STADIUM
TECH REPORT

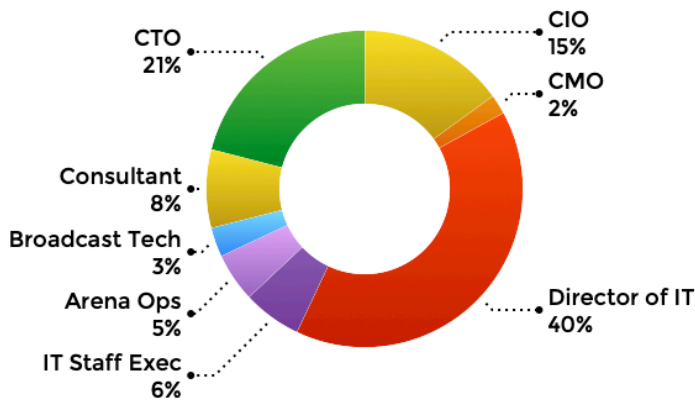**Stadium Connectivity White Paper**

Results & Analysis

November 2025

With concerns about rising operating costs, venues are increasingly looking to improve efficiency across multiple business segments by leveraging technology.

A big jump in venues reporting reducing operating costs as their primary concern looking into 2026 was accompanied by steady increases in use and interest in new technologies to help streamline multiple venue functions, according to the results of our fifth annual Stadium Connectivity Outlook Survey.

More wireless connectivity, increased use of cashierless concessions and biometrics, and increased interest in generative artificial intelligence (AI) are all technologies venues say they will be looking to leverage in the next 12 months as they seek to whittle their spending and increase business efficiency. Also, more than half our respondents said they already had private 5G wireless networks installed at their venues, with back of house operations the leading private-network application of interest.

RESPONDENT PROFILES

Approximately 40 percent of respondents are directors of IT; 21 percent of respondents are CTOs, and 15 percent of respondents are CIOs.

- CTO 21%
- CIO 15%
- CMO 2%
- Consultant 8%
- Broadcast Tech 3%
- Arena Ops 5%
- IT Staff Exec 6%
- Director of IT 40%

KEY TAKEAWAYS

1. Lowering operational costs is a runaway leader for top challenge among venues for 2026, continuing a three-year trend.

2. Improved wireless connectivity and cashierless concessions technology are the top roadmap items for venues in 2026.

3. Larger venues may be leading the way on private wireless network deployments; for all venues, back-of-house use and security operations are the top private-network application interests.

4. Use of generative AI is growing, with a third of venues already reporting some use of Gen AI applications.

5. Venues are less sure of their security stance, with more venues saying their stance is "not good enough," compared to the previous year's survey when it comes to their overall security and their digital transformation strategy.

In July and August of this year we reached out to the STR community and asked them to participate in our fifth annual Stadium Connectivity Outlook Survey, which included a wide range of questions about the current state of a venue's connectivity and technology infrastructure. As in years past, the goal was to get a clearer understanding of what's shaping respondents' operational strategy and how they're prioritizing investments.

We also asked very specific questions about the latest stadium technologies, including biometrics and cashierless concessions, and even added several new topics, asking respondents how they might be using generative AI and what their plans were for LED board purchases.

