



CAN'T STOP, WON'T STOP: 2016 MOBILE AND VR GAMES YEAR IN REVIEW

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- **The mobile games market earned \$40.6B in 2016 -- the equivalent of global box office sales for the year.**
 - The ever growing U.S. mobile market is now amongst the ranks of traditional media as mobile gamers play more often than they watch Netflix, Hulu or YouTube.
- **Larger screens do not yield higher retention. Instead, developers should focus on RAM as more than half of smartphones worldwide have less than 2GB.**
 - Developers also want to consider how their games will affect battery life, particularly in the most popular smartphones with less processing power.
- **One in three apps on a smartphone in 2016 were action games**
 - More American mobile gamers played puzzle games than any other genre (58%).
- **Games on iOS retained almost twice as many American players on day 1 as those on Android.**
 - In the U.S., developers made 45% more on an iOS player, but in China Android players were worth eight times more.

- **At 30 minutes a day, mobile engagement was 19% higher in Q4 2016 than the year before.**
 - Revenue for mobile games increased 14% year over year, largely due to Android, which saw a 32% uptick in revenue.
- **Virtual Reality made \$1.8B in its first commercial year.**
 - Samsung Gear VR led with 4.5M devices sold.
 - Sony's PlayStation VR beat out other non-mobile headsets, approaching a million sales by the end of 2016.

“The mobile games market earned \$40.6B in 2016 -- the equivalent of global box office sales for the year.”

