Architizer + chaos

The State of Architectural Visualization 2024-25

For the second year in a row, Architizer and Chaos conducted a global survey of design professionals on the current state of architectural visualization.

2024-2025

Questions included:

What forms of architectural visualization are most critical to your design process?

What are the biggest challenges you face with architectural visualization?

How are you integrating emerging visualization technologies such as real-time rendering, sustainable analysis, and artificial intelligence (AI) into your workflow?

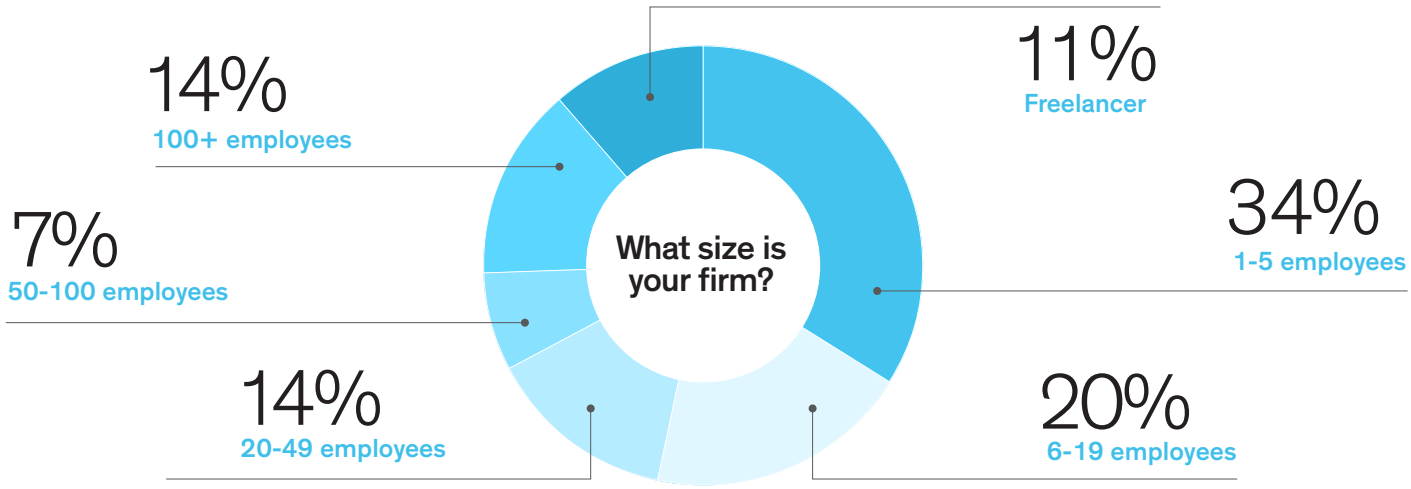
Key Findings

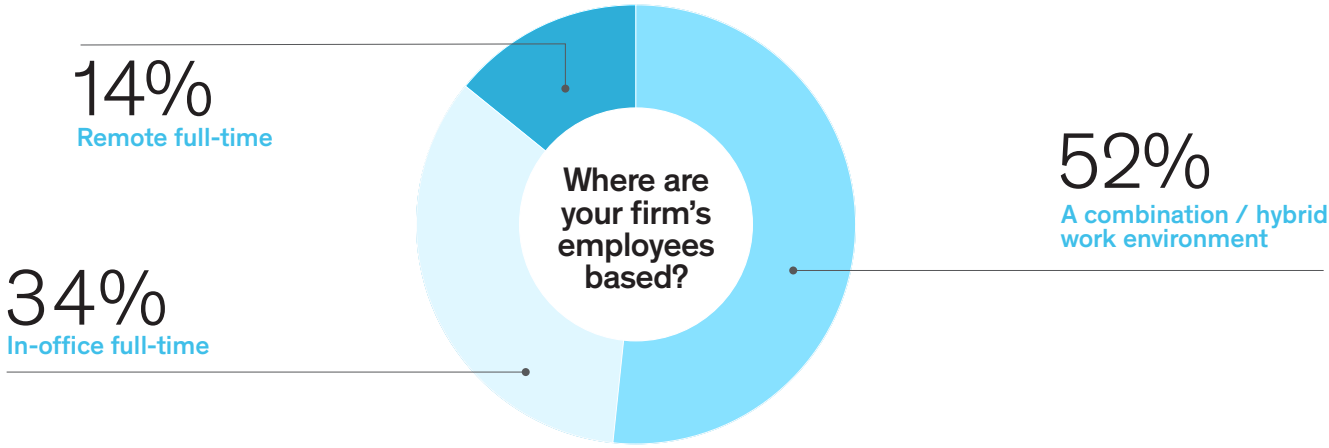
In a survey of more than 1,000 professionals, insights were gathered on the present state and future possibilities of architectural visualization. Key findings include:

- Still-image renderings remain of prime value to clients despite the availability of newer, more technologically-enabled methods.
- Firms are finding it challenging to keep up with the cost and implementation of rendering technologies.
- Real-time rendering is one of the biggest visualization needs in the industry.
- Integrating sustainability tools with rendering software is an emerging capability and there is a desire to see it further developed.
- AI tools are becoming established in architectural visualization, but progress is slowing as their utility is interrogated.

About the Respondents

Employees of relatively small firms, from freelancers to 19 employees, were well represented in the survey, making up nearly 64% of respondents. Among larger firms, those with 100+ employees represented a healthy 14% of respondents, as did mid-size firms (20-49 employees). In terms of location, those based in the United States had the largest representation (40%), though respondents from the UK and EU made up just over 20%, as well. The remaining 40% hailed from a collection of 75 countries around the globe.





Reflective of professional work in the post-COVID era, a majority of employees (52%) had hybrid working arrangements, though about one-third worked in an office full-time, with the remaining 14% fully remote. This distribution shifted notably since the same question was asked in our 2023 industry survey, with full-time office work dropping 20% and hybrid gaining 20%, possibly indicating a growing acceptance of hybrid work as the norm.

The Rules of Rendering: Old Expectations, New Challenges

Despite the availability of new technology, traditional, static-image renderings are still valued above all else.

Five of the initial survey questions asked respondents which type of renderings they produce or share the most, which are most important to their design process, or which their clients prefer or expect. In each case, "conceptual/artistic renderings" and "photorealistic visualizations" were always the top two answers by 20% or more, significantly beating out the dynamic methods of animations, virtual reality (VR), and augmented reality (AR).

