

2018 AUGMENTED AND VIRTUAL REALITY SURVEY REPORT



INDUSTRY INSIGHTS INTO THE FUTURE OF AR/VR

MARCH | 2018

Executive Summary

AR/VR SHOWS SIGNS OF ADVANCEMENT—AND NEW WORRIES

With investment in augmented reality (AR) and virtual reality (VR) on the rise, the results of a new survey by global law firm [Perkins Coie LLP](#) depict a growing industry that is moving to a greater focus on more practical applications, while facing concerns reflective of an expanding customer base. The survey of startup founders, technology company executives, investors and consultants, released in March 2018, follows the firm's inaugural [AR/VR Survey](#),¹ released in September 2016.

As in the first survey, this year's respondents chose gaming as the sector they expected to attract the most investment for the coming year. But gaming's lead position was not as strong in 2018, with retail, military and defense, and real estate among the areas making gains. And in another sign that AR/VR is building appeal beyond gamers, a strong majority of respondents (82%) noted a focus among developers on creating more collaborative and social experiences for AR and VR in the coming year—while another 81% said that developers will focus on creating AR tools and applications for smartphones.

“Not everyone is a gadget freak. The industry needs to appeal to those who aren't.”

– Mixed reality (MR) startup developer

Respondents were also generally more concerned about legal issues than they were 18 months ago, likely because more AR/VR companies have been going to market or getting close to doing so. This was especially pronounced with regard to intellectual property issues, with 40% expressing concern about facing lawsuits for IP infringement and 30% voicing concern about technology and IP licensing issues. Both are signs of a maturing industry—one that not long ago was more focused on developing technology than building fences around it.

Just as in the last survey, respondents said that user experience was the top obstacle for mass adoption of both AR and VR. Cost was the second biggest obstacle identified for VR, whereas respondents said that AR adoption would face more difficulties stemming from a lack of content offerings. This is likely because AR is a technology that many consumers can access on smartphones they already own, rather than on new headsets or devices they must purchase, making cost less of a consideration.

Even as the market is developing, growth remains the focus. Nearly half of startup respondents (45%) identified their growth or exit strategy over the next three years as raising capital to build their companies, whereas only 23% are looking to acquisitions and 18% are pursuing strategic partnerships. Startup respondents also indicated ongoing concerns from investors regarding slow adoption of the technology and the absence of an established market, which appear to be keeping those investors from writing big checks. Last year, [PitchBook reported](#)² the prominence of smaller deals, noting that since 2010, there have been 1,179 venture deals for 707 different startups with total investments worth \$4.5 billion—and that figure is somewhat skewed given that about a quarter of the total venture investment went to Magic Leap.

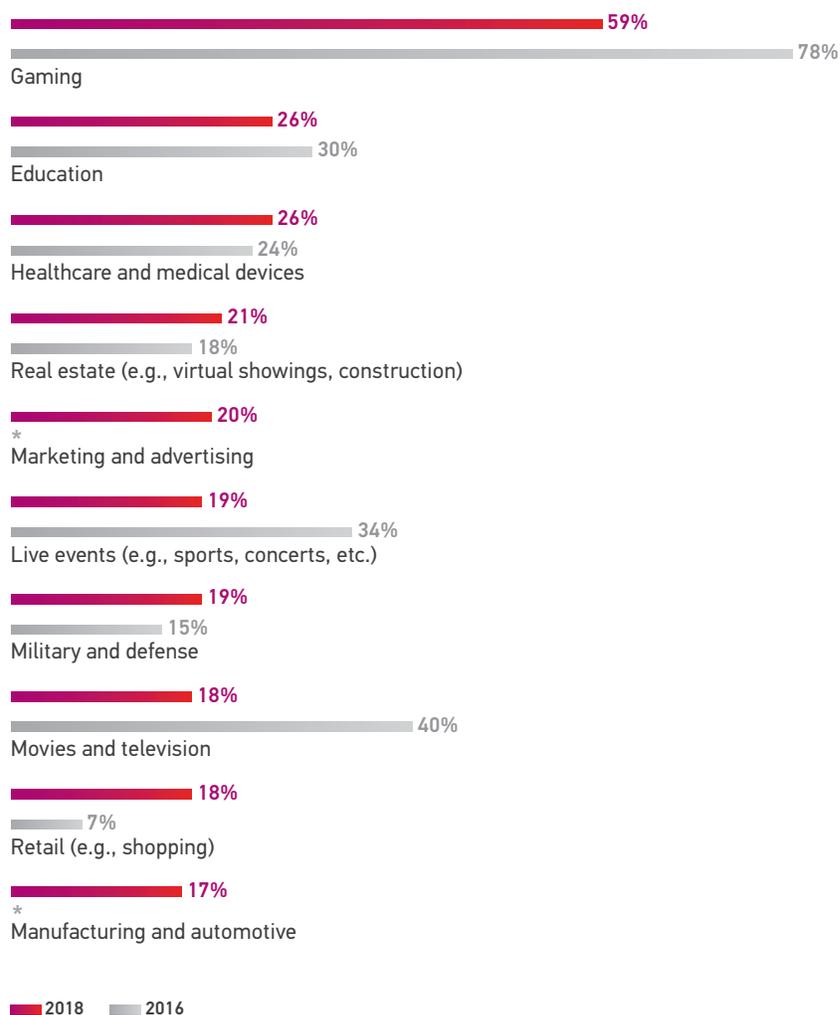
Overall, the survey shows that those in the industry have strong confidence in the potential of AR and VR. One respondent called this era a formative and experimental phase—one that will create significant rewards for both developers and players in the not-too-distant future.