\$40.6B

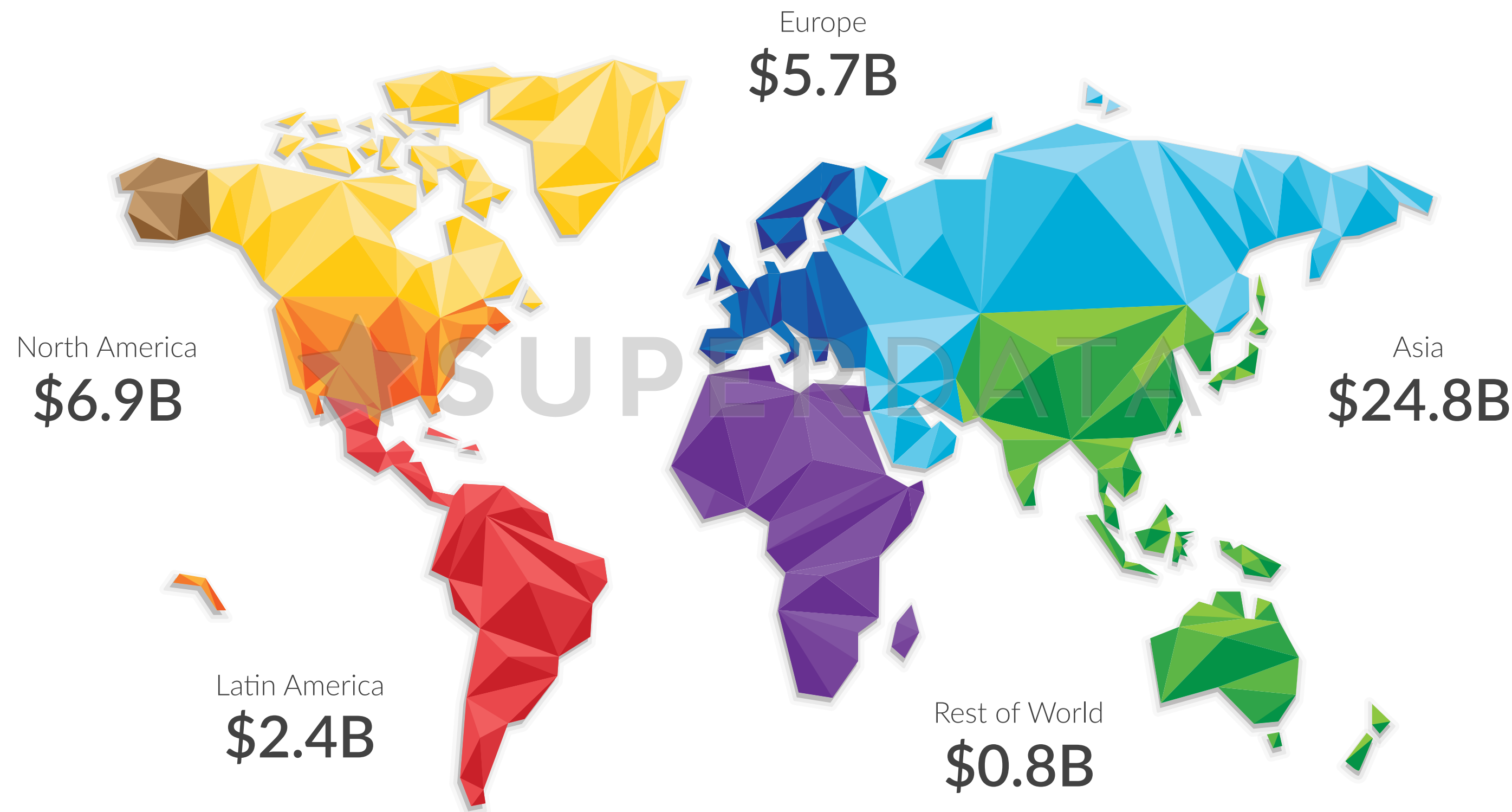
Worldwide Mobile Games Revenue, 2016

Mobile games earned the equivalent of all box office sales in 2016.

After blockbuster Unity titles like *Super Mario Run* and *Pokémon GO*, the mobile games market grew 18% in 2016 year over year and accounted for half of the entire digital games market. This sustained growth is helping legitimize mobile games in the traditional media landscape. It also is attracting big players, with acquisitions like Activision Blizzard's \$5.9B deal to buy King and Tencent's \$8.6B payout for Supercell.

