Welcome to the VRDC VR/AR Innovation Report, presented by the Virtual Reality Developers Conference! The data in this report was gathered from surveying over 500 professionals involved in the development of augmented or virtual reality games and experiences.

This is the first ever VR/AR Innovation Report, and the trove of data contained within is intended to provide useful insight into a rapidly growing and diverse industry. Some of the many takeaways of this survey include the outstanding developer interest in the HTC Vive and Oculus Rift, a surprising prevalence of self-funding among VR/AR professionals and common concerns about VR’s current price of entry and lack of “killer apps.”

This data was collected, organized and presented by the UBM Game Network, which runs the Virtual Reality Developers Conference (VRDC) as well as the Game Developers Conference (GDC) and Gamasutra.com.

VRDC’s next event will take place alongside the Game Developers Conference in 2017 and focus on creating VR and AR experiences for games and entertainment.
WHAT VR/AR PLATFORMS ARE PEOPLE DEVELOPING FOR?

This is the year that big players like Oculus, HTC, Sony and Microsoft release consumer grade VR and AR headsets, so a major question for the VR/AR industry at large must be: which headsets are getting the most attention from developers?

The answer, at least according to our polling, seems to be the HTC Vive and the Oculus Rift, followed by Samsung’s Gear VR smartphone-powered headset.

When asked to choose the VR/AR platform(s) they were developing for right now, 48.6 percent of those surveyed said the HTC Vive, 43.2 percent said the Oculus Rift, and 33.8 percent said Samsung’s Gear VR headset.

![Chart showing which VR/AR platforms developers are using](chart.png)

Google commands quite a bit of developer attention across its various VR and AR initiatives: 29.2 percent of those surveyed said they were currently developing something for Google’s inexpensive, smartphone-powered Cardboard platform, while 14.6 percent said they were developing for Google’s more powerful mobile-powered VR platform Daydream.

Coming in after Daydream, perhaps because they’ve yet to see a consumer release, were Sony’s upcoming PlayStation VR headset with 12.9 percent and Microsoft’s HoloLens headset with 8.8 percent.
The least popular option proved to be Google’s new mobile device-driven AR platform Tango with 7.3 percent, while 10.7 percent of those surveyed said they were developing for an “other” platform and 24.1 percent said they weren’t developing for any VR/AR platforms right now.

Looking ahead, developer interest in the Vive and the Rift remain high but it seems that Google’s inexpensive smartphone-based VR/AR platform Cardboard is proving more intriguing than Samsung’s Gear VR headset.

When asked to pick the one VR/AR platform they planned to develop their next title for, 34.6 percent of respondents chose the HTC Vive. 23.4 percent went with Oculus’ Rift headset, and 14.0 percent were in favor of Google Cardboard.

<table>
<thead>
<tr>
<th>VR/AR Platform</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTC Vive</td>
<td>34.6%</td>
</tr>
<tr>
<td>Oculus Rift</td>
<td>23.4%</td>
</tr>
<tr>
<td>Google Cardboard</td>
<td>14.0%</td>
</tr>
<tr>
<td>Samsung Gear VR</td>
<td>10.3%</td>
</tr>
<tr>
<td>Microsoft Hololens</td>
<td>6.5%</td>
</tr>
<tr>
<td>PlayStation VR</td>
<td>3.7%</td>
</tr>
<tr>
<td>Google Daydream</td>
<td>3.7%</td>
</tr>
<tr>
<td>Google Tango</td>
<td>3.7%</td>
</tr>
</tbody>
</table>

However, unlike the last question a large number of respondents skipped answering this question, which may suggest that many VR/AR developers aren’t confident about where their next project will be or even if it will be at all, given that this question did not include the option to respond with “Other” or “None.”
HOW BIG OF A DEAL IS PLATFORM EXCLUSIVITY, REALLY?

With multiple consumer-grade VR and AR headsets entering the market this year, the question of exclusivity—developing games and experiences to be released exclusively on a single headset, either temporarily or permanently—has become an important one.

There are lots of reasons to make exclusivity deals, but not much hard data on exactly how common the practice currently is in the rapidly-expanding VR/AR market. With that in mind, we asked those surveyed whether or not their next title would be exclusive to a single VR/AR platform—and the results were surprising.

<table>
<thead>
<tr>
<th>Will your next title be exclusive for a single VR/AR platform?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

The majority of those surveyed, 78.1 percent, said that no, their next project would not be released exclusively on a single platform. That means, of course, that 21.9 percent of those surveyed said yes, their next release would be exclusive to a single VR/AR platform. Since no timeframes were specified, these responses could conceivably refer to both permanent platform exclusives and timed deals where a title is available exclusively on one VR/AR platform for a limited time before seeing a wider release.
MOST VR/AR DEVELOPERS ARE PAYING OUT OF THEIR OWN POCKETS

Investors have poured a great deal of money into the expanding VR/AR industry over the past few years, but it’s not always clear how those investments stack up against the other forms of funding fueling the industry’s growth.