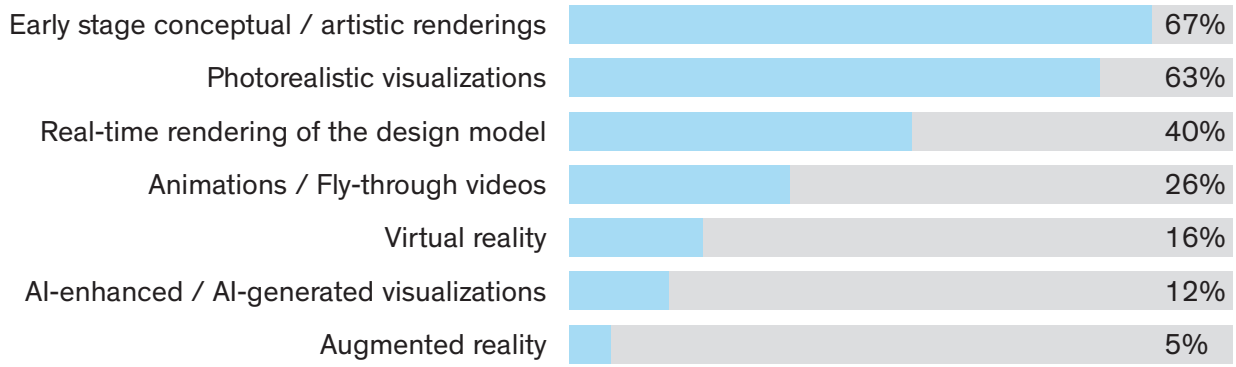
This suggests the preference for these types of rendering comes at the exclusion of dynamic rendering methods, and is thus a preference for still images, though it is likely that some respondents are using dynamic rendering methods to produce static-image visualizations.

Historical data also suggests that the demand for photorealistic renderings is not just being maintained, but is actually increasing: Compared to a similar question in our 2023 industry survey, reported use of conceptual and photorealistic renderings increased from about half of respondents to about two-thirds.

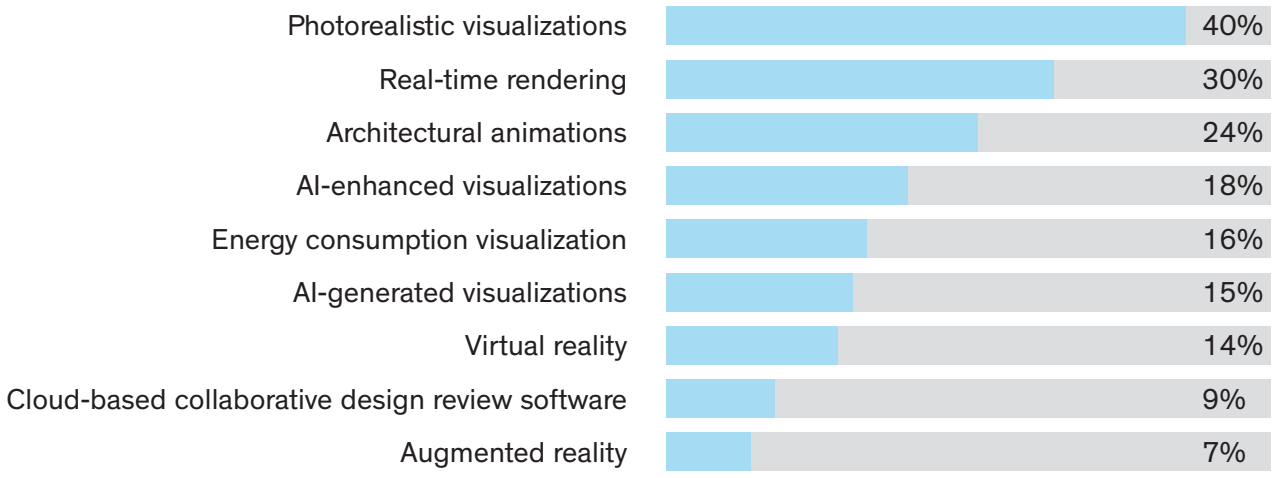
> **Historical data suggests that the demand for photorealistic renderings is not just being maintained, but is actually increasing.**

"Photorealistic visualizations" was also the most popular answer for what respondents were planning to invest more in over the next year, ahead of more technologically-enabled methods by a full 10% or more. On the other hand, "photorealistic visualizations" was among the least popular selections when asked what respondents believed "will become more prevalent in architects' workflows in the near future". This contrast suggests such visualizations are so valuable and widely used in contemporary design practice that architects are hungry for both new ways to produce them quickly and easily, as well as new rendering tools entirely.

What forms of architectural visualization does your firm create most frequently?



What is your firm looking to invest more in in the next 12 months?



Architects are struggling to keep up with the cost and implementation of technology to meet client demands.

When asked "What are the biggest challenges you face with architectural visualization?", the answer "High-quality visualizations take too long to render" was solidly the most popular answer, with 43% of the vote. This finding was consistent across all firm sizes. Similarly, when asked "What do you believe are the biggest industry-wide challenges in architectural visualization today?", the top response was "Managing rising software and hardware costs".