To be clear, these are not our views but the insights of our audience - honest feedback that once again provides an industry-wide perspective on the common issues facing venues of all shapes and sizes, from large NFL and college football stadiums to Major League Baseball stadiums, to NBA and NHL arenas, as well as more intimate concert halls.
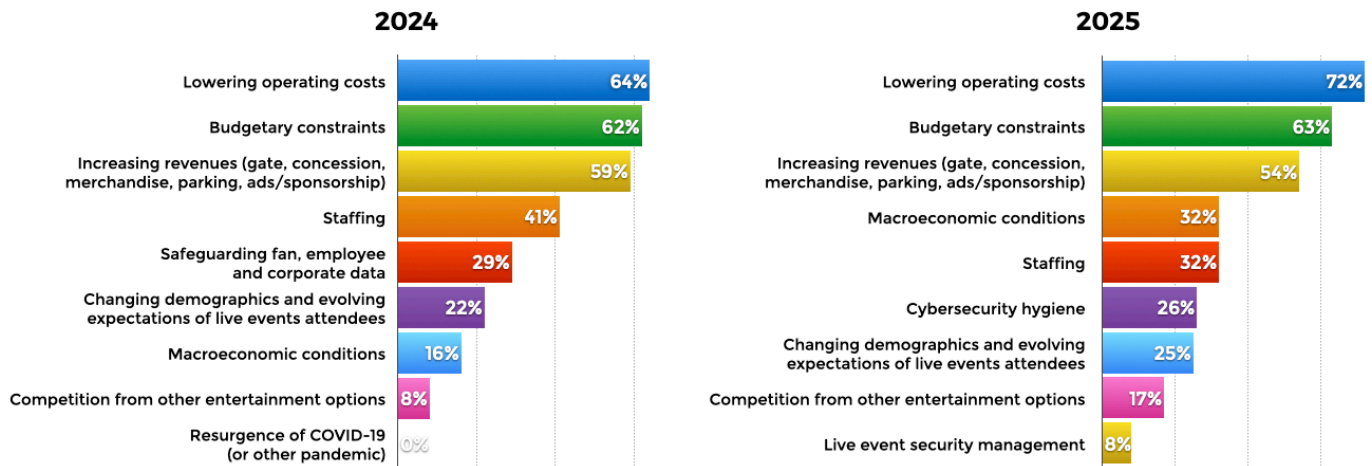
If there is a caveat to the responses, it is that the data we collected may be skewed toward the concerns and strategies of larger venues. Almost 50 percent of our replies came from representatives of the largest venues (50,000 seat capacity and above), which are mainly NFL and large-college stadiums. Twenty-five percent of our respondents represent venues with a seating capacity of between 15,000 and 19,000 seats.

Only six percent of answers came from venues with capacity of 14,999 or less, which is a category that will likely expand in the near future with many smaller venues currently under construction or development.

Lowering operating costs becomes a bigger priority

In our fifth annual Stadium Connectivity Outlook Survey, respondents showed a significant shift in their annual economic concerns. While lowering operating costs, budgetary constraints and increasing revenues remained the top three challenges for the next 12 months, this year lowering costs was cited by 72 percent of respondents, up from 64 percent in 2024 and 56 percent in 2023. Increasing revenues, meanwhile, was cited by only 54 percent of respondents to this year's survey, compared to 59 percent a year ago. According to this year's respondents, 18 percent said reducing costs was a bigger challenge than increasing revenues.

Survey question: *What are the biggest challenges you face in the next 12 months? Check all that apply:*

2024

Challenge	%
Lowering operating costs	64%
Budgetary constraints	62%
Increasing revenues (gate, concession, merchandise, parking, ads/sponsorship)	59%
Staffing	41%
Safeguarding fan, employee and corporate data	29%
Changing demographics and evolving expectations of live events attendees	22%
Macroeconomic conditions	16%
Competition from other entertainment options	8%
Resurgence of COVID-19 (or other pandemic)	0%

2025

| Challenge	%
Lowering operating costs	72%
Budgetary constraints	63%
Increasing revenues (gate, concession, merchandise, parking, ads/sponsorship)	54%
Macroeconomic conditions	32%
Staffing	32%
Cybersecurity hygiene	26%
Changing demographics and evolving expectations of live events attendees	25%
Competition from other entertainment options	17%
Live event security management	8%

Why are costs a bigger concern? The replies may be a reflection on the current economy climate, where prices for goods and services have been increasing due to both inflationary pressure and fiscal policy (eg: tariffs). Our respondents seemed to call this fact out, as the number of respondents who selected "macroeconomic conditions" as a top challenge for the next year doubled from last year's survey, from 16 percent in 2024 to 32 percent in 2025. Add in the fact that budgetary constraints once again registered as a significant challenge (62 percent in 2024, 63 percent in 2025), the concerned attitude about controlling costs starts to make more sense.