With that in mind, we asked survey respondents to tell us the source or sources of their funding. The most popular response, by far, was out of their own pockets: 49.7 percent of those surveyed said some or all of their funding comes from their personal funds, while 33.4 percent said it came from their company’s existing funds.

Where does your funding come from?

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Funds</td>
<td>49.7%</td>
</tr>
<tr>
<td>Company’s existing funds</td>
<td>33.4%</td>
</tr>
<tr>
<td>Client(s)</td>
<td>16.7%</td>
</tr>
<tr>
<td>Angel Investors</td>
<td>13.3%</td>
</tr>
<tr>
<td>Venture Capital</td>
<td>10.6%</td>
</tr>
<tr>
<td>External Publisher</td>
<td>4.7%</td>
</tr>
<tr>
<td>Crowdfunding</td>
<td>3.6%</td>
</tr>
<tr>
<td>Alpha Funding (e.g. Steam Early Access)</td>
<td>2.3%</td>
</tr>
<tr>
<td>Other</td>
<td>7.8%</td>
</tr>
</tbody>
</table>

Less common was funding from clients (16.7 percent), angel investors (13.3 percent) and venture capital (10.6 percent). 4.7 percent said they’d received funding from a publisher, 3.6 percent claimed some or all of their funds from crowdfunding, and 2.3 percent said they’d raised money via alpha funding on platforms like Steam’s Early Access.

We thought that was a pretty good spread of options, but nevertheless 7.8 percent of respondents said they received some or all of their funding for VR/AR operations from an “Other” source.
SURPRISE: THE VAST MAJORITY OF VR/AR DEVS BELIEVE VR/AR IS A LONG-TERM SUSTAINABLE MARKET

To get a sense of how committed our survey respondents were to the idea that VR/AR is here to stay, we asked a simple question: do you believe VR or AR is a long-term sustainable market?

**Do you believe VR or AR is a long-term sustainable market?**

<table>
<thead>
<tr>
<th>Yes</th>
<th>95.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

Overwhelmingly, we got a simple answer: yes. 95.5 percent of those surveyed answered in the affirmative, leaving just 4.5 percent who answered no. Still, it’s interesting to see that even among VR/AR professionals there’s a small contingent who are dubious about the long-term health of the industry.
NAUSEA, PRICE AND THE LACK OF “KILLER APPS” SEEN TO BE THE BIGGEST HURDLES TO MASS-MARKET VR/AR ADOPTION

And while the VR/AR industry is growing rapidly, it seems likely to face a number of challenges before we can truly say it’s achieved mass-market adoption. Nobody knows that better than the professionals who are working on the cutting-edge of VR/AR, so we put the question to our survey respondents: what do you think VR or AR’s biggest hurdle will be when trying to achieve mass market hardware adoption?

It was one of many write-in questions on our survey, and we got hundreds of great responses. In reading through them, it’s easy to pick out a few recurring themes: for example, many VR/AR professionals are worried about the risk of bad, nausea-inducing VR/AR experiences turning off people who might otherwise be enthusiastic about the technology.

“Nausea—when someone has a bad experience you have lost them forever,” wrote one respondent. “Too easy to have [a] bad experience.”

“Price and nausea,” wrote another. And indeed, the price of entry for VR/AR was a point of concern for many respondents, which makes sense in light of the fact that it can cost upwards of $2,000 to buy an Oculus Rift or HTC Vive and a PC powerful enough to run the most demanding VR games and experiences.

“Price. If a family of 4 has to shell out $4K to play one game together, you’re not going to get widespread adoption,” wrote one respondent.

“Cost. Bringing the price down low enough that more people can afford a quality HMD will be a big hurdle,” wrote another. “Products like PSVR is a move in the right direction.”

“Price. The hardware has to be affordable as a first step,” opined another survey respondent.

“Once you have it in people’s hands they need to be able to use it as something more than a novelty. Trying to push the tech before it’s useful may result in consumer apathy.”

And indeed, many of those surveyed said that VR and AR need system sellers—“killer apps”—to really break out and become mass-market success stories.

“There is still yet to be a ‘killer app’ for VR/AR, outside of gaming,” wrote one respondent.

“It’s the same hurdle as communicating the value of a computer or 4K TV,” wrote another. “AR is more viable for mass market adoption than VR since it can be done with phones (eg Pokemon†Go) while VR will continue to have to figure out a balance for hardware. I predict that pre-built standard computers will eventually become the norm for VR because of the convenience to the consumer (like consoles). If Sony’s PSVR takes off it could shape the future of this technology a lot.”
WHAT ARE VR/AR’S BIGGEST TECH OR DESIGN OBSTACLES? LOCOMOTION AND, AGAIN, NAUSEA

While it’s interesting to think about what the biggest barriers to mainstream adoption of VR/AR might be, it’s more practical to get feedback from VR/AR professionals about what specific technical hurdles they’re facing in their own work.

