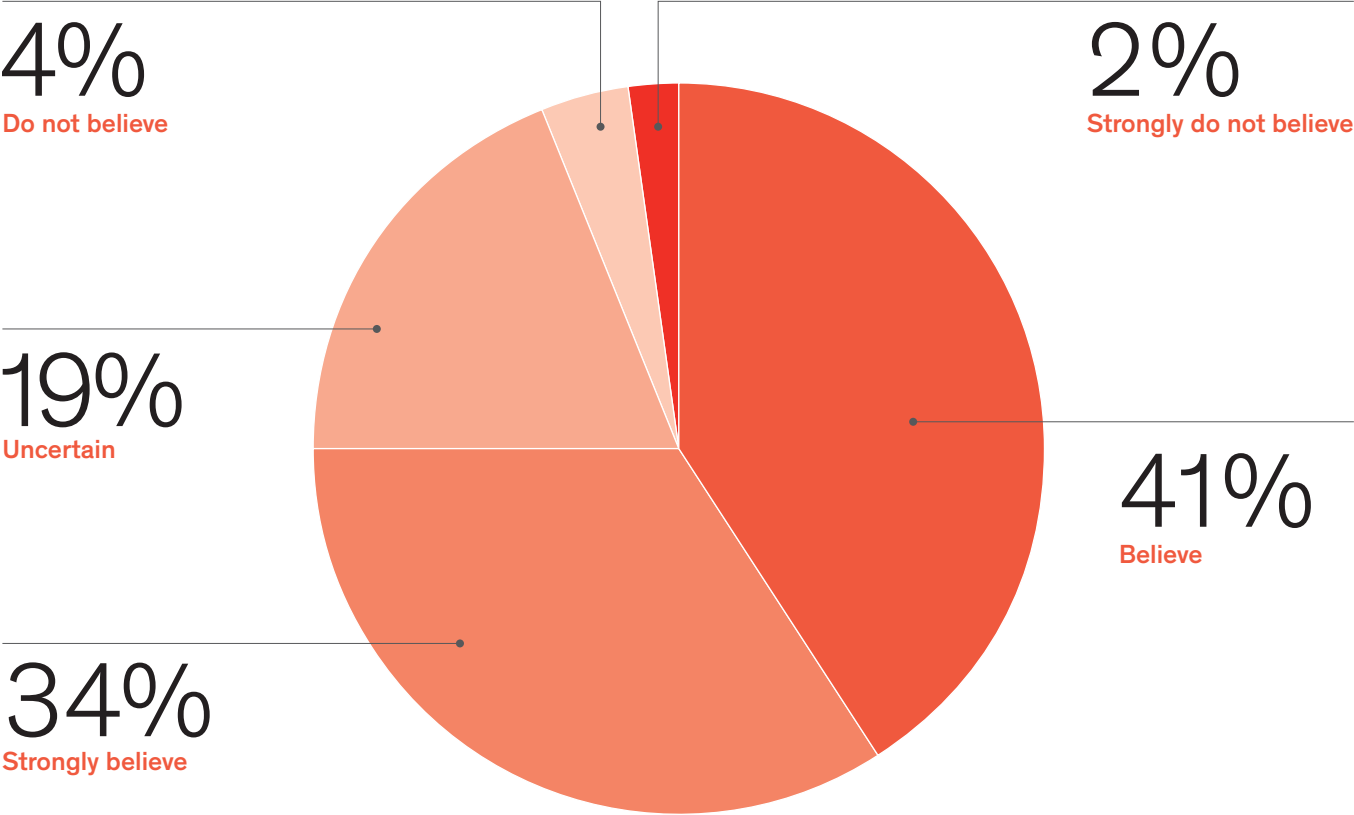
How has the integration of AI impacted your overall design workflow?

60%	Improved efficiency
57%	Enhanced creativity
53%	Unlocked new creative workflows
30%	Cost savings
16%	Streamlined collaboration
13%	Enhanced sustainability
12%	No significant impact

In relation to rendering & visualization, what advancements would you like to see in AI-powered tools?

62%	Greater control over output images
58%	Ability to convert a 2D image into a 3D scene
55%	Ability to create materials using text prompts
52%	Automatically suggest and adjust lighting in a 3D scene
48%	Automatically place assets in a 3D scene
46%	Greater ability to generate working drawings
45%	Simulate the natural aging process of materials

Do you believe that AI has the potential to drive innovation in architectural design?