Key Findings

- Gaming remained the sector expected to attract the most AR/VR-related investment over the next 12 months, but its leading position dropped a bit from the 2016 survey (78%) to the 2018 survey (59%). Education and healthcare/medical devices (both at 26%) rounded out the top three in this year's survey, whereas the sectors ranking second and third in 2016 were movies and television (40%) and live events (34%).
- Respondents identified the user experience as the top obstacle for mass adoption of both VR (41%) and AR (39%), reflecting ongoing concerns with technical limitations and performance issues, as well as bulky hardware in the case of VR. Cost was viewed as a greater concern for VR (22%) than AR (14%), whereas respondents expressed more concern about content offerings for AR (25%) than VR (17%).
- The vast majority of respondents expect developers to focus their efforts over the next year on creating AR tools and applications for smartphones (82%) and on creating more collaborative and social experiences in AR/VR (81%).
- In a result similar to that of our first survey, two-thirds of respondents expect the AR market to surpass VR in revenue. However, 51% now expect it to happen within three years, whereas only 18% selected that timeframe in 2016. Even taking into account the 18 months between surveys, it appears that respondents believe the timeframe in which AR will surpass VR is shorter than previously anticipated.
- In comparison to our last survey, respondents expressed more concern about the various legal risks affecting AR/VR, with consumer privacy and data security the top option selected (44%), followed closely by product liability and health and safety issues (42%) and IP infringement (40%). Within IP, patent litigation was the area that respondents most expected to drive disputes and litigation in AR/VR, given concerns about being sued for IP infringement.
- Most respondents plan to monetize AR/VR technology by selling products or subscriptions (59%), followed by charging for additional features or for in-app purchases with free apps (27%).
- Growth and exit strategies for AR/VR startups for the next three years mirrored those from the 2016 report. A plurality of this year's startup respondents (45%) said they planned to raise capital to build their companies, followed by 23% who are pursuing acquisitions and 18% who are pursuing strategic partnerships.

The survey was completed by 140 respondents. In the charts that follow, some questions do not add up to 100% due to rounding, and some exceed 100% because respondents were invited to select more than one answer. For the full survey methodology and a breakdown of respondent demographics, see page 18.

> In which sectors do you expect to see the most investment directed to the development of AR or VR technology or content in the next 12 months? [select up to 3 options]



“Business customers need to know that VR/AR can solve specific problems in ways that are better, faster, cheaper or more effective than traditional methods.”
 – VR startup founder

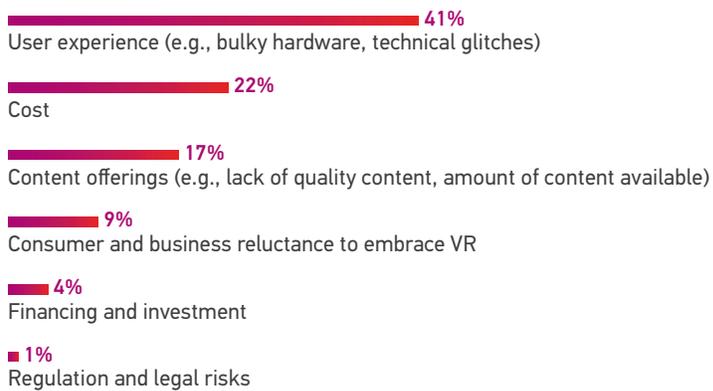
*This answer choice was not provided for the 2016 survey