To do so, we asked those surveyed to write in and tell us about the biggest unsolved technology or design problem they faced in making VR/AR experiences. Here, again, concerns about VR and AR’s potential to make people sick cropped up: many said that dizziness, motion sickness and general nausea were big problems that need to be solved via technical improvement.

“The latency of the graphics, which results different kind of illness as motion sickness, nausea,” wrote one respondent.

“Solving simulator sickness, probably with lower latency tracking,” wrote another.

“Freedom of movement without motion sickness,” wrote yet another respondent, hitting on other point of concern among those surveyed: the problem of effectively simulating movement in VR experiences, even those that are room-scale.

Many respondents simply wrote “locomotion” when asked to name VR/AR’s biggest unsolved technical or design problem.

“In VR the biggest unsolved problem for me, in making experiences, is locomotion,” wrote another respondent. “In AR, I think markerless tracking and compositing on the fly have a long way to go.”

“The biggest problem, from my outlook, is immersive movement in VR not being accommodated for (it is not as much unsolved as it is a design problem there is achievable designs that both HTC Vive and Oculus Rift could have been shipped with),” opined one respondent. “A cheap, separate component could be sold to achieve this but adoption of extra components is hard to push to the main market; this reduces the chances of developers pushing it themselves, making for an unfortunate, and unnecessary, setback that is key to boosting VR towards being accepted by the mainstream market. The other major problem with this oversight is that, without it, the genres achievable for an immersive VR experience are heavily restricted right now.”
SO WHAT ARE THE BEST EXAMPLES OF VR/AR GAME AND EXPERIENCE DESIGN RIGHT NOW?

So why are so many talented people focusing their efforts on VR/AR, even in the face of significant challenges? There are as many answers as there are those to give them, and already the VR/AR industry is brimming with exciting projects from talented creators around the world.

To shed light on some of the most inspired applications of VR/AR technology so far, we decided to ask our survey respondents to highlight a particular game, experience or other project that they thought was the most innovative use of VR/AR to date.

There are too many great responses to list here, but some common trends emerged that are worth spotlighting. Games were a very popular response, and among the most popular VR games cited were Neat Corporation’s stealth action game Budget Cuts, chiefly for its innovative teleportation movement mechanic.

“Budget Cuts: the teleporting mechanic that also allows you to preview from the viewpoint of the destination via a portal in your hand,” wrote one respondent. “Budget Cuts. Definitely the ability to ‘hide’ in virtual space,” wrote another.

In terms of non-game VR experiences, many respondents pointed to Google’s roomscale 3D painting app Tilt Brush as their favorite demonstration of innovative VR experience design.

“I think the most innovative use of AR/VR I’ve seen is Tilt Brush,” wrote one respondent. “It’s a simple concept, basically transposing a modeling and painting software to 3D but I think experiences that allow people to change their environment and create work for others will ultimately be the most enduring experiences.”

“Tilt brush has to be the best initial interactive experience I’ve seen yet,” added another. “The novel approach to painting and natural interface are something that we could never have even emulated previously.”

In terms of AR game innovation, everyone’s talking about Niantic and The Pokemon Company’s Pokemon Go which is unsurprising in light of the fact that the game has become something of a worldwide phenomenon since its release this summer.

“Pokemon Go with its focus on person-to-person interaction, real-world exploration, and exercise incentives,” opined one respondent.

“Pokemon Go makes non-gamers play games,” wrote another. “You get exercise and explore your city in a new way, you learn something new.”
In terms of innovative non-game AR experiences, responses were much more varied and vague.

“AR for surgery. It allows surgeons to see what they are doing in a way they’ve never been able to before,” wrote a respondent.

“For AR, Google’s demo of Tango which showed map directions laid out on the floor to help you find your destination would be really useful if built into some glasses,” wrote another. “In their case it was within a building, looking for a conference room.”

Microsoft’s upcoming HoloLens augmented reality headset seems to have impressed a lot of VR/AR professionals, though it remains to be seen if that will hold through its consumer release.

“We haven’t really seen too much from AR, but the things I’ve been seeing Microsoft’s HoloLens being developed to do has been pretty crazy,” wrote one respondent. “Everything from architectural design to virtual walkthroughs of things such as when buying a place to live or looking at a car and so forth is going to be really awesome. I would also imagine that we will be able to use AR to look inside the human body, for instance, to provide a better learning experience for students and health professionals alike.”

“The most innovative AR tech I have seen is the Microsoft HoloLens,” wrote another. “It is making great progress in terms of marker-less tracking and compositing elements into the world.”

Of course, there’s no way anyone could hope to catalog all the many innovative ways VR/AR technology is being applied by talented creators around the world. Some of our respondents agreed, and shut the book on the whole endeavor.

“This would be a very long answer if I answered it,” wrote one survey respondent. “Perhaps another time.”

With that in mind, remember to make time to attend the Virtual Reality Developers Conference and join creators of amazing immersive VR and AR experiences of all kinds February 27th and 28th alongside the Game Developers Conference!
Learn how to create VR and AR experiences for games and entertainment

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