4%
Do not believe

19%
Uncertain

34%
Strongly believe

2%
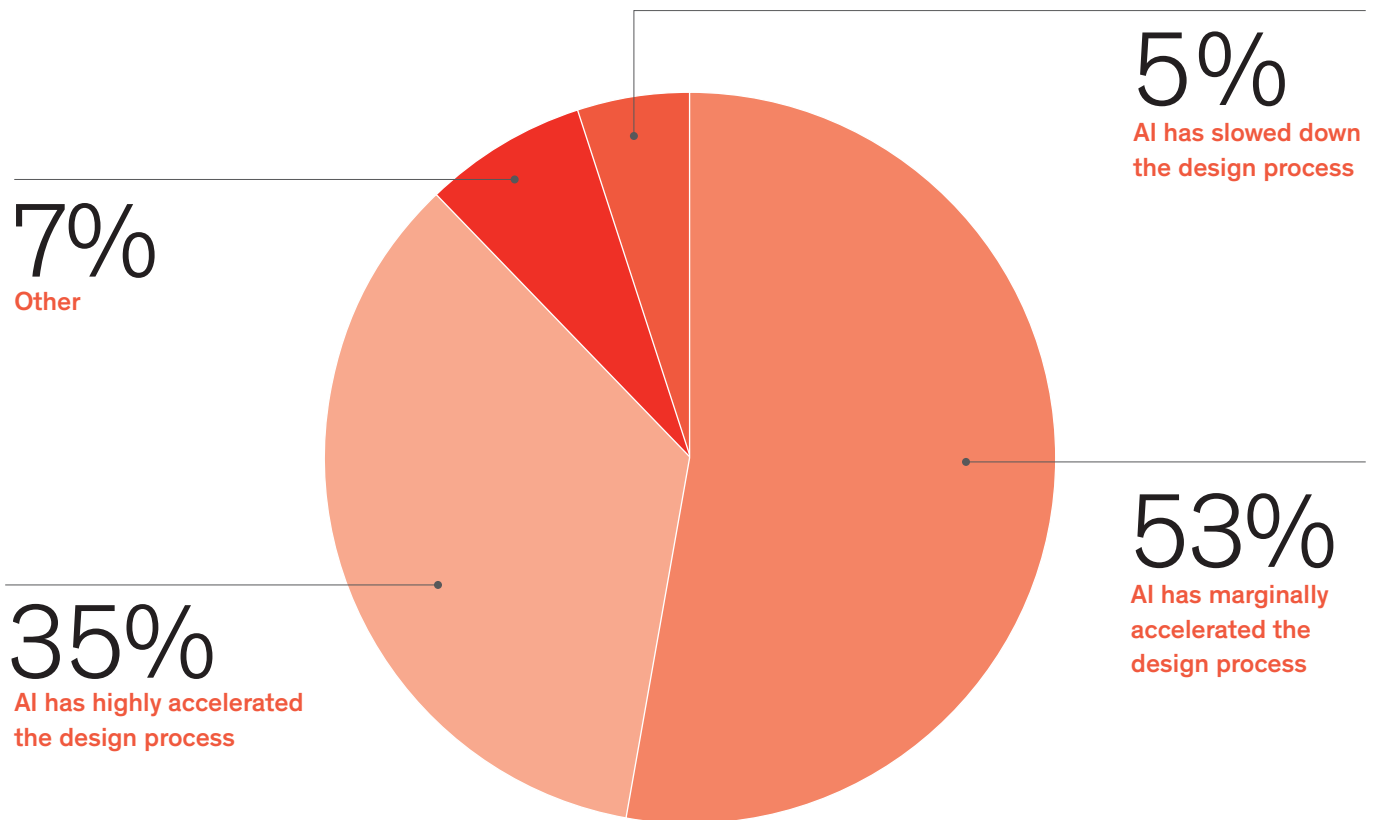Strongly do not believe

41%
Believe

Additionally, for those firms currently using AI, the most prevalent design service offered is master planning. While all services were well represented among current AI users, the emergence of master planning, which often relies on representative renderings, is telling. This pattern of use is further reflected in respondent's beliefs of which project stages have the most potential to be enhanced by AI, with conceptual and pre-design being the most popular response. Beyond that, belief in AI's potential for specific project phases decreases proportionally to the level of precision required in each phase.

To what extent do you think AI will influence the future of architectural design in the next 12 months?

46%	Moderately influence
32%	Strongly influence
21%	Minimally influence
1%	Not influence at all

How has AI impacted the iterative design process in your projects?

5%
AI has slowed down the design process

7%
Other

53%
AI has marginally accelerated the design process
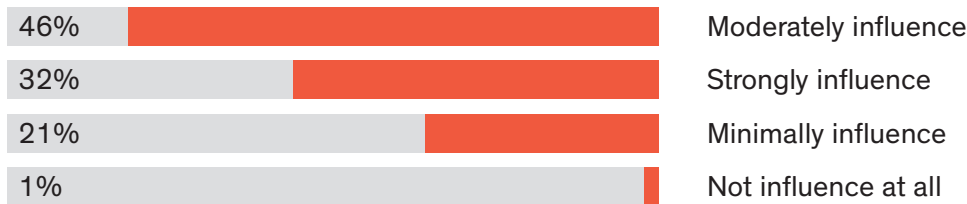
35%
AI has highly accelerated the design process

AI in Practice: Speculation and Specialization

Early adopters see the most value in AI.