Wireless upgrades continue as bandwidth demands increase

Once again, improving wireless connectivity for fans topped the list of our respondents' replies for their top initiatives for 2026, with 60 percent selecting that answer. Improving in-venue connectivity for operations climbed a bit in this year's survey, with 54 percent, up from 48 percent in 2024. Those two initiatives once again sandwiched cashierless concessions, which got 57 percent of respondents, compared to 58 percent last year.

Survey question: *Which initiatives are on your roadmap for 2025? Check all that apply.*
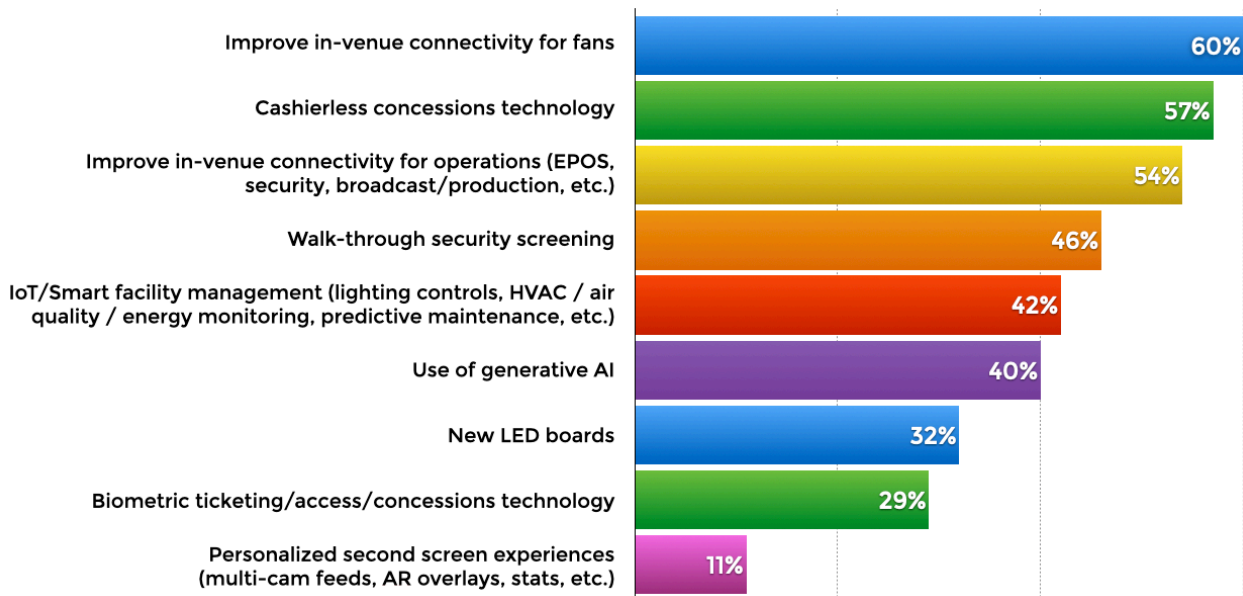
Like last year, here at Stadium Tech Report we could see this continued interest in wireless upgrades coming. Stories of new Wi-Fi deployments and cellular network upgrades have been joined by talk of a "converged network" approach, where both Wi-Fi and cellular play complementary roles in providing coverage.

Our ongoing analysis reveals several reasons why teams and venues are spending the money to upgrade these networks now, even as they cite lowering costs as a goal. Included in that list is the fact that new technologies like Wi-Fi 6, Wi-Fi 6E and cellular 5G are maturing in the market, with good product and service support from the vendor and carrier community; there is also the ability to tap into big chunks of new wireless spectrum, specifically the 1,200 MHz available in the 6 GHz band for unlicensed Wi-Fi 6E here in the United States, and the C-band and CBRS spectrum for cellular.