Asia's Big Three are among the five largest mobile games markets in the world.

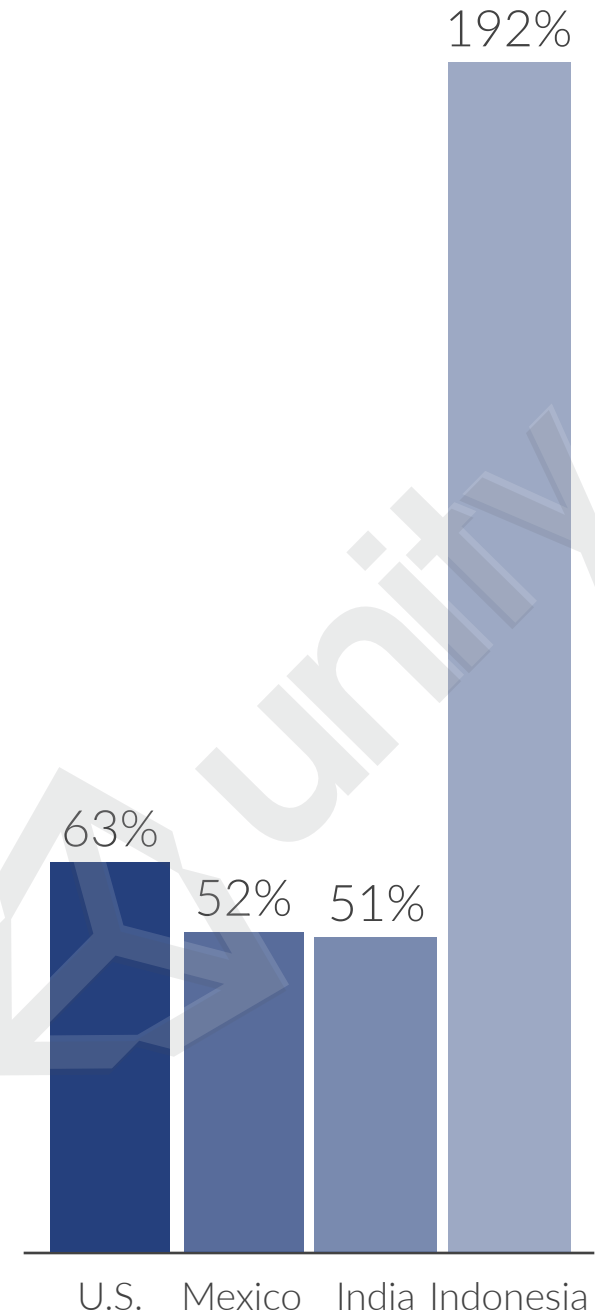
Though China's dominance is a result of the nearly 1 billion monthly active users playing on mobile, Japan and Korea solidify their places in the top five by boasting big spenders: among players who made in-game purchases in 2016, Koreans spent almost \$60 in an average month while Japanese spenders shelled out \$70. The other three top markets came in well below, with spenders in the U.S. and China paying about \$25 a month and Brits paying just over \$30.