Gaming remained the top choice among survey respondents attempting to predict in what sector the most investment will be directed to AR/VR over the next year, though by a smaller margin than in 2016. The drop is likely less about bearish attitudes toward gaming and more about the broadening of interest in AR and VR applications in other areas. Some other entertainment-centric options—notably movies and television and live events (e.g., sports and concerts)—also dropped from the last survey, while other, more practical applications, notably retail, jumped. That result mirrors overall buzz about retail, particularly with the evolving use of AR applications and smartphones.

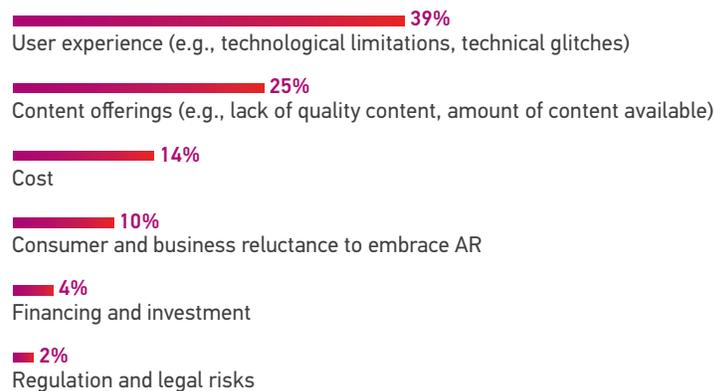
Greg Jones, director of VR and AR at Google, said last fall that Pokémon GO had prompted consumers to expect similar experiences while they shop. “They just had the Pokémon GO experience and now they already expect this in stores,” Jones said.³ “AR is set to reconnect physical and digital retail.”

The drop for movies and television could stem from a belief that shorter experiences work better with AR and VR. But the drop for live events was somewhat surprising and not necessarily reflective of activity in the market, including the October 2017 announcement that Facebook would use Oculus technology to allow its users to watch live concerts and sports with friends from around the world, as reported by *TechCrunch*.⁴ Additionally, Magic Leap recently announced a partnership with the NBA that will allow users to see some NBA content through Magic Leap’s goggles using “spatial computing,” which overlays a digital world onto the physical one,” according to *Newsweek*.⁵

> What is the biggest obstacle to mass adoption of VR technology?



> What is the biggest obstacle to mass adoption of AR technology?



For the second consecutive survey, user experience was viewed as the top obstacle to mass adoption of both AR and VR. For VR, cost remained the second biggest obstacle, though at a lower level than in 2016, when it was selected by 32% of respondents. That makes sense, given the price cuts announced by VR players such as HTC and Oculus in 2018. As Stephanie Llamas of SuperData Research *told Forbes*⁶ last year, in comments that also addressed user experience, “HTC understands the benefit of setting a more accessible price for their headset. I think it will definitely boost the user base, especially if they concentrate on making the software side more seamless.”

Content was a greater concern for AR than for VR. That is likely so because cost is perceived to be less of an obstacle for AR, given that the technology is directly tied to smartphones, which are essentially ubiquitous. Interestingly, while few respondents found regulation and legal risks to be the biggest obstacle to mass adoption, as noted on page 9, a large number of respondents found legal issues—especially in the area of intellectual property—to be a significant concern.

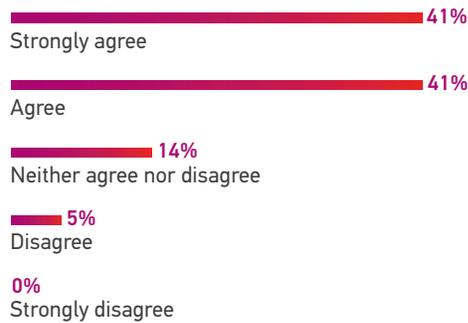
“VR tech needs to be streamlined to be faster, lighter and cheaper. AR technology needs to move beyond the handheld screen and into cheap, lightweight and fashionable headsets.”