Overwhelmingly, the expected impact of AI on architecture is high, with 78% of respondents predicting that AI will moderately or strongly influence architectural design in the next 12 months.
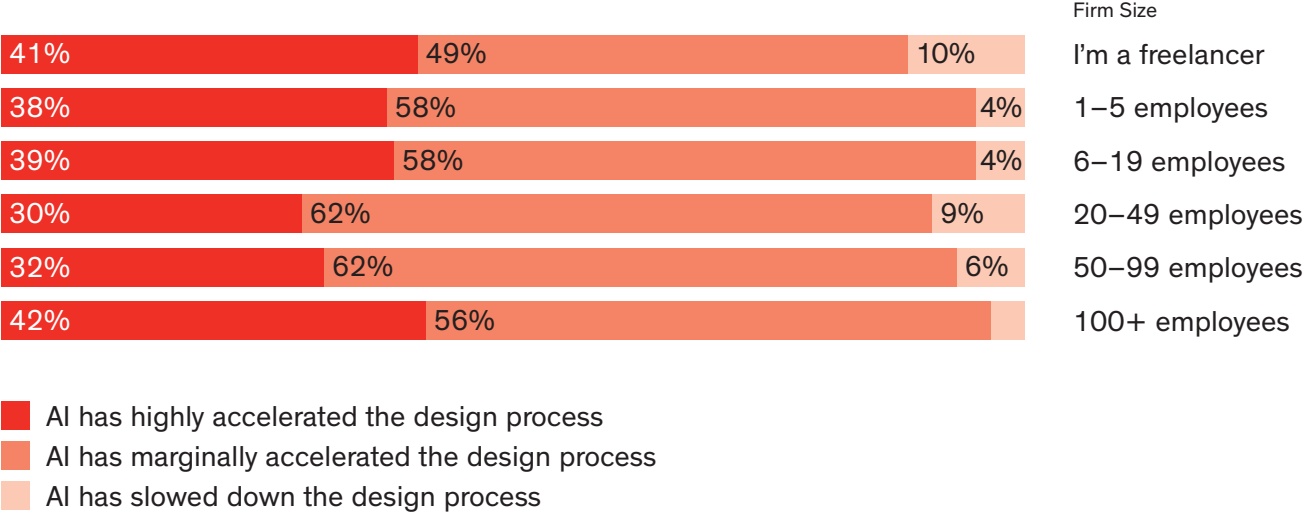
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…early adopters of AI are impressed by its future potential in architecture, while the rest remain skeptical of its utility.

Tellingly though, there is a notable divide in sentiment between those already using AI and those yet to embrace the technology. Among respondents currently using AI, nearly twice as many believe AI will strongly influence the industry compared with those who are not yet using it. Meanwhile, twice as many of those not using it believe that influence will only be minimal compared to those who are. This indicates that early adopters of AI are impressed by its future potential in architecture, while the rest remain skeptical of its utility.
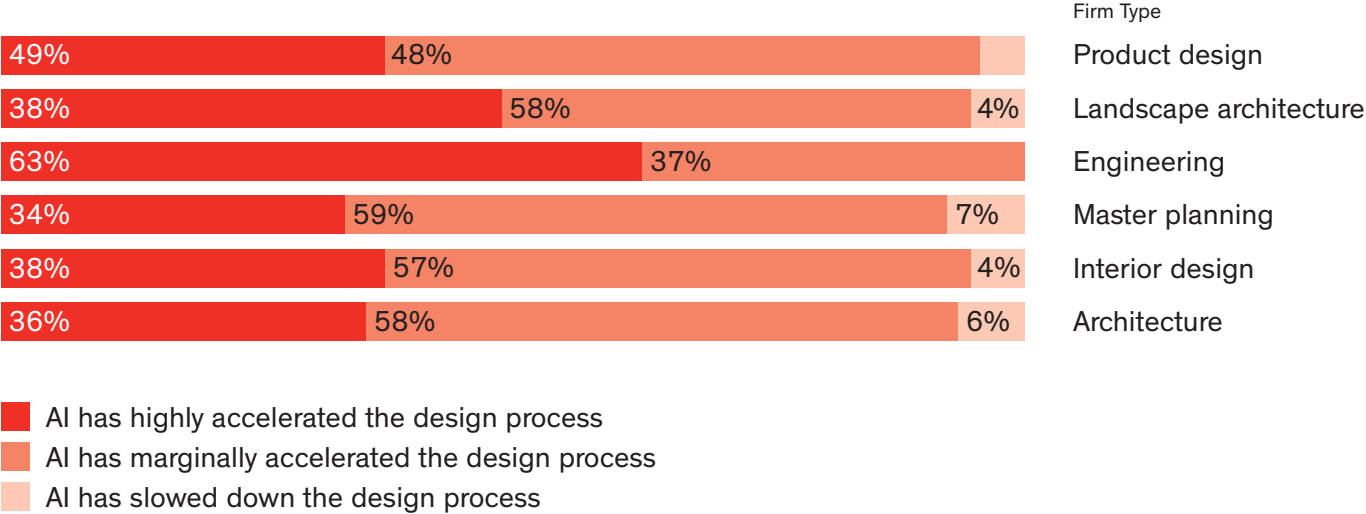
Among those currently using AI, there is a further divide, with 34% declaring AI has "highly accelerated" their design process but 53% calling that difference only "marginal." This is strongly correlated to discipline, with engineering firms nearly twice as likely to report a "highly accelerated" design process than architectural, interior, and landscape design.