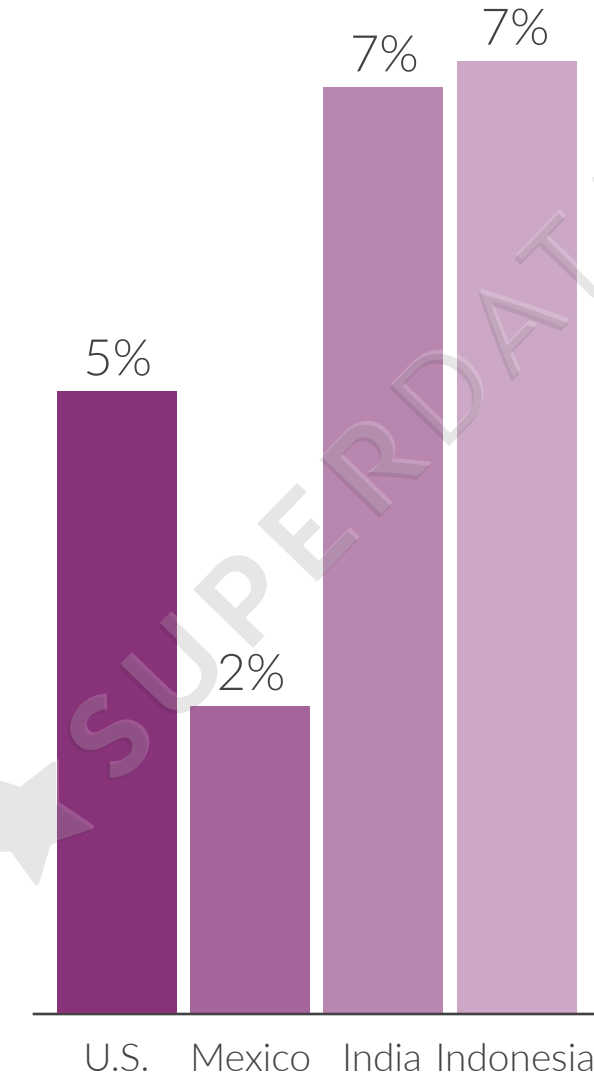
Growth in key markets

Q4 2015 vs. Q4 2016

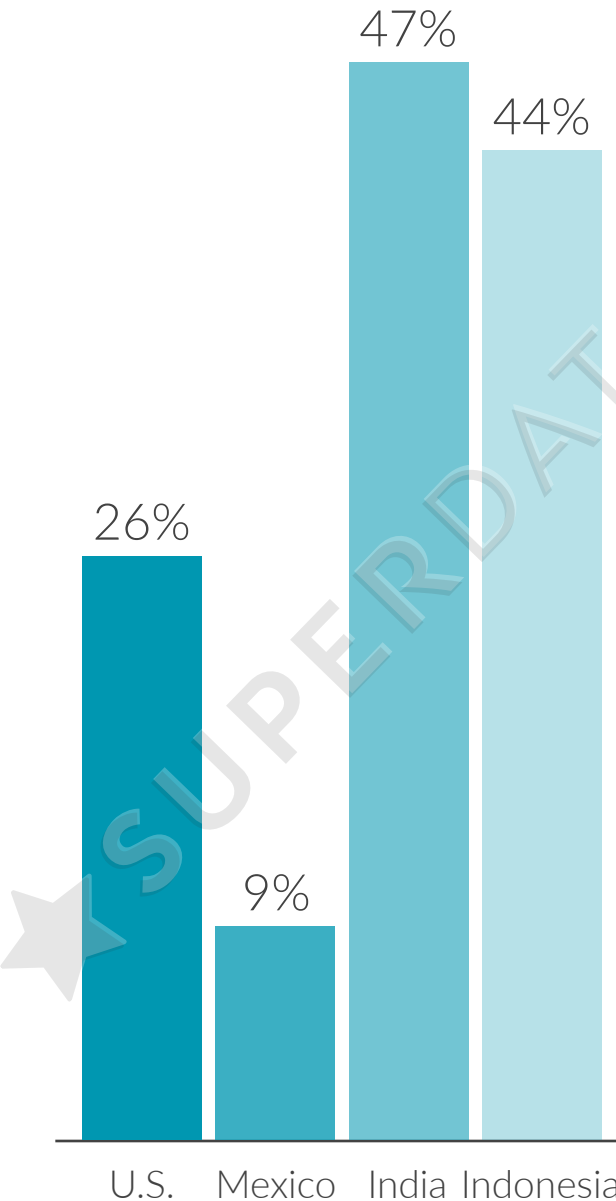
Installs



Average monthly revenue per paying user (ARPPU)



Total Revenue



Indonesia tripled its potential for advertisers in 2016 and boasted spenders who paid 84% more on average than Indian players.

Indonesia is the fastest growing market in Southeast Asia -- and among the fastest worldwide -- creating an undeniable opportunity for developers. The country has the third largest population in Asia, steeply dropping behind China and India. However, it is gearing up to have a similar relationship with Asia to what Japan and Korea have with China: fewer players but higher spenders. Compared to India, the percentage of Indonesian mobile gamers who paid was almost 50% higher and they spend almost twice as much.

Mexico's declining economy made it harder to turn players into payers last year as conversion dropped 2% on iOS.

Mobile's top three markets in Latin America -- Brazil, Argentina and Mexico -- all saw an economic downturn in 2016, which translated to slow growth. Mexico, the region's second-largest market, had a 52% increase in installs, but only single-digit growth in revenue and spending. Since less Mexicans are paying, it's important that developers keep spenders happy in order to also keep their revenues up.