– Technology company executive

“We need better resolution and pinpoint control. Users are very used to pinpoint control with a mouse, and current hand analogues simply don't have the expected finesse.”

– AR/VR developer

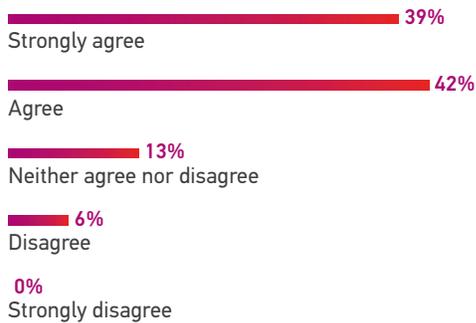
> To what extent do you agree with the following statement: Over the next year, developers will focus on creating AR tools and applications for smartphones.



Respondents clearly see a wave coming regarding AR tools and applications for smartphones—41% strongly agree that it is imminent. This finding was echoed by a [July 2017 column in *Computerworld*](#),⁷ which noted that AR’s reputation as a frivolous technology centered around gimmicks and games is changing and that the time is not far off when AR will play a greater role in the corporate world. Part of this evolution hinges on the continued improvement of phones and tablets, but the article predicts that the “ultimate and eventual hardware platform for augmented reality will be glasses and goggles.”

The *Computerworld* column preceded the launch of Apple’s ARKit framework last fall, when company officials said they wanted to make iOS the “largest AR platform in the world,” according to [VentureBeat](#).⁸ In early 2018, Apple issued a [press release](#)⁹ stating that there were “close to 2,000 ARKit-enabled apps spanning every category on the App Store.”

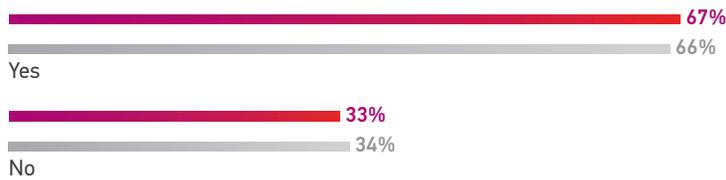
> To what extent do you agree with the following statement: Over the next year, developers will focus on creating more collaborative and social experiences in AR/VR.



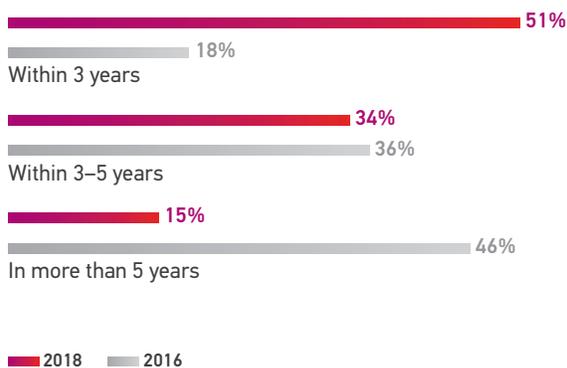
Respondents widely agreed that developers would focus on more collaborative and social experiences over the next year. Facebook’s announced plan for Oculus—which was shown with a video of a band playing for an audience of cheering cartoon avatars—is likely among the causes. In addition to its partnership with Magic Leap, the NBA [announced a partnership](#)¹⁰ between Turner Sports and Intel that will allow fans to watch certain games—beginning with the 2018 NBA All-Star Game—in VR. The NBA said that “everyday fans can experience the game like the celebrities sitting courtside with their feet in the hardwood. Fans can choose to view the game from high in the stands to get a bird’s eye view of the action or take the viewpoint of the photographers sitting on the baseline with the players coming right at them.”

There are concerns that advancements in AR/VR will have negative effects, including furthering social disconnects. But the overwhelming agreement from our respondents that collaborative and social experiences will be the future of AR/VR suggests that the technology can actually bring people together.

> Do you anticipate that the AR market will surpass the VR market in revenue?



> When do you expect the AR market to surpass the VR market in revenue?



Responses to our 2018 survey indicating a belief that AR will eventually overtake VR closely mirrored the responses to our 2016 survey. However, 51% now expect it to happen within three years, whereas only 18% selected that timeframe in 2016. Even taking into account the 18 months between surveys, it appears that respondents believe the timeframe in which AR will surpass VR is shorter than previously anticipated.