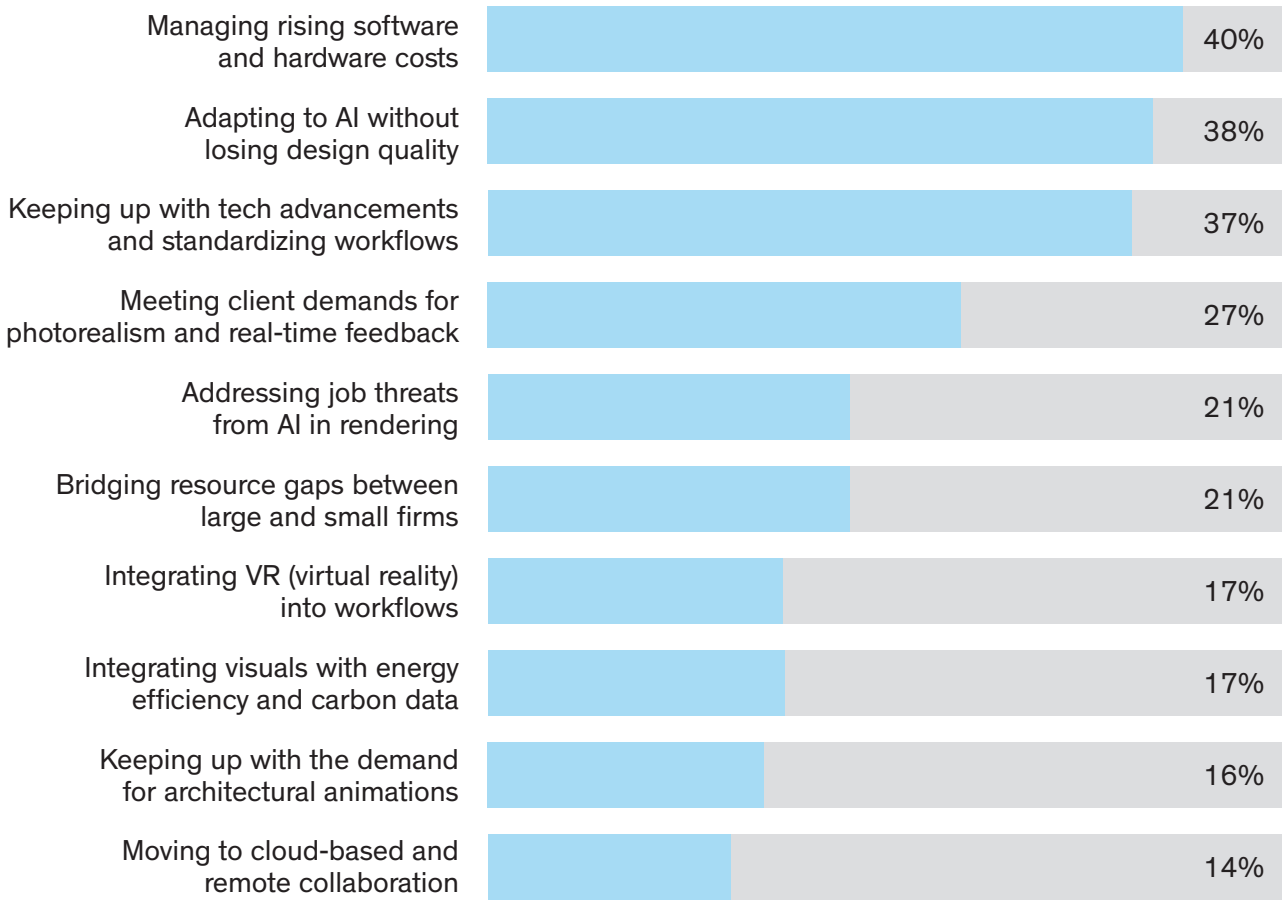
If these difficulties apply to respondents' collective preference for static renderings, then the runner-ups for what they believe are the biggest industry challenges are telling. "Adapting to AI without losing design quality" and "keeping up with tech advancements and standardizing workflows" were a close second and third place, respectively, indicating that architects are grappling with technologies that could help solve those common challenges around rendering speed and cost.

> **"Despite being preoccupied with the challenges of producing traditional, static-image renderings, respondents still want to invest in emerging, dynamic rendering technologies and practices."**

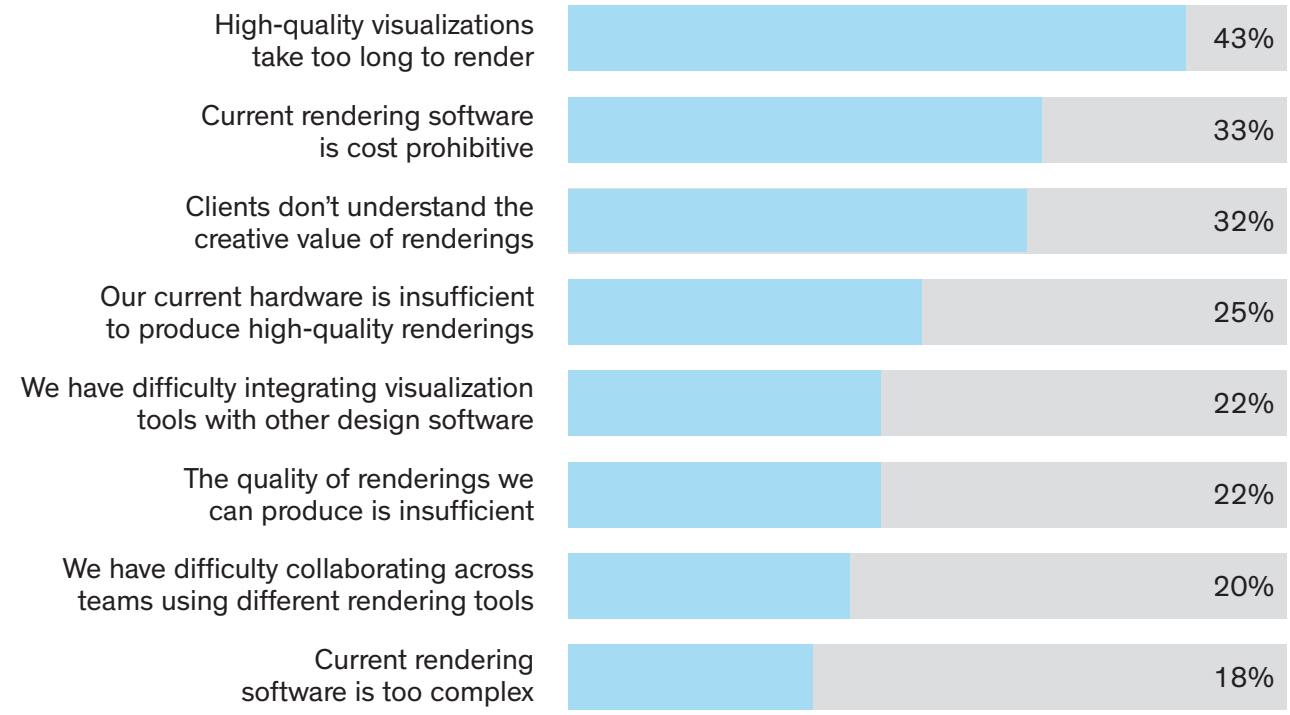
There was also a revealing shift from the 2023 survey in terms of what respondents believe will become more prevalent in architects' workflows in the near future. For that question in this survey, citations of the emerging, dynamic rendering methods of real-time rendering, sustainability visualization, and AI-assisted rendering all increased significantly. Even the less popular methods of AR and VR visualizations, which have been available to designers for longer, saw increased citations by several points each on this question.

Taken together, these findings seem to tell a story that, despite being preoccupied with the challenges of producing traditional, static-image renderings, respondents still want to invest in emerging, dynamic rendering technologies and practices. What seems to be holding them back is a fairly straightforward struggle: they're just trying to keep up with the current constraints of producing renderings with conventional methods, despite believing the tools of the future are already available.