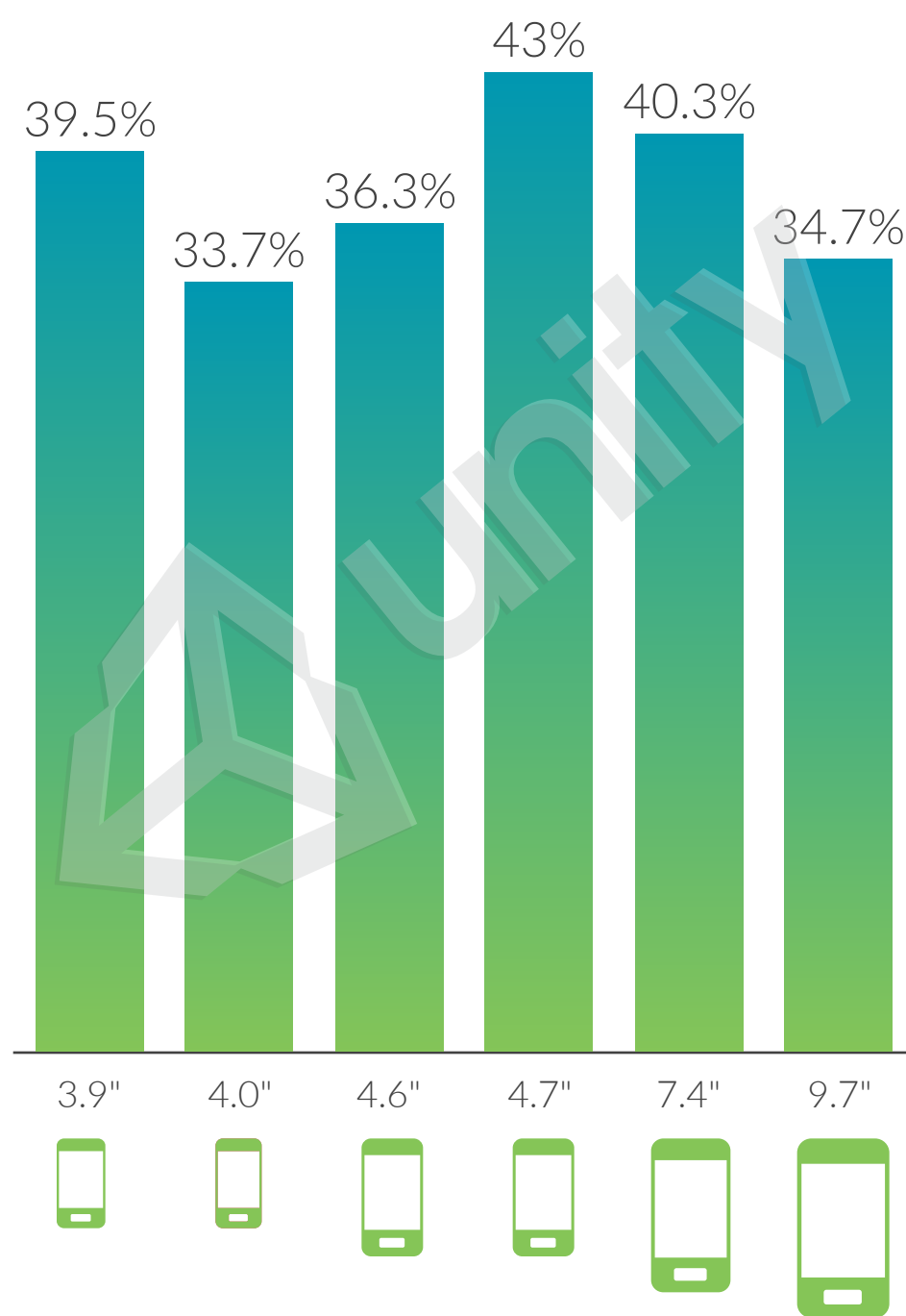
The ever-growing U.S. mobile market is now amongst the ranks of traditional media as mobile gamers played more often than they watched Netflix, Hulu or YouTube.

Mobile games are solidifying their position as a media staple for Americans. Players are installing more apps than ever and are more engaged with mobile games than TV and online videos: they play six days a week but watch content only five. Americans are spending even less time on other media like podcasts and books, engaging with them only half of the week.