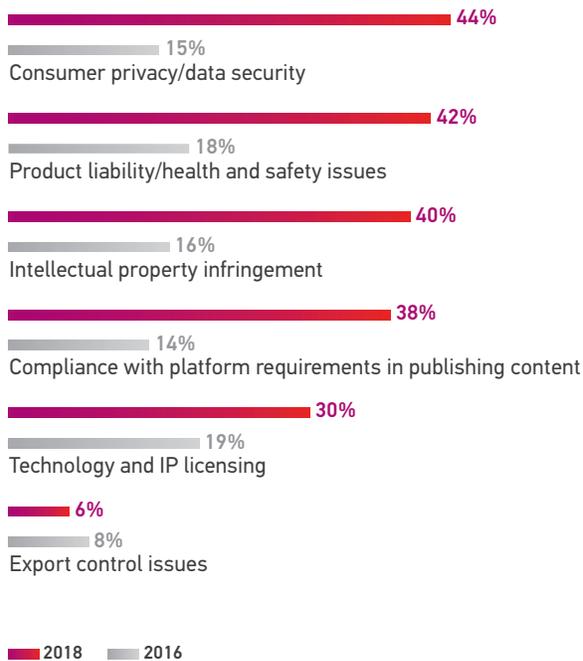
With an ability to combine the digital and physical worlds, AR has been cited as having the potential to reach a wider consumer base and to have more practical applications beyond gaming, an assessment that supports the expansion beyond gaming and entertainment discussed on page 4. Indeed, AR's ubiquity compared with VR's focus was a key point in a January 2018 [analysis](#)¹¹ by Digi-Capital, which expects sharply rising growth for AR and \$90 billion in AR revenue by 2022. It also expects growth, though less pronounced, for VR, with revenue around \$15 billion.

Beyond the fact that AR can reach users through smartphones, there have been some major developments in AR headsets. Magic Leap One, an AR setup consisting of goggles tethered to a pocket-sized computer, was unveiled in December 2017. Then, in February 2018, Intel launched its new Vaunt smart glasses, in a strategy that [The Verge](#)¹² described this way: "Instead of trying to convince us we could change our lives for a head-worn display, Intel is trying to change the head-worn display to fit our lives."

"AR is more available to consumers since smartphones have become a human appendage. Plus, AR doesn't require as much isolation as VR equipment."

– MR startup developer

> Which of the following legal risks are of concern to your organization in developing AR or VR technology or content? (Select all that apply)



Comparing the results of the two surveys, it is clear that participants in the AR and VR space are more concerned with legal risks than they were 18 months ago. This is a sign of a maturing market and also a sign that more AR/VR companies have been going to market or getting close to doing so. The ranking of concerns changed as well, with consumer privacy and data security—an issue that continues to rise higher on the list of priorities for all companies—the top option selected.

The concerns expressed by respondents with regard to legal issues also suggest that the AR/VR landscape is becoming less collaborative. In a field where, not long ago, developers could access any type of hardware, there is a trend toward the proprietary. As one respondent put it, “Several companies in the space are not public with their hardware.” Relatedly, there was a significant jump (12% in 2016 to 31% in 2018) in the percentage of executives with established technology companies who cited platforms requiring exclusivity as a challenge they have faced in deals with companies developing AR/VR solutions (see page 17).

“Licensing is a slippery slope. The industry is in its early stages; there are bound to be screw-ups.”
 – VR startup developer

> Which of the following intellectual property issues do you feel are most likely to drive disputes and litigation in the AR/VR industry? (Select all that apply)

 61%
Patent litigation (e.g., infringement lawsuits over AR/VR-related inventions that are protected under patent law)

 38%
Trademark and copyright disputes (e.g., use of copyrighted images/text or trademarked products/services in a virtual world)

 35%
Trade secret claims (e.g., confidential business information acquired by a competitor or third party by a former employee or other improper means)

 32%
Rights of publicity (e.g., laws protecting the economic interest of brands/people portrayed in a virtual experience)

Respondents chose patent litigation, by a wide margin, as the area of IP that they expected to drive disputes and litigation in AR/VR, likely because they are worried they will be sued for patent infringement. This is another sign that the AR/VR market is developing, because products have to be in the market before any such lawsuit can be pursued. One respondent made plain his chief concern related to technology and IP licensing: “That we’re securing patents and not infringing on others.”