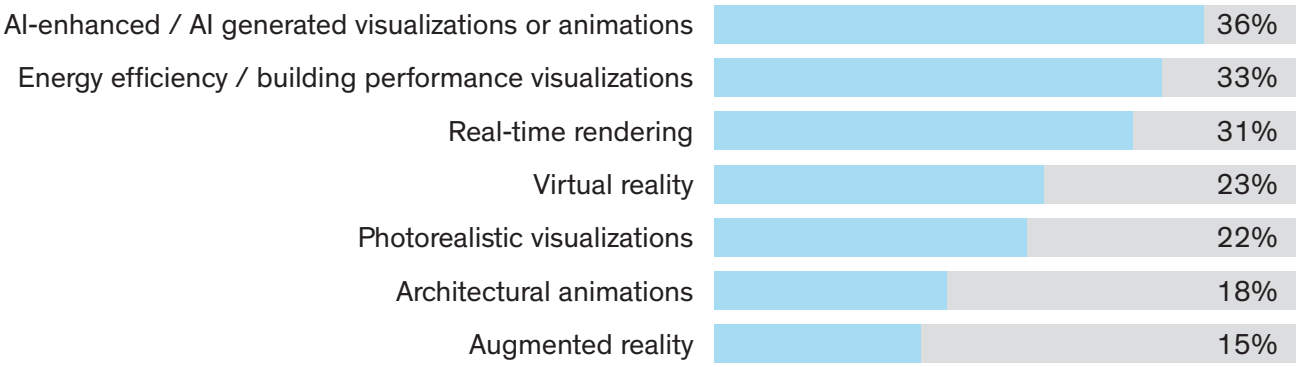
What do you believe are the biggest industry-wide challenges in architectural visualization today?



What are the biggest challenges you face with architectural visualization?



Which of these do you believe will become more prevalent in architects' workflows in the near future?



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Uneven Advancements: New Tools Bring New Opportunities to Some

Real-time rendering is one of the biggest visualization needs in the industry.

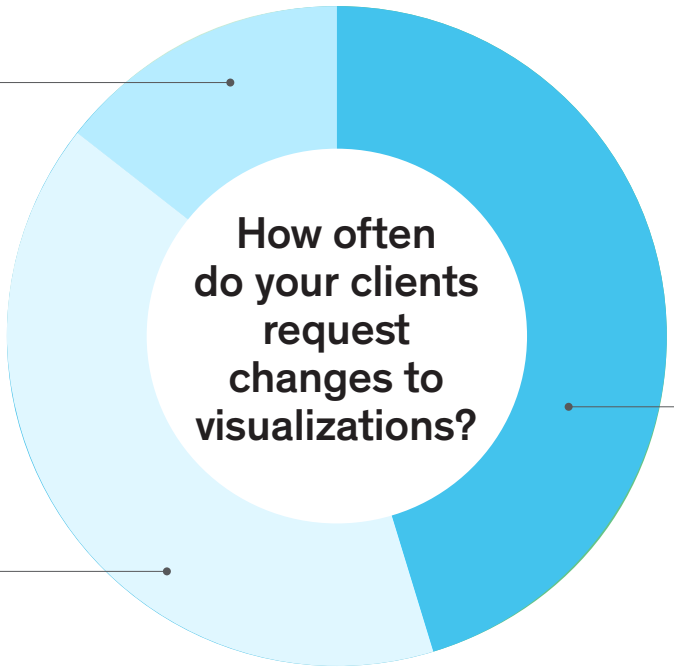
The belief that real-time rendering will become more prevalent in architects' workflows in the near future increased about 10% since 2023, even while respondents' plans to invest in it over the next 12 months dropped by a similar percentage. Furthermore, the percentage of respondents already using real-time rendering stayed about the same, dropping slightly from 44% to 40%. This finding seems to track with respondents feeling challenged to embrace emerging rendering technologies, since they're struggling just to keep pace with current methods.

At the same time, 85% of respondents occasionally or regularly field client requests to make changes to their visualizations. This is likely exacerbating the struggles respondents are having with the costly and time-intensive nature of their current methods. Since respondents' preferred methods appear to skew towards traditional, static-image renderings, it follows that most are looking for faster, more efficient ways to create high-quality still visualizations.

> **"85% of respondents occasionally or regularly field client requests to make changes to their visualizations."**

Real-time rendering would likely meet this need for many, and changes in its frequency of use suggest this. Compared to 2023, daily use of real-time rendering increased by about 10%, while those using it twice a week or more decreased by about 10%. While it is not possible to track whether the same respondents replied to both surveys, this could indicate that those who were already using real-time rendering in 2023 have recognized its value in creating high-quality visualizations quickly, and have increased how often they use it.

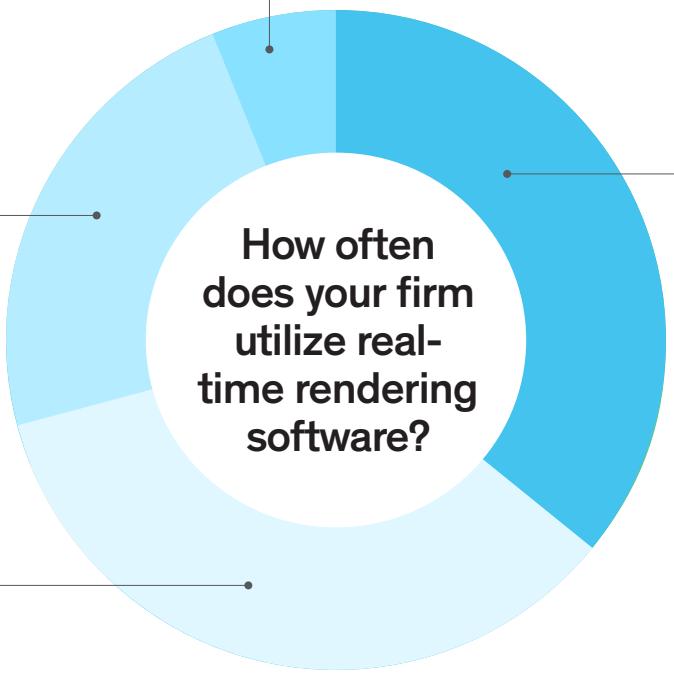
Additionally, belief that architectural animations will become more prevalent in future practice also gained in popularity since 2023. The findings indicate that there is a consistent desire to create animations, but that architects aren't using them as frequently as they want. This appears likely due to the same cost and implementation challenges respondents face using traditional rendering methods, indicating a desire for cheaper, easier-to-use tools for all types of architectural visualization.