Vendors of wireless equipment are also helping venues make timely upgrade decisions by introducing new products designed to take advantage of the latest spectrum and standard advancements. On the Wi-Fi side Cisco extended its lead in the "hyper-directional" antenna segment with the introduction of a new version of its long-reach venue antenna that supports the Wi-Fi 7 standard. On the cellular side, Galtronics and MatSing continue to innovate with their hyper-directional product lines, well timed as many older venue DAS contracts come up for renewal.

The increase in interest for improved back-of-house wireless connectivity is no doubt spurred by the increase in demand from core business functions inside many venues. As concessions, entry, security

and other mission-critical operational wireless needs increase, venues need to provide additional bandwidth. One way venues appear to be satisfying these needs is through the deployment of private 5G networks, which can be kept separate from public networks for both security and capacity reasons. We will look at the private network topic more closely in our next section.

Private 5G networks filling a back of house need

While we have been tracking venues' plans for private 5G networks since the start of the survey, we had never asked directly about actual deployments until this year's survey. According to our respondents, 51 percent of venues already have a private 5G wireless network installed, with another 18 percent currently evaluating options for deploying one.

One factor that may be contributing the surprisingly high number is the fact that all 30 NFL stadiums have at least one private network, mandated by the league to support on-field coaching communications. A similar mandate by the NHL is also seeing private 5G networks being put into team arenas, also for in-game communications. Even if it's not fully representative of adoption across venues of all sizes, the increase of private 5G networks overall could suggest the technology is reaching an inflection point.

"We see 5G and Wi-Fi as two essential components of a unified network strategy, working together to provide the speed, capacity, and reliability that large-scale venues require"

Jake Kornblatt, Vice President, Global Enterprise, Verizon Business

Survey question: *With private 5G, you can isolate a portion of the bandwidth and dedicate it to a specific workflow. Which workflows would you use it for? Check all that apply:*
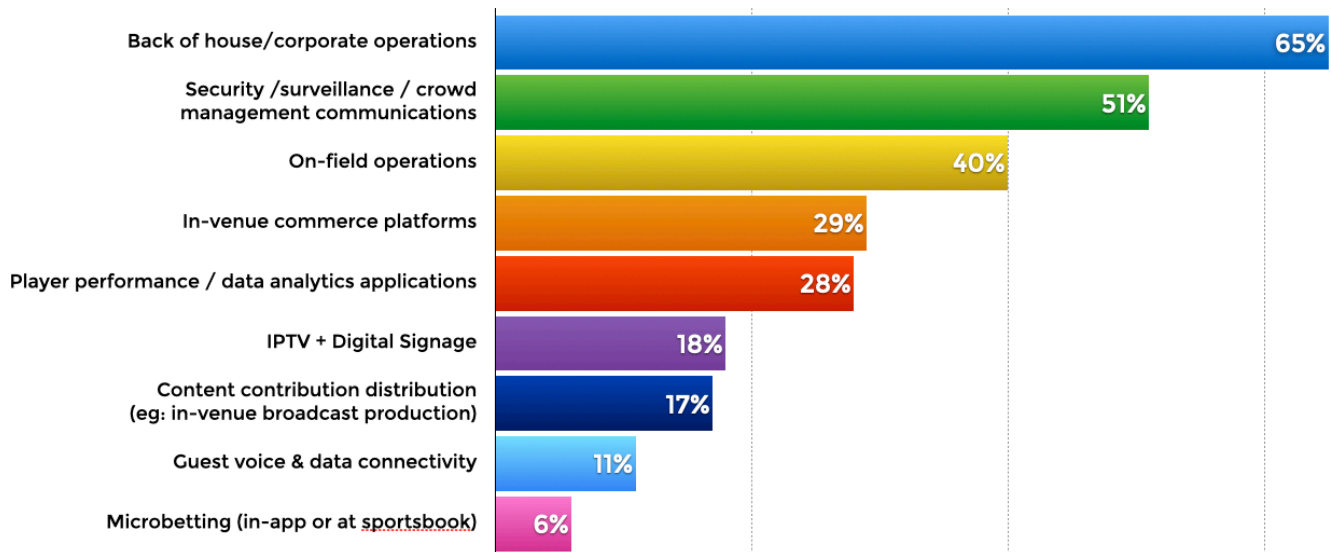
Using private 5G for back-of-house operations was still the top selection for possible Private 5G use cases for all venues, with a big jump to 65 percent of respondents this year, compared to 52 percent