There is a particular worry that as AR and VR products come to market, patent trolls will take notice. One respondent noted concern about “predatory trolling of VR-related tech from those waiting for the market to develop.”

“Too many patents are being granted for under-examined, pre-existing prior art. And there’s an inability for anyone other than large companies to afford patent interference litigation.”

– VR industry consultant

> What steps has your organization taken to address privacy and data security concerns with AR/VR technologies? (Select all that apply)

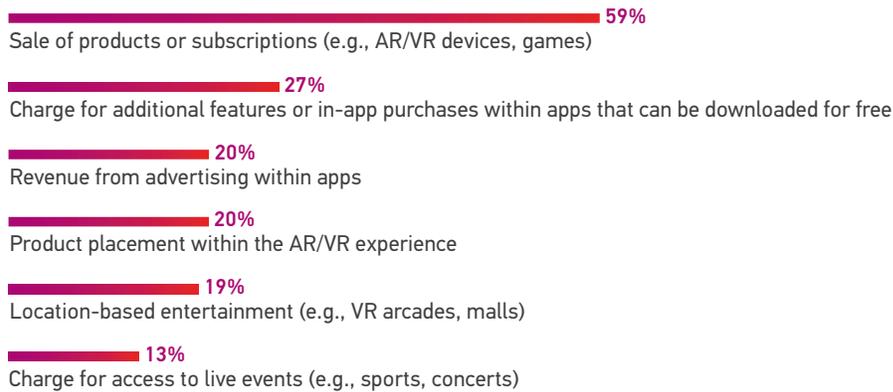


With cyberattacks seemingly in the news every week (if not every day), it was surprising that only slightly more than half of the respondents felt the need to limit the data they collected—though it is possible that their companies do not collect consumer data in the first place.

Similarly, only 46% of respondents said they were strengthening data security measures to mitigate the risk of breaches or hacks, and only 37% were updating policies and disclosures regarding consumer data. That is somewhat troubling, particularly given that the European Union’s General Data Protection Regulation is set to take effect in May 2018. As noted by the [World Economic Forum](#),¹³ “Not only does the law necessitate unambiguous consent for data collection, it also compels companies to erase individual data on request, with the threat of a fine of up to 4% of their global annual turnover for breaches.”

Respondents who expressed concern about consumer privacy and data security in the question on page 9 were more likely to take all four of the steps listed above; however, in most instances their responses were only about 10% higher than those of the broader respondent group.

> How are you currently, or how do you intend to, monetize AR/VR products or services? (Select all that apply)



Clearly, most respondents are banking on the sale of products or subscriptions to generate revenue. For both AR and VR, the ability to charge for subscriptions hinges on the creation of compelling content. A recent [Forbes article](#)¹⁴ noted, “Currently, there is not enough content to fully support the types of distribution channels that can benefit from subscriptions.”

It is also possible that AR and VR features will be part of other subscription products. The NBA is broadcasting 27 games in VR this season as part of its League Pass subscription package. As for monetizing AR, Snapchat launched its Custom Lenses program. “By combining augmented reality with your customizable captions, Snapchat hopes you’ll share more from birthdays and weddings while earning it a little money,” [TechCrunch wrote](#).¹⁵

“It is time for the industry to move beyond the ‘new technology’ phase, and concentrate on providing solid, provable business cases to clients that show a measurable return on investment, and deliverable results.”

– VR startup founder

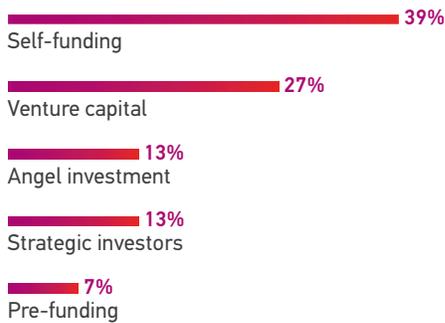
The following questions were answered only by startups.

> What are the most common concerns you hear from potential investors in AR or VR startups? (Select all that apply)



Slow adoption registered as the top concern that AR/VR startups hear from potential investors, just slightly ahead of a lack of an established market for the technology. As one respondent said, "Just because VR and AR are cool, it doesn't mean everyone will want to use it or have time for it. Immersive experiences need to be easy and comfortable for people to embrace it."