14%
Very rarely

46%
Occasionally, for specific details

40%
Regularly, throughout the design process



6%
Rarely: 2-4 times a year

36%
Regularly: 2 or more times a week

23%
Occasionally: 2-4 times a month

35%
Daily

Integrating sustainability tools with rendering software is a mostly unknown capability but there's a desire to see it further developed.

The survey included a set of questions focused on the relatively new capability of integrating sustainability-related tools with rendering software. Perhaps not surprising on account of its novelty, nearly half of respondents don't yet utilize this capability. This is correlated with firm size, as firms with 20-99 employees were at least 20% or more likely to integrate such tools than firms with 1-19 employees.

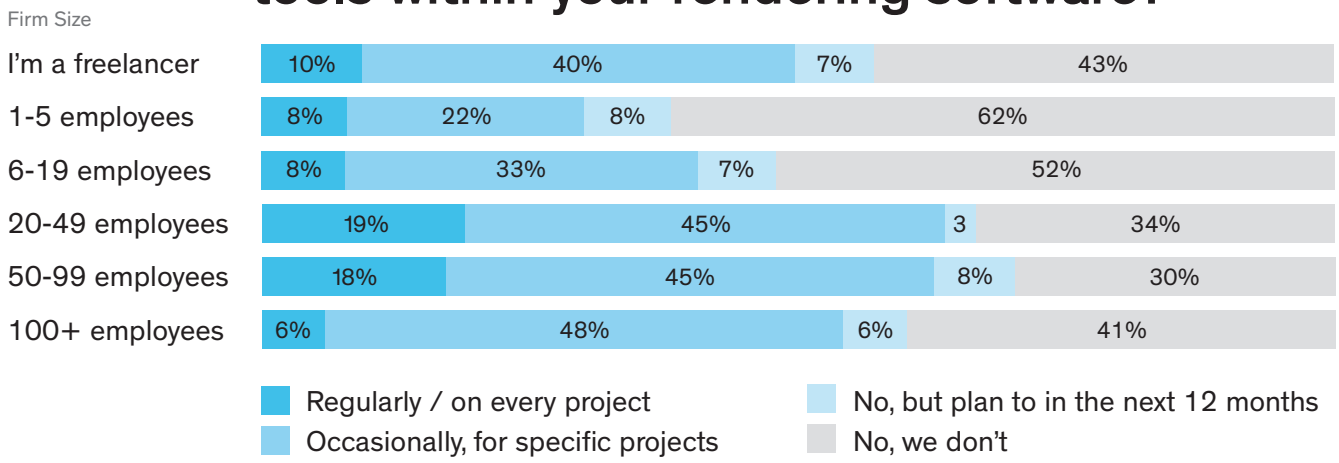
Interestingly, freelancers were noticeably more likely to integrate sustainability tools with rendering than firms with 1-19 employees, and only slightly less likely than firms with 100+ employees. This suggests there may be a correlation between company size and capacity for adopting new technologies like these, with those in the middle being the most limber.

On the other hand, "solar studies, daylighting simulation and artificial lighting analysis" was cited as the most insightful possible integration of sustainability analysis into rendering software by over 25%. Given the strong preference for this narrowly focused feature, it's possible the full range of sustainable design capabilities are still widely unknown in visualization, even to early adopters, and utility may expand as these tools become more mainstream.

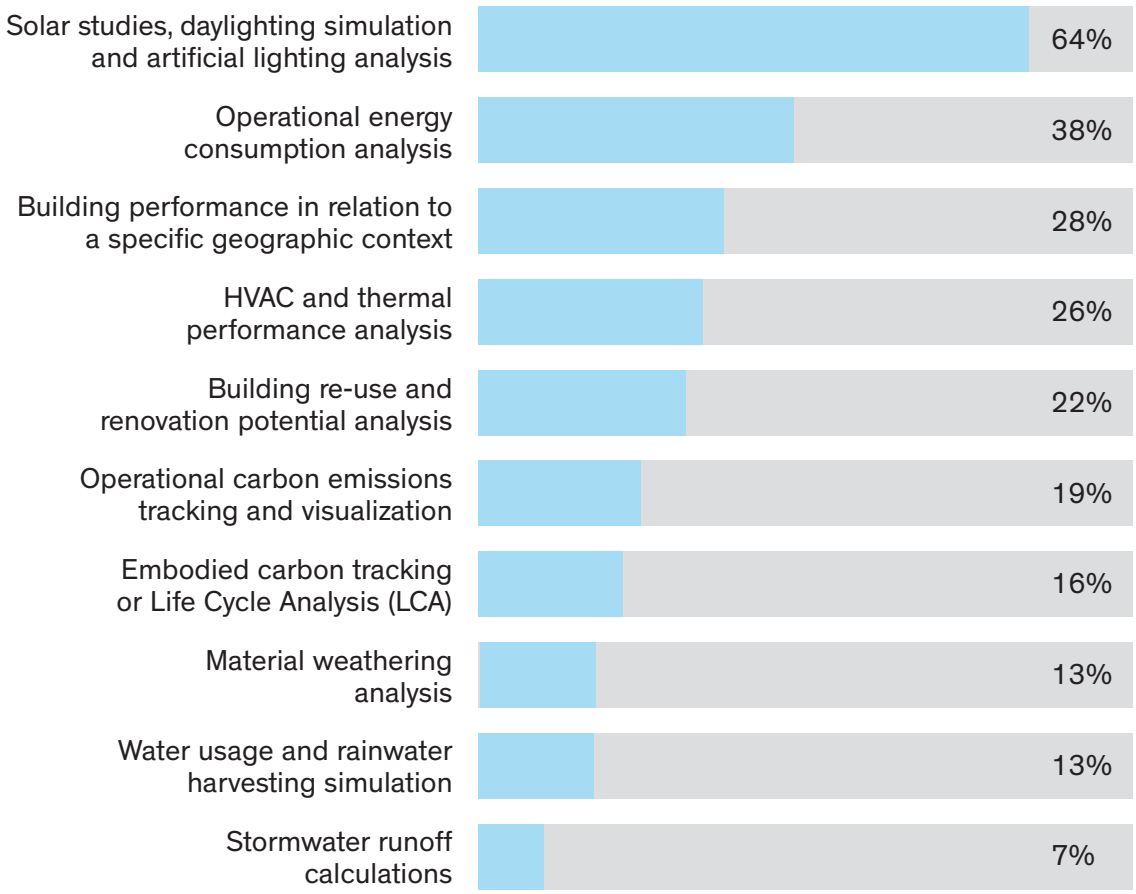
> **"It's possible the full range of sustainable design capabilities are still widely unknown in visualization, even to early adopters, and utility may expand as these tools become more mainstream."**

As for the future of sustainable design visualization, when asked what new developments they believe would have the greatest impact on that practice, "fully automated energy performance analysis integrated into visualization" was the clear favorite. Digging deeper, there was an interesting correlation with firms already using sustainable visualization technology being more than twice as likely than firms who don't (and don't plan to) to view "visualization of operational carbon emissions" as having the greatest impact. This indicates that firms with a pre-existing preference for low-carbon design are among those most likely to embrace such technologies. Overall, since a majority of respondents see value in the integration of sustainability analysis with design visualization, it's likely this technology will see more widespread adoption, with those already using it helping to drive future developments.