When asked what advancements they would like to see in AI tools, "greater control over output images" was the most popular response, suggesting a desire for AI in architecture to be more precise and predictable. Similar sentiments track with other responses to this question, with the potential advancements of converting 2D images into 3D models and creating materials from text prompts also ranking highly.
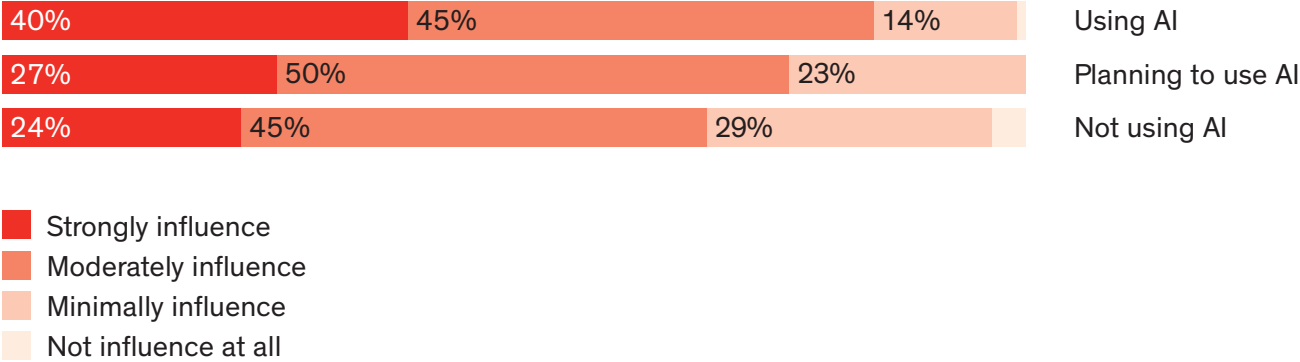
# How has AI impacted the iterative design process in your projects?

Firm Size

41%	49%	10%	I'm a freelancer
38%	58%	4%	1–5 employees
39%	58%	4%	6–19 employees
30%	62%	9%	20–49 employees
32%	62%	6%	50–99 employees
42%	56%		100+ employees

■ AI has highly accelerated the design process
■ AI has marginally accelerated the design process
■ AI has slowed down the design process

How has AI impacted the iterative design process in your projects?

Firm Type

49%	48%		Product design
38%	58%	4%	Landscape architecture
63%	37%		Engineering
34%	59%	7%	Master planning
38%	57%	4%	Interior design
36%	58%	6%	Architecture

■ AI has highly accelerated the design process
■ AI has marginally accelerated the design process
■ AI has slowed down the design process

To what extent do you think AI will influence the future of architectural design in the next 12 months?

40%	45%	14%	Using AI
27%	50%	23%	Planning to use AI
24%	45%	29%	Not using AI

- Strongly influence
- Moderately influence
- Minimally influence
- Not influence at all

How likely are you to increase your use of AI tools in your architectural practice in the next 12 months?

42%	Likely
32%	Very likely
19%	Neutral
4%	Unlikely
2%	Very unlikely
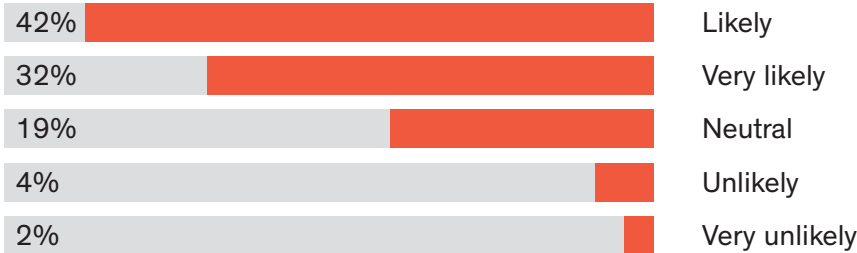
Do you think AI tools will play a significant role in the future of architecture practice as a whole?

44%	Likely
42%	Very likely
11%	Neutral
2%	Unlikely
1%	Very unlikely
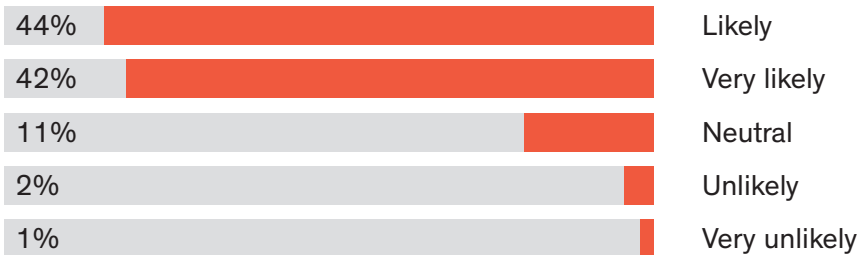
## Designers are exploring the utility of AI for niche tasks.