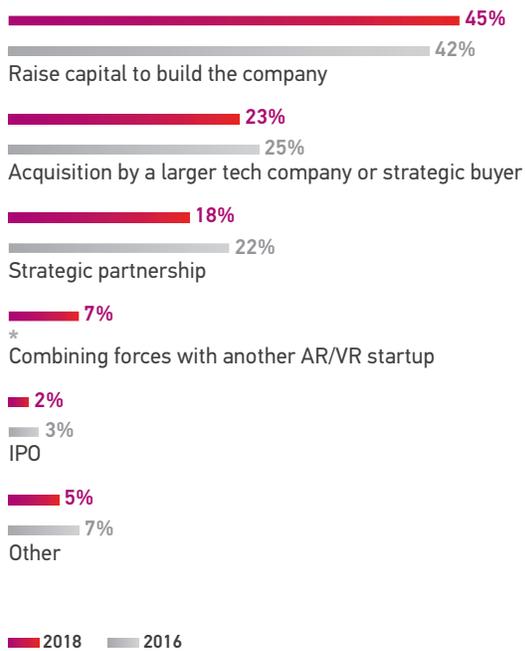
> What is the current state of your company's funding?



> What is the current status of your efforts to raise capital?



> Which of the following best describes your growth or exit strategy over the next three years?



*This answer choice was not provided for the 2016 survey

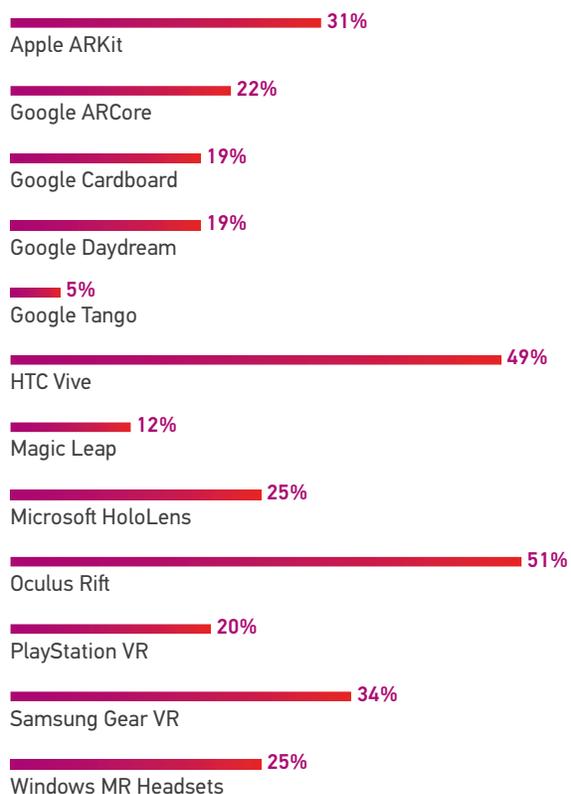
The results from the preceding three questions show that AR/VR startup respondents are still in a growth phase and actively seeking funding. Compared to 2016, the 2018 survey showed a slight increase in the percentage of respondents who said they recently obtained capital (11% to 15%)—but a similar increase in the percentage who have sought funding without success (21% to 24%). The largest percentage of respondents (36%) said they plan to seek a capital infusion in the next 12 months.

In general, AR/VR financing remains largely in the seed phase, at least through the first few months of 2017. That is the conclusion of a *PitchBook* analysis in May 2017,¹⁶ which found that “seed rounds made up 59% of all rounds in the VR/AR space in 2013 and 65% in 2016. *PitchBook* went on to note that compared with other, more established sectors, the AR/VR space is “still in its infancy.”

Similar to the 2016 survey, the 2018 survey suggests that startups are still taking a longer-term view in growing their companies, given that most selected raising capital as their growth and exit strategy for the next three years, as opposed to pursuing acquisitions or strategic partnerships.

> The following questions were answered only by startup and established tech companies.