Do you use sustainability-related tools within your rendering software?

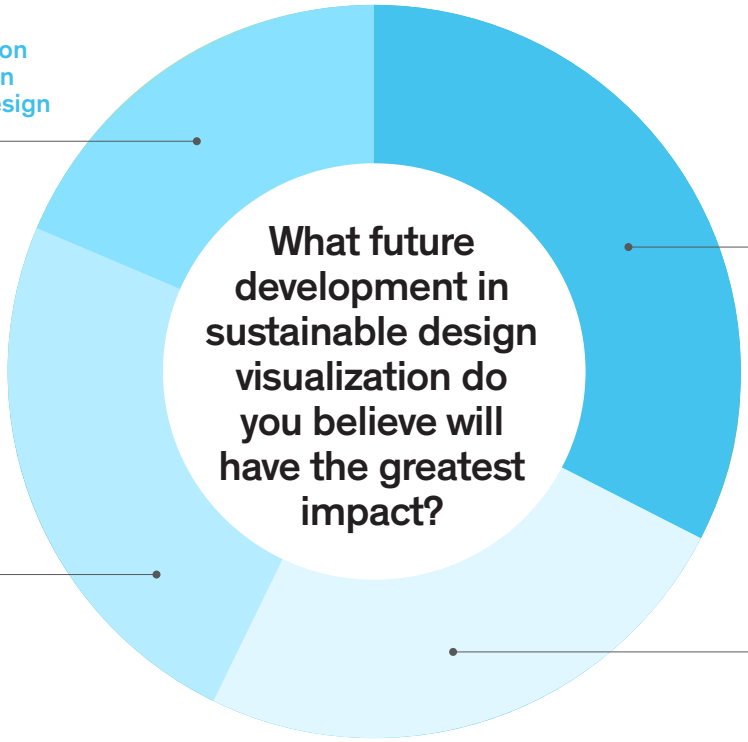


What types of sustainable design tools do you think are most insightful to designers if integrated into real-time rendering software?



30%
Real-time visualization of operational carbon emissions during design

53%
Fully automated energy performance analysis integrated into visualization



39%
AI-driven recommendations for optimizing energy efficiency

40%
Predictive modeling for long-term building performance

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Artificial Intelligence: Here to Stay But Far From Settled

Larger firms are investing more in AI but progress is slowing, while small firms are struggling to get started with it.

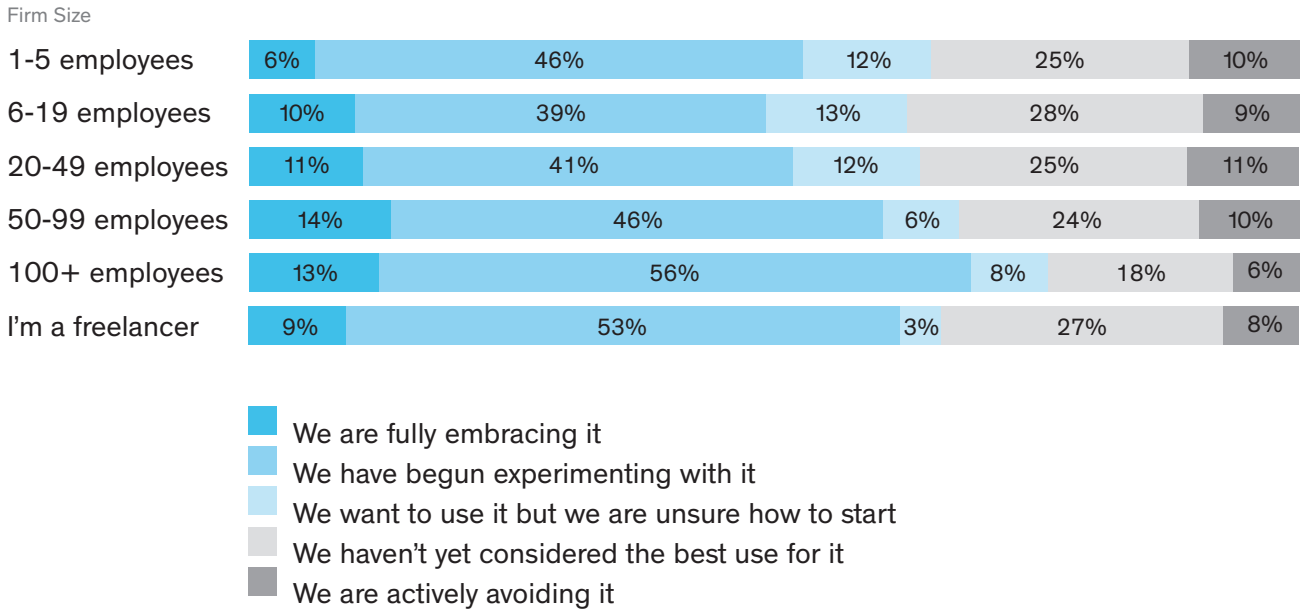
The survey found firms with 50 or more employees are more likely to be using AI in visualization than smaller firms by around 10%. This tendency is similar to results from the 2023 survey, as well as Architizer and Chaos's 2024 survey on AI in architecture. However, only about half as many respondents in this survey indicated plans to invest in AI over the next year than in 2023, regardless of firm size.

Additionally, the popularity of various ways firms are experimenting with AI (such as image generation, editing, etc.) all dropped significantly from the 2024 survey. Generating concept images was the most common answer in this survey, cited by 43% of respondents, but enhancing photorealism and optimizing image quality also received healthy percentages (32% and 26%, respectively).