While the use of AI outside of image generation or editing is significantly lower, the consistency of its use for certain, specialized tasks tells a compelling story nonetheless. Use rates for layout/plan generation, feasibility studies, and building code and energy efficiency analyses all fall around 20%. This speaks to a wide range of specific functions being found for AI in architecture, and the reasons for its use are clear — "improved efficiency" was cited as AI's primary impact by a majority of respondents.

"

[Specialist tasks] might be getting an AI supercharge from new or custom-built software.

The second-most cited response to how AI has impacted practice is that it has "unlocked new creative workflows" and, to a lesser extent, that it has "streamlined collaboration" and "enhanced sustainability". Considered alongside building code and energy efficiency analyses, tasks that are often delegated to an in-house specialist or an outside consultant, this type of work might be getting an AI supercharge from new or custom-built software.
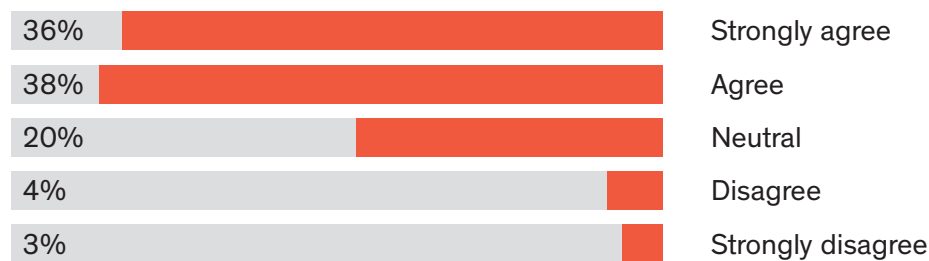
How comfortable are you with the idea of your firm incorporating AI-generated design suggestions into its projects?

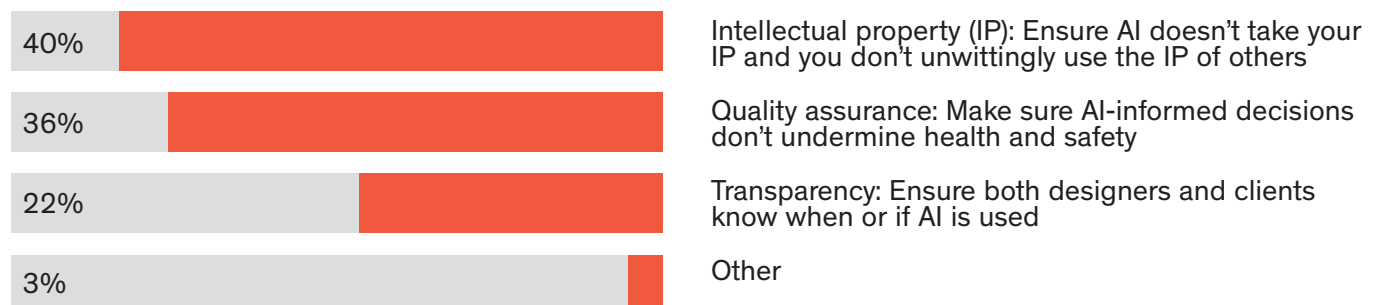|	
41%	Very comfortable
29%	Somewhat comfortable
22%	Neutral
6%	Uncomfortable
2%	Very uncomfortable
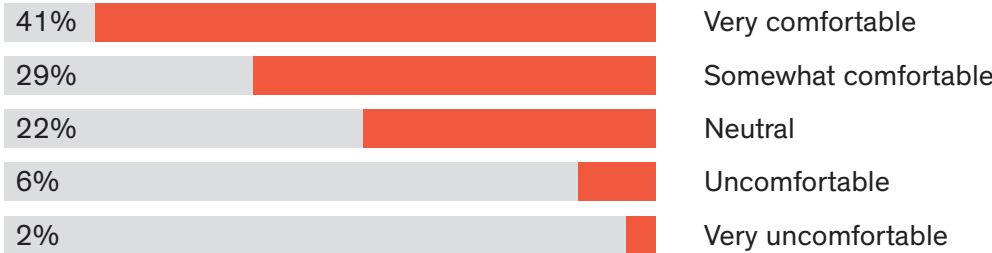
A correlation according to firm size is seen again here, with larger firms generally more likely to be using AI for these kinds of tasks. This could be indicative of larger firms' increased capacity for AI-oriented research and development — more resources offer greater scope to test and apply new AI-driven technology.