in 2024. In second place for the third straight year was using private 5G for security and surveillance communications, at 51 percent compared to 48 percent last year.

Verizon's successful deployment of coach-to-coach on-field networks in every NFL stadium in 2023 may be the reason why respondents continue to show high interest (40 percent of respondents) in using Private 5G for on-field operations. Verizon is also in the process of deploying private 5G networks in National Hockey League arenas for tasks including communications with officials and coaching staffs, following a 2024 renewal of Verizon's partner deal with the NHL.

Private 5G networks might also find a home in venues to support IoT and smart facility management activities. In our question about initiatives for 2026, 42 percent of respondents cited "IoT and smart facility management" as something on their roadmap for the next 12 months. That result has grown steadily the past few years, from 29 percent in 2023 to 36 percent last year.

New technologies continue to expand: Cashierless concessions, AI, and Biometrics all showing growth

Cashierless concessions continues to be a top of mind technology for our venue respondents, with the subject holding down the No. 2 spot (57 percent) in this year's question about top initiatives for the next 12 months. Cashierless concessions was also No. 2 in 2024, with 58 percent of respondents.

Though the rise in venues reporting usage of any cashierless concession technology was small - 72 percent in this year's survey, compared to 70 percent last year - at Stadium Tech Report we expect numbers to keep rising throughout the next year. The growth has been steady, with 49 percent of venues reporting having cashierless concessions in 2022, followed by 66 percent in 2023.

One new twist we have seen emerge in recent news stories is venues deploying checkout-free technology in front of regular concession stands without much construction change. In these so-called "walk-up" formats, the technology provider installs the cameras and gates in front of a regular walk-up counter, while food and beverage are typically put into "grab and go" shelves, closets and coolers that can sit atop the existing counter. In addition to costing much less than formats that require internal construction, the new formats can also be deployed much more quickly, often in a week or less time.

(Editor's note: By our definition, "checkout-free" stores are the types of stores with gates at the entrances where customers scan or swipe payment information to gain access. Once inside, customers select the items they want, which are identified by cameras and/or sensors, and just leave, with billing taking place later online.)

There have also been numerous additional deployments of other frictionless retail solutions, including optical scanning checkout terminals, self-checkout kiosks with bar-code readers, and even systems of both these types using facial authentication for purchase and age verification. Multiple competitors have emerged in all these categories, increasing innovation and driving prices down, both good outcomes for venues.

> *"Private 5G Networks provide enhanced security, dedicated bandwidth and the flexibility to customize venue networks to meet specific business needs."*
>
> **Brian Gorney, Senior Director, U.S. Pro Sports**

Missing key moments in a game or performance while waiting to grab a snack or purchase merchandise negatively impacts the live event experience. Our reporting on cashierless concession technology has shown a high rate of fan acceptance and use, since many of the venues employing these innovative solutions are able to reduce average transaction times to less than a minute.

Many teams and venues have reported that they've been able to grow revenue by increasing transaction volume and basket size, while also improving the fan experience by significantly reducing queuing time. Further, when replacing traditional belly-up stands with new frictionless solutions, they've gained operational efficiencies by having the ability to allocate their staff more effectively. To highlight the acceptance of this technology, our data shows that venues with more than five cashierless concession deployments increased steadily the past three years, from 39 percent in 2023 to 53 percent in 2024 and 58 percent this year.