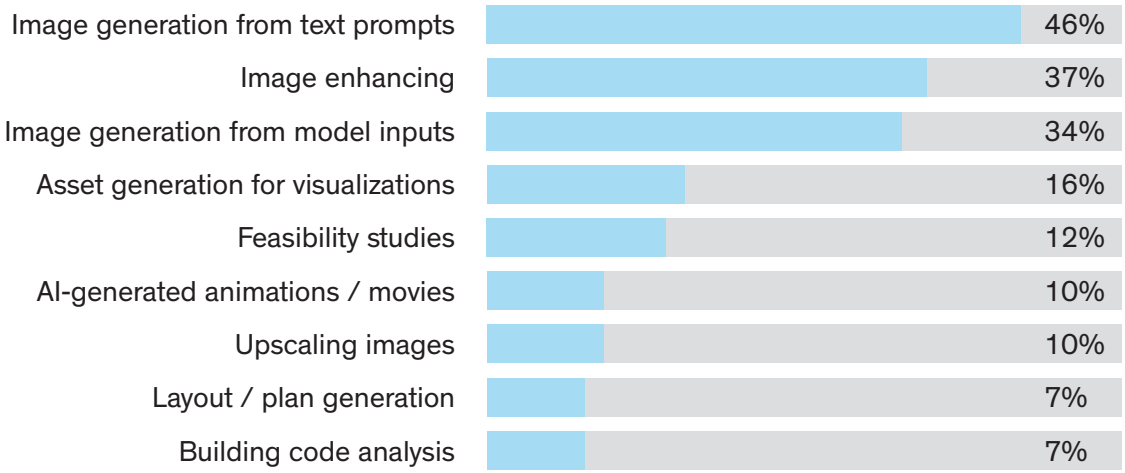
> **"It appears AI is being harnessed by some very small or very large firms as a way to produce traditional, still renderings quickly and cheaply, while some medium-size firms are experimenting with it to unlock new creative workflows."**

A fascinating correlation was observed among very small (freelancer to 5 employees) and very large (100+ employees) firms being somewhat more likely than medium-size firms (6-99 employees) to report "improved efficiency" from AI, while medium-size firms were more likely to report "new creative workflows" and "enhanced sustainability".

Are you or your firm using AI tools in relation to architectural visualization?



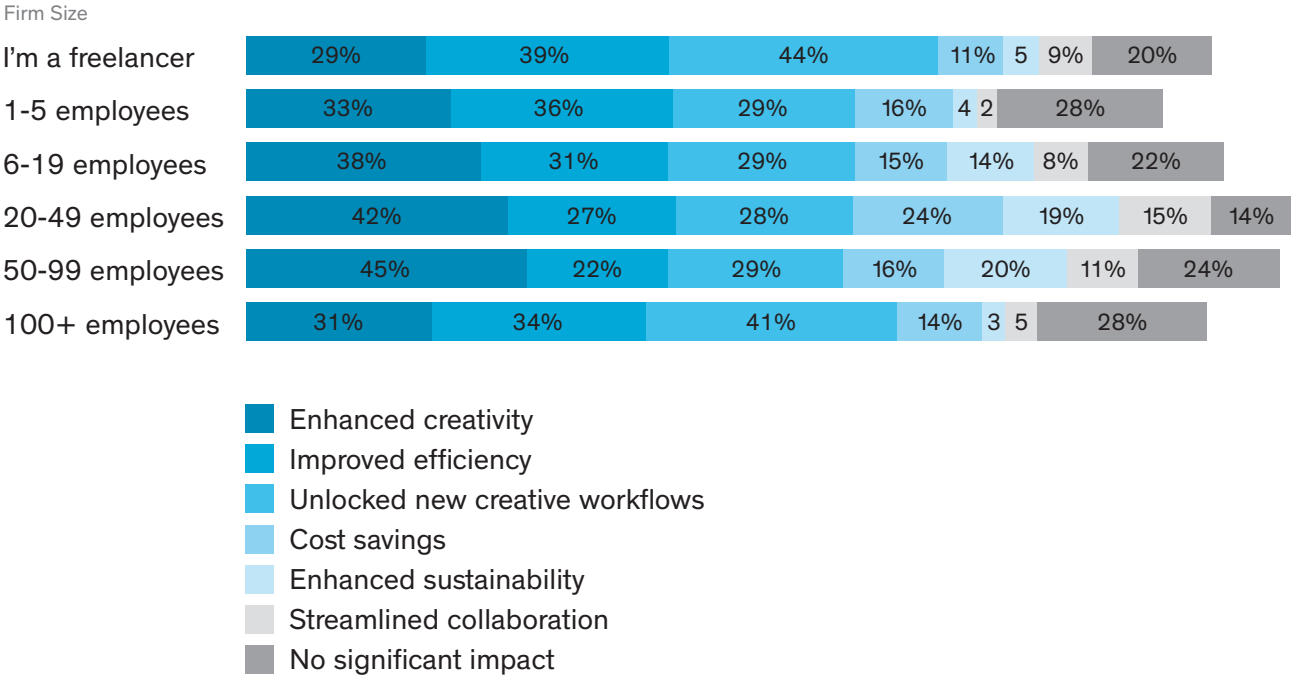
How have you experimented with AI tools in your design workflow?



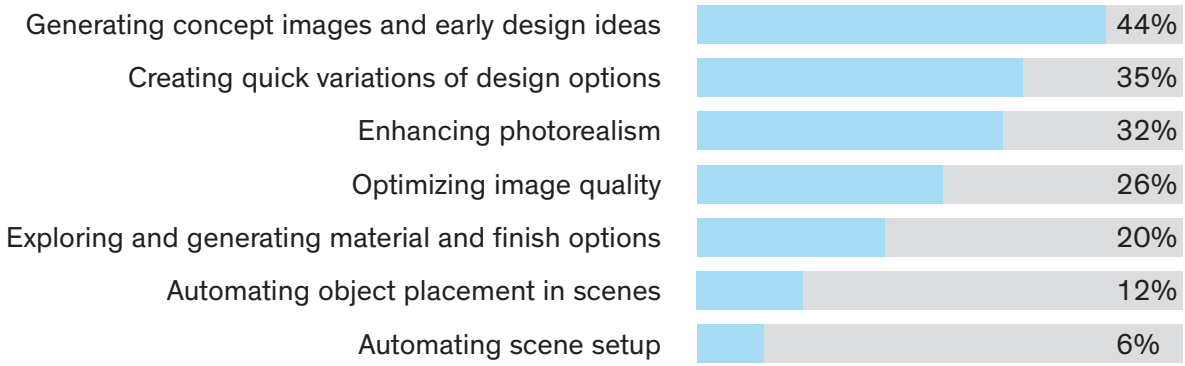
Another interesting finding emerges when cross-referencing these responses with the respondents' area of specialization. Between early 2024 and now, AI use for image generation among those practicing architecture or both architecture and interior design remained consistent (around 50%), while it dropped drastically (20-30% or more) for those indicating they only practice interior design. While the reason for this is not clear, perhaps the abstract nature of AI-generated images is better suited to guide the early conceptualization of a building's exterior rather than developing its interior, where there is less scope for deviation between initial ideas and final specifications.