While image generation dominates the survey in terms of responses, an AI-led overhaul of more technical and specialized tasks could end up spurring the kind of quiet, practical change that fundamentally alters the role of architects for years to come.

Should there be ethical guidelines or standards put in place for the use of AI in architectural design?

36%	Strongly agree
38%	Agree
20%	Neutral
4%	Disagree
3%	Strongly disagree

What ethical standards would you like to see prioritized?

40%	Intellectual property (IP): Ensure AI doesn't take your IP and you don't unwittingly use the IP of others
36%	Quality assurance: Make sure AI-informed decisions don't undermine health and safety
22%	Transparency: Ensure both designers and clients know when or if AI is used
3%	Other

The Future of AI: From Fringe to Fundamental

AI is here to stay, but will take time to become integral to practice.

A recognition of AI's current limitations is clearly evident in responses related to the biggest challenge faced in adopting AI, with just over half of respondents pointing to "limited AI functionality for architecture".
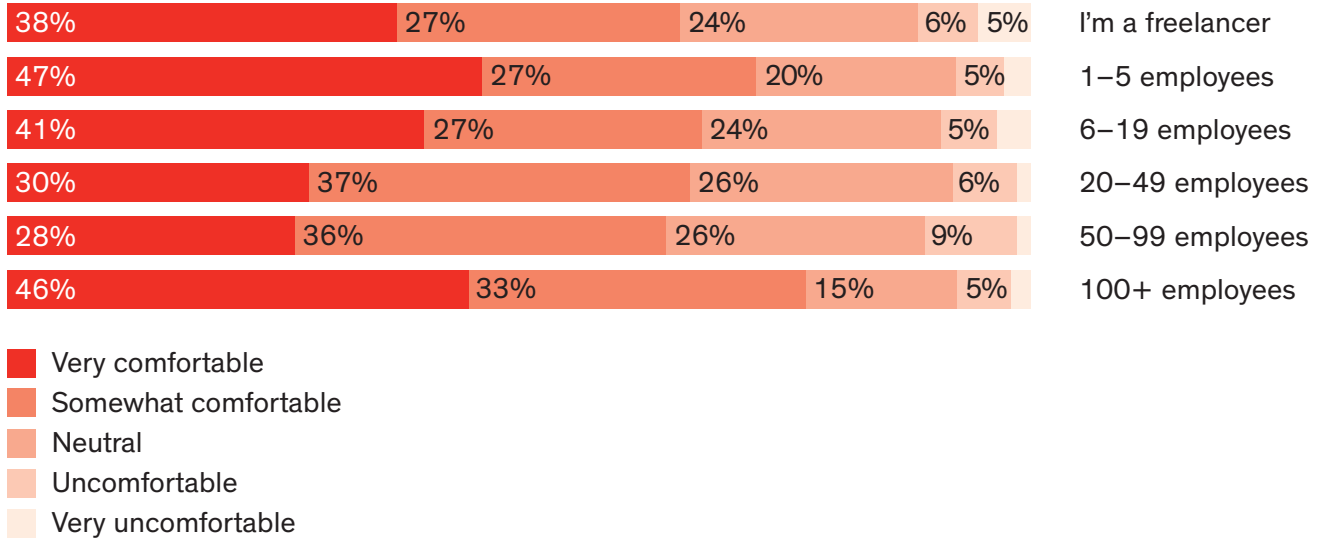
Despite this, 74% of all survey respondents said they were likely or very likely to increase their use of AI in the next 12 months. Furthermore, an even greater share (86%), indicated they believe AI will play a significant role in the future of architectural practice as a whole. So, despite a split of opinions over the value and potential utility of AI, a majority of respondents still plan to increase their use of it or see its rise as inevitable.