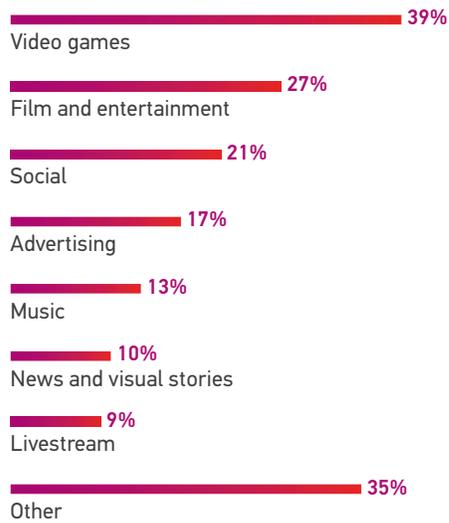
Which platform(s) are you currently developing for? (Select all that apply)



Oculus Rift and HTC Vive ran neck-and-neck at the top of the list of platforms that startups and tech companies are developing for, a result that largely matches the two platforms' sales and their placement in the [Steam Hardware & Software Survey](#),¹⁷ released in January 2018.

The third-most selected platform was Samsung's Gear VR, followed by Windows Mixed Reality headsets and Google's Daydream VR, which offered Americans access to VR content from the 2018 Winter Olympics through a partnership with Intel and Olympic Broadcast Services.

> If your organization is creating content for AR/VR, what type of content are you currently developing? (Select all that apply)



Video games topped the list of content that startups and tech companies are currently developing, though nearly as many respondents chose “Other.” When asked to elaborate, many respondents in the latter group noted that they were focused on content not related to entertainment. One respondent said his company was developing “VR simulations for Real Estate, Architecture, Engineering, Medical & Healthcare and the Oil and Gas industry.” Others listed “business applications,” “training and visualization for the aerospace industry,” “industrial training,” and “real-time in-surgery holograms.”

This finding largely tracks the results on page 4, which showed gaming as the area where respondents expect to see the most investment in the next 12 months—but with more practical applications making major gains. Some experts are keeping a close eye on applications of AR and VR in healthcare, with [Grand View Research, Inc.](#)¹⁸ projecting that the market will reach \$5.1 billion by 2025.

“The consumer market isn’t going to make it,” one respondent said. “Enterprise (specifically training) is doing much better.”

> The following question was answered only by established tech companies.

What challenges have you faced in entering into deals with companies developing AR or VR solutions? (Select all that apply)



As noted on page 9, the biggest change from 2016 to 2018 in the challenges that tech companies are seeing in AR/VR deals was the percentage of respondents who have encountered platforms requiring exclusivity—which jumped from 12% to 31%. The second annual [VRDC VR/AR Innovation Report](#),¹⁹ released in summer 2017, also captured that trend, finding that nearly a third of the professionals surveyed said that their next project would be released exclusively on a single VR, AR or MR platform. That was up from 10% a year earlier.

Respondents once again ranked uncertainties regarding viability of the hardware as the top challenge, and this problem actually appears to be growing more acute.

Methodology and Demographics

In January 2018, 140 respondents completed Perkins Coie's Augmented and Virtual Reality Survey via an online survey tool. The results were tabulated, analyzed and released in March 2018.

More than half of the respondents (56%) held C-level or VP titles (e.g., CEO, president, owner or chief technology officer). Individuals completing the survey came from a variety of industries, with entertainment (21%) and gaming (18%) among the most prominent. The breakdown of respondents is as follows:

- Founder/executive of an AR, VR or MR startup (42%)
- Executive within an established technology company (21%)
- Adviser/outside consultant (15%)
- Investor (8%)
- Production company (4%)
- Developer (3%)
- Other professional (7%)

Respondents identified their primary area of focus as:

55%

Virtual Reality (VR)

Immersive multimedia experiences simulate a physical presence in a real or imagined world and allow the user to interact in that world

15%

Augmented Reality (AR)

A physical, real-world environment is overlaid by computer-generated content

30%

Mixed Reality (MR)

The real and virtual worlds are merged to create an environment where physical and digital objects coexist and interact

About the Study Authors

Perkins Coie is a leading international law firm that is known for providing high-value, strategic solutions and extraordinary client service on matters vital to our clients' success. With more than 1,000 lawyers in 19 offices across the United States and Asia, we provide a full array of corporate, commercial litigation, intellectual property and regulatory legal advice to a broad range of clients, including many of the market leaders in AR, VR and MR technology, products, services and content. The firm represents clients in identifying, anticipating and resolving legal issues raised by this developing technology, including corporate financings, IP protection, software licensing, privacy and data security, product liability, commercialization and content strategy execution. For more information, please [click here](#).



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