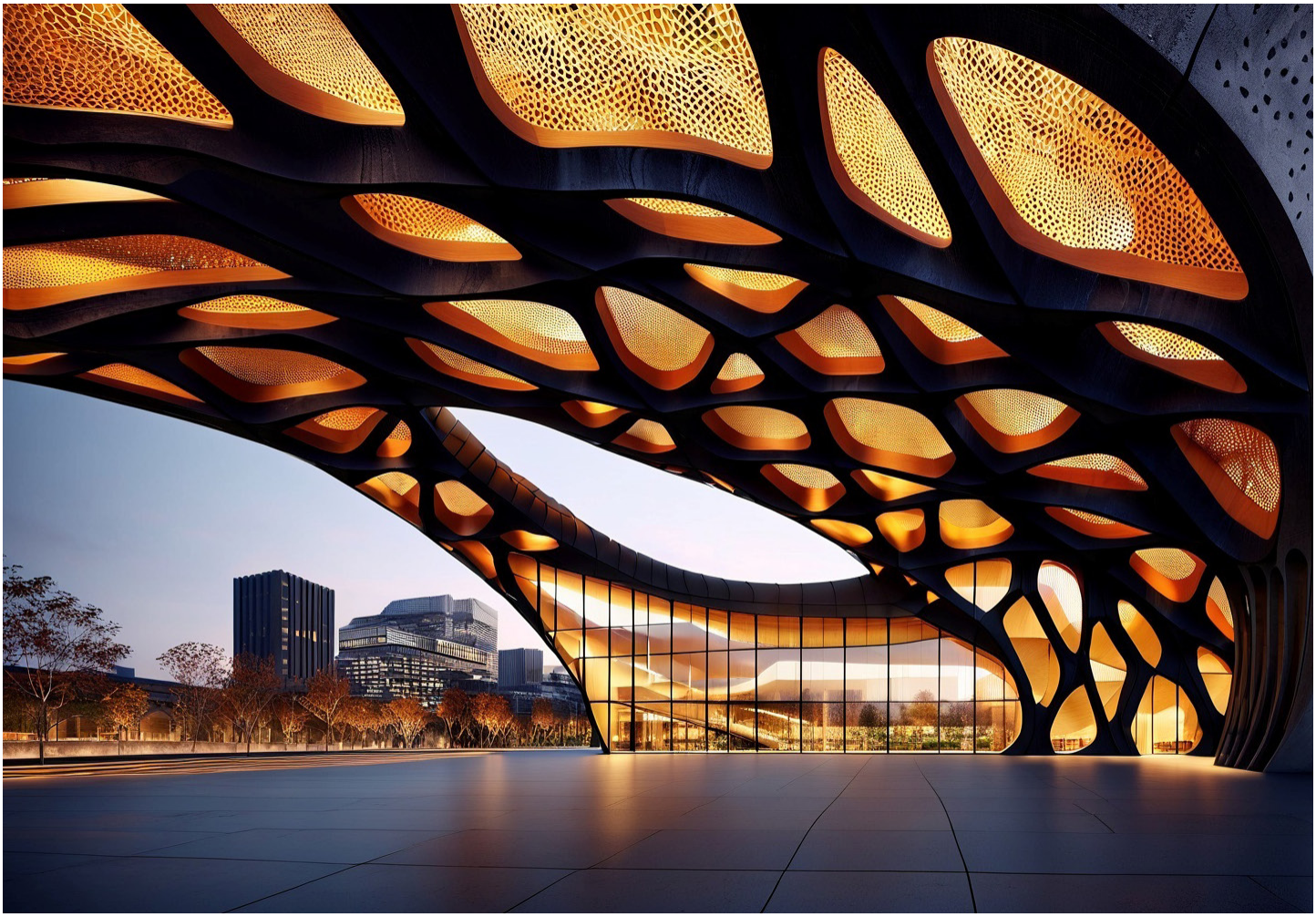
Considered against the overwhelming need shown in this survey for photorealistic and concept-level renderings, it appears AI is being harnessed by some very small or very large firms as a way to produce traditional, still renderings quickly and cheaply, while some medium-size firms are experimenting with it to unlock new creative workflows. These findings suggest that AI is here to stay in architectural visualization, but that the nature of its integration currently varies widely across firm size and specialization.

How has the integration of AI most impacted your overall design workflow?



What are you using AI for when it comes to visualization?





Conclusion.

Compared to other recent surveys regarding architectural visualization, this survey indicates that many architects have a desire to embrace more dynamic, technologically-enabled rendering methods, but are being held back by constraints related to time and costs. This could be explained by the majority of respondents hailing from smaller firms, whose capacity to train up on and adopt advanced visualization technologies may be limited by their resources.

Nonetheless, the 1,000+ respondents to this survey are clearly not devoid of technological savvy. Findings show the most room for innovation might lie in medium-sized practices, with firms ranging from 20-99 employees often reporting higher uses of emerging visualization technologies in creative ways than smaller and larger firms. Even less prevalent visualization methods, such as VR and AR, had significant upward shifts among this demographic on certain questions.

“Findings show the most room for innovation might lie in medium-sized practices, with firms ranging from 20-99 employees often reporting higher uses of emerging visualization technologies in creative ways than smaller and larger firms.”

Perhaps the most noteworthy takeaway, though, is the emerging trend seen when usage rates of newer rendering technologies are compared to each other. Respondents using any one of the more technologically-enabled methods of real-time rendering, sustainable design visualization, or AI-assisted rendering were generally more likely to report using all three. This speaks to a landscape of architectural visualization flooded with new opportunities, while their respective places in the profession are still up for grabs.

As it often seems is the case with new technologies, those who pick them up first will likely drive practice forwards and influence how they develop in future. Indeed, from real-time rendering to AI-powered visualization, the architects and rendering artists that are brave enough to embrace these tools early will be the ones who shape their usage — and shape the profession itself — for years to come.

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About Chaos

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

Chaos offers 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, a physically based renderer that has been honored with an Academy Award and an Engineering Emmy;
- Enscape, a high-quality real-time rendering and virtual reality plugin;
- Corona, a high-performance photorealistic rendering engine;
- Anima, a 3D/4D animation software to add realistic people and crowds to visualizations.
- Veras, an AI-powered visualization plugin and web app.

Headquartered in Karlsruhe, Germany, Chaos has offices in 11 cities worldwide. For more information, visit **chaos.com**.

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.