Survey question: *How is your venue using generative AI technology? Check all that apply.*
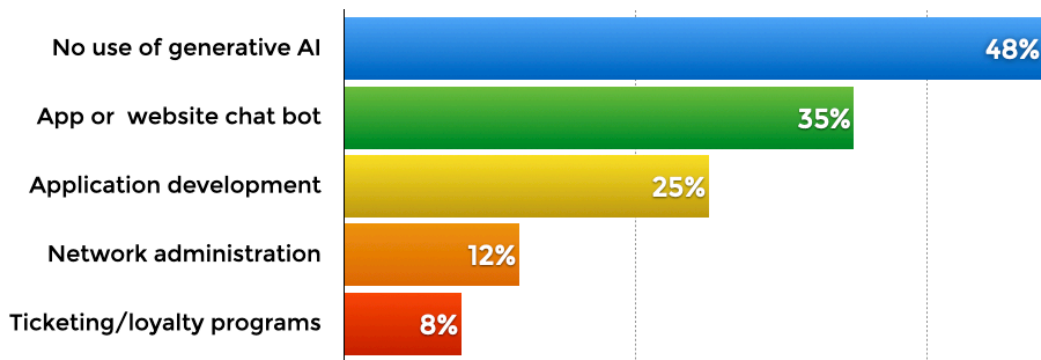

In this year's survey we added a new question to get more granularity on how venues are (or are not) using generative AI. While nearly half of all respondents (48 percent) said they are not yet using any kind of AI technology, venues that are using AI technology selected two functions, for website or app chat bots (35 percent) and for application development (25 percent) as the leading use cases.

Network administration (12 percent) and ticketing/loyalty programs (8 percent) were the other choices for AI usage, and in the "other" category several respondents said they are using AI technology to assist with content generation. AI use seems to play into the overall theme of reducing operational costs, since many AI projects look to streamline or reduce the human-hours needed for tasks.

Another technology showing steady growth in venues is biometrics. While most stadium deployments of biometric technology involve facial authentication systems, there are also other forms of biometric verification being deployed, like the Amazon One system which uses a human palm for verifying transactions.

According to our respondents, use of biometric technology for two functional categories showed significant growth from 2024 to 2025. Respondents who said they are using biometrics for ticketing jumped from 14 percent to 22 percent, while the number of respondents using biometrics for concessions operations doubled, from 7 percent to 14 percent. The top use of biometrics, according to our respondents, is for staff/team and media-area access, at 35 percent. And the percentage of venues saying they have no use of biometrics dropped from 58 percent in 2024 to 51 percent in 2025.

Survey question: *Does your venue use facial or other biometric authentication technology for any of the following functions? Check all that apply.*
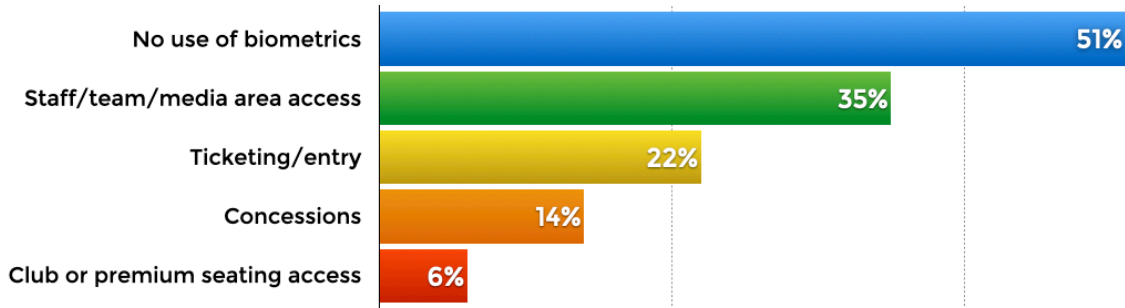

Taken as a whole, the use of technology in all three of these categories plays into the overall them of cost reductions, since all three have proven to be effective at streamlining operations while also allowing venues to more effectively allocate staff.