Bolstering this finding, respondents did not seem to exhibit much fear about the rise of AI in architecture, either. 70% said they were "very" or "somewhat" comfortable with using AI-generated design suggestions in their own projects, while only 8% indicated they were uncomfortable or very uncomfortable with doing so. Since the total number of survey respondents split fairly equally among those currently using AI and those who aren't, this could be a sign that most designers are optimistic about incorporating AI into their workflows.
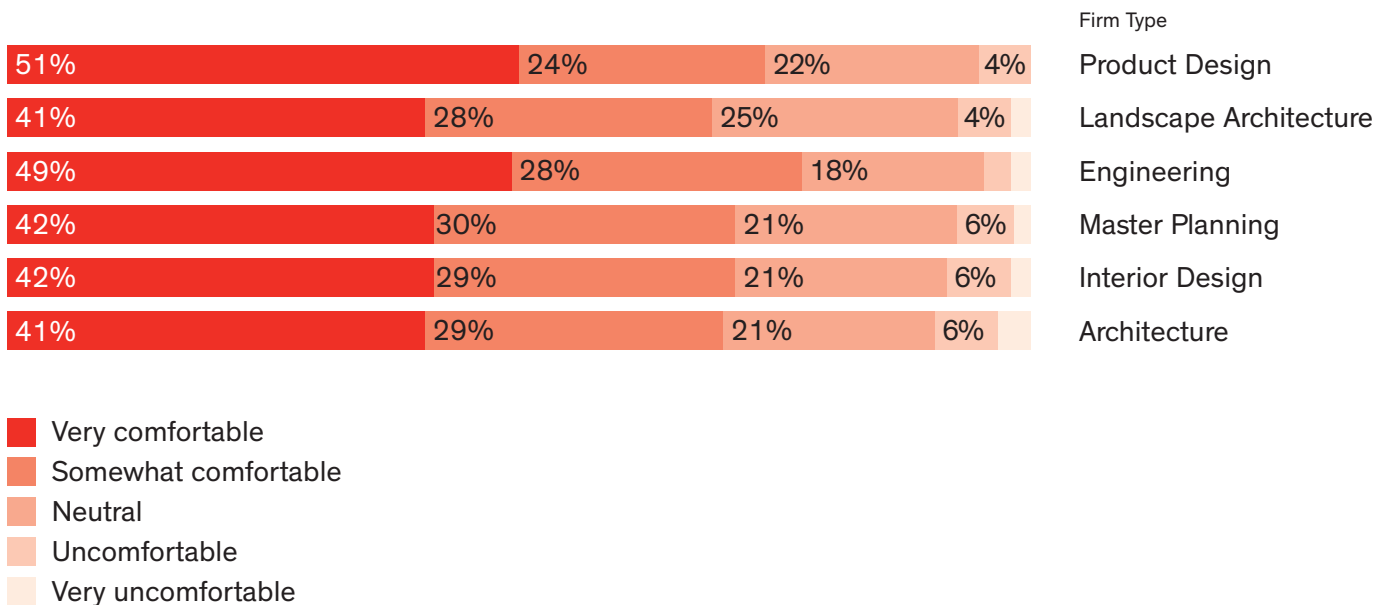
Interestingly, small and large firms — those with less than 20 employees or 100 or more — were more likely to be "very comfortable" with AI-assisted design than medium-sized firms with 20-99 employees. There appears to be a correlation with firm size and the willingness or ability to balance the risks and rewards of using emerging AI tools. Those in small firms may feel they must embrace AI technology, either for fear of falling behind their competitors, or because they view it as a way to create an outsized advantage over their peers.

On the other hand, those in large firms likely have more resources available to them to research, learn and become comfortable with AI tools over time. These survey responses imply that medium-sized firms are generally more risk-averse, preferring to maintain their existing workflows in order to meet client expectations and preserve their budget.
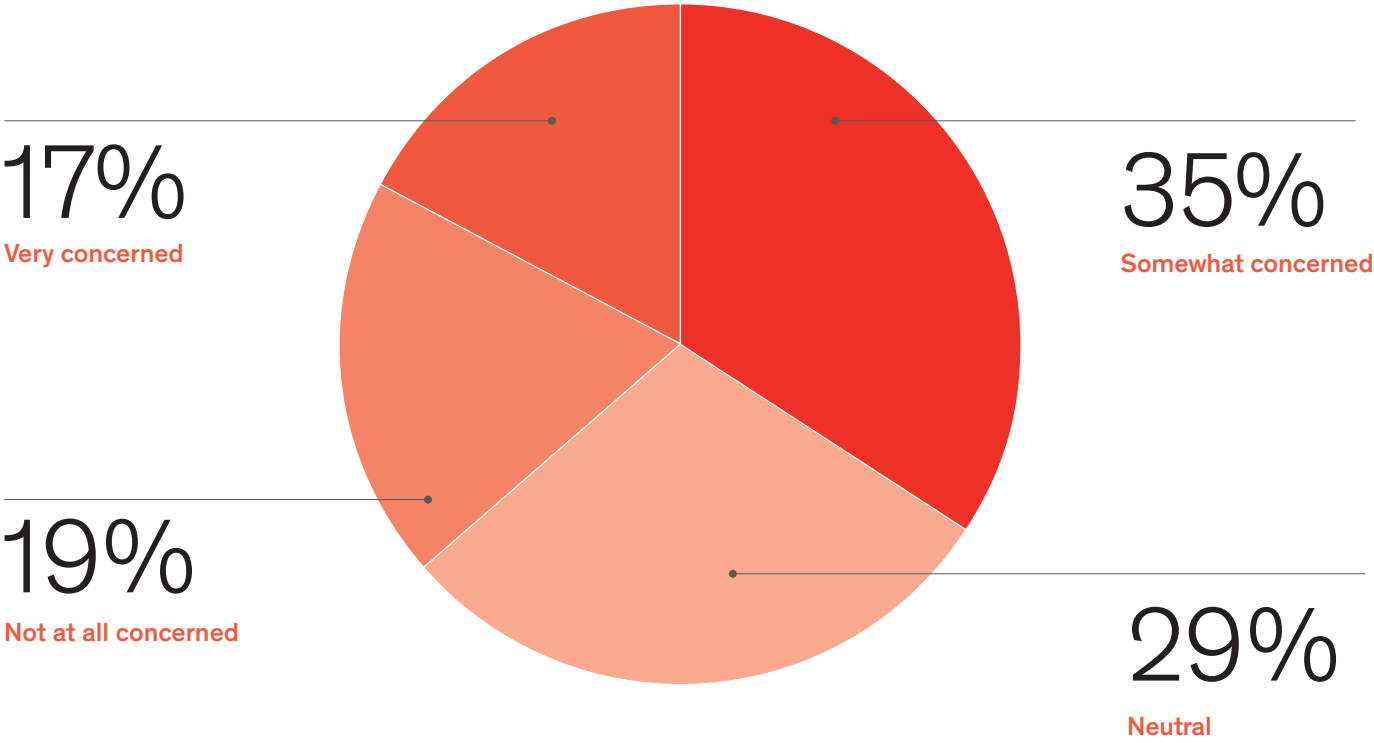
How comfortable are you with the idea of your firm incorporating AI-generated design suggestions into its projects?

38%	27%	24%	6%	5%	I'm a freelancer
47%	27%	20%	5%		1–5 employees
41%	27%	24%	5%		6–19 employees
30%	37%	26%	6%		20–49 employees
28%	36%	26%	9%		50–99 employees
46%	33%	15%	5%		100+ employees

- ■ Very comfortable
- ■ Somewhat comfortable
- ■ Neutral
- ■ Uncomfortable
- ■ Very uncomfortable

How comfortable are you with the idea of your firm incorporating AI-generated design suggestions into its projects?

Firm Type

51%	24%	22%	4%	Product Design
41%	28%	25%	4%	Landscape Architecture
49%	28%	18%		Engineering
42%	30%	21%	6%	Master Planning
42%	29%	21%	6%	Interior Design
41%	29%	21%	6%	Architecture

- ■ Very comfortable
- ■ Somewhat comfortable
- ■ Neutral
- ■ Uncomfortable
- ■ Very uncomfortable

Are you concerned about the risk that AI poses to jobs in architectural visualization and the AEC industry more broadly?

17%
Very concerned

35%
Somewhat concerned

19%
Not at all concerned

29%
Neutral

Are you concerned about the risk that AI poses to jobs in architectural visualization and the AEC industry more broadly?

21%	25%	33%	21%	Currently using AI tools or features
17%	35%	36%	12%	Planning to use AI tools or features in the near future
17%	32%	35%	15%	Not currently using AI tools or features

- ■ Not at all concerned
- ■ Neutral
- ■ Somewhat concerned
- ■ Very concerned

Conclusion.

Overall, the survey demonstrates the prevalence of AI in architecture is significant and growing, but that opinions around its use are polarized, even among those actively using it. For example, concern over the risk AI poses to AEC industry jobs is split nearly evenly, with 52% of respondents "very" or "somewhat" concerned and 48% "neutral" or "not at all" concerned. Peeling back the layers of this concern, only 17% and 18%, respectively, expressed the extremes of "very" or "not at all", but within those two cohorts, a majority of each are currently using AI in architectural work, indicating a stark difference in opinion among those who are striving to understand AI's capabilities first-hand.

Regardless of whether or not they're currently using AI, a large majority of respondents (74%) agree or strongly agree that ethical guidelines should be put into place for its use in architecture. The options put forth for what these ethical standards should be, which included intellectual property protections, quality assurance procedures, and disclosure of AI use, all received roughly a quarter to a third of respondent's interest, indicating a split in views over what future AI regulation might entail.

" **…findings suggest future battles over AI in architecture will likely revolve around the quality of the end product and who gets credit for it…**

These findings suggest future battles over AI in architecture will likely revolve around the quality of the end product and who gets credit for it, which are not so different from conflicts that have cropped up in the profession for generations.

What's different this time around is the level of productive output that hangs in the balance, with a potential for exponential gains among those who master AI. The pace at which AI has been incorporated into the profession and expectations for its growth speak to that potential. This fast-paced evolution, together with the responses to this survey, are a powerful sign of AI's potential value in design, and speak to the likelihood it will become a permanent feature in architecture — sooner rather than later.

About Chaos

Founded in 1997, Chaos is a leading global visualization technology company.

Chaos is defining visualization by offering accessible tools, simplifying and accelerating workflows, and empowering visual storytelling for artists, architects, designers, and other creative professionals.

Chaos' portfolio of visualization technologies for architecture and design includes V-Ray, Enscape, Vantage, Corona, and anima.

About Architizer

Home to the world's largest community of architects online, Architizer's core mission is to celebrate the world's best architecture and the people that bring it to life.

Powered by continually evolving technologies, we serve architects with the inspiration and information they need to build better buildings, better cities, and a better world. We advocate for a more sustainable, resilient and ethically designed built environment.

We provide design professionals and building-product manufacturers with a global platform to promote their work through awards, competitions and engaging content.