Are more security concerns creeping in? And are stadiums rethinking their digital path?

Though 71 percent of this year's respondents claimed that their security posture was "adequate," that number represents a 6 percent decline from last year's survey. Perhaps even more alarming is that the percentage of venues who answered "I don't know" what their security posture was increased from 2 percent in 2024 to 6 percent in 2025.

Survey question: *In terms of digital transformation execution our venue is:*
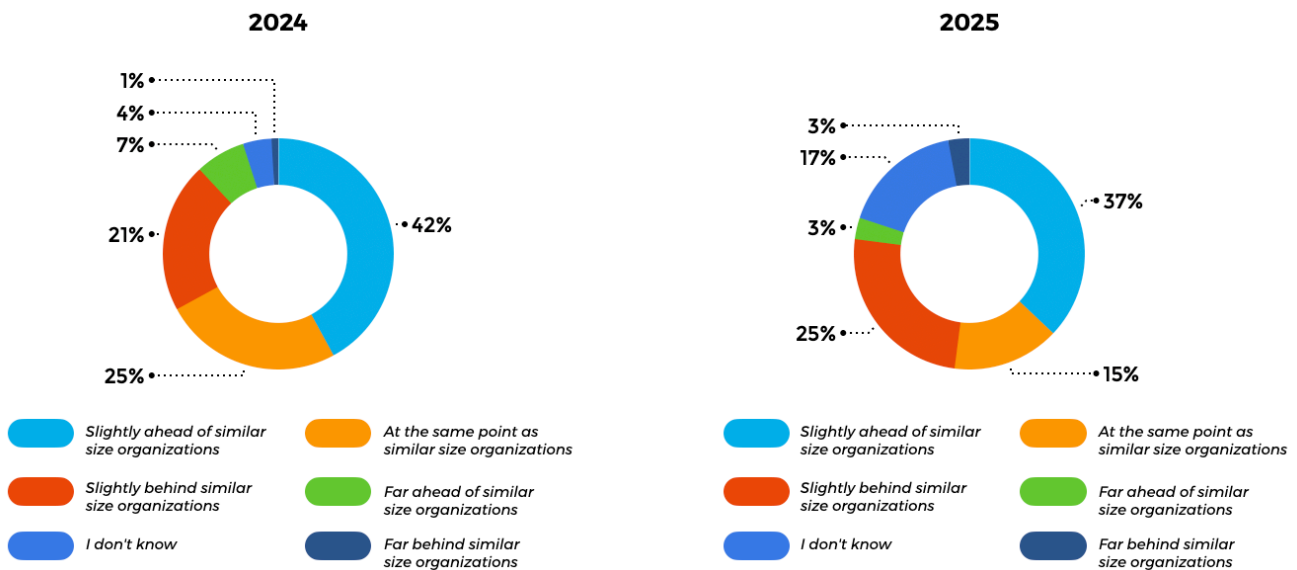
Overall, however, venues seem to be paying good attention to security concerns, with the number of venues reporting walk-through security scanners remaining steady at 69 percent (from 70 percent last year). And 17 percent of respondents saw "cybersecurity hygeine" as a top challenge for the next 12 months, putting the new question on the map in its first year of answers.

As more new transformative technologies like AI are being put in place, it's perhaps no surprise that many of our respondents seem to be rethinking their digital transformation journeys. While last year 42 percent of respondents thought their digital transformation activity was ahead of other similar-sized organizations, in 2025 that number dipped to 37 percent; and the number of venues who thought they were "at the same point" as other similar-sized organizations also declined, from 25 percent in 2024 to 15 percent this year.

While new applications of new technology might be causing concerns, one clear fact is that venues are consistently turning to technology to help solve their most basic economic concerns. The good news is, with more innovation, competition and best practices emerging, all venues should have more choices when it comes to finding ways to streamline internal operations while keeping the fan experience at a high level.