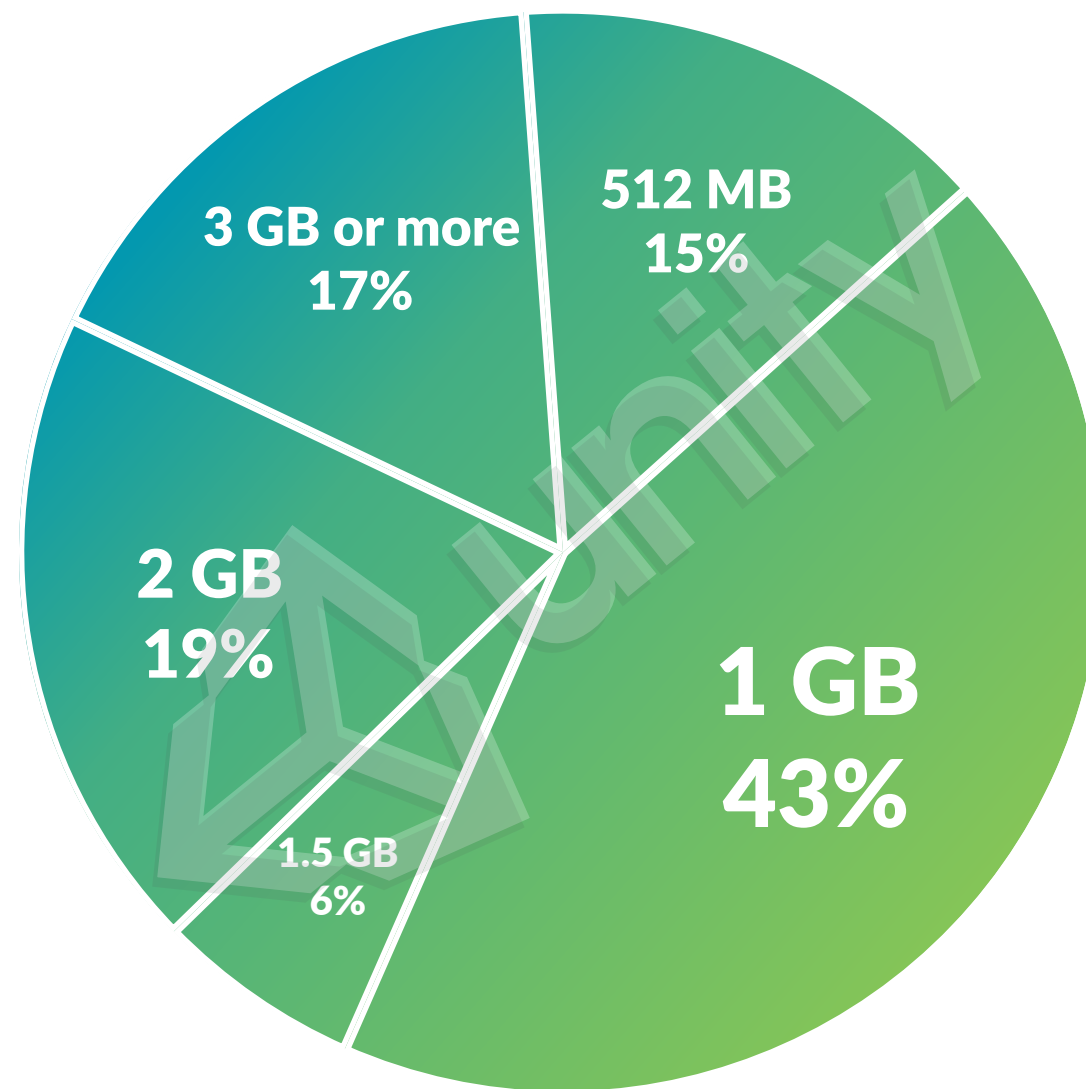
Does size really matter?

Growing screen sizes don't mean growing retention -- the power lies within.

Worldwide day 1 retention by screen size



Market share of memory size (RAM)



Size doesn't matter... but looks do.

Retention was comparable across all major screen sizes, so in terms of retaining players, size was not a key factor. Large screens do not necessarily have better resolution, but games that work on small screens with high resolution will render well on large screens with lower resolution as well. In the end, processing power is what's important when rendering textures or assets, so bigger doesn't always mean better.

It's also what's on the inside that counts.

The muscle behind smooth graphics and functionality is RAM. More than half of smartphones in 2016 had less than 2 GB of RAM, which will continue to be the trend for the next 12 to 18 months. This is especially the case in emerging regions, which means developers looking to penetrate them should aim for games smaller than 500MB. That way phones won't slow down when multiple apps are running at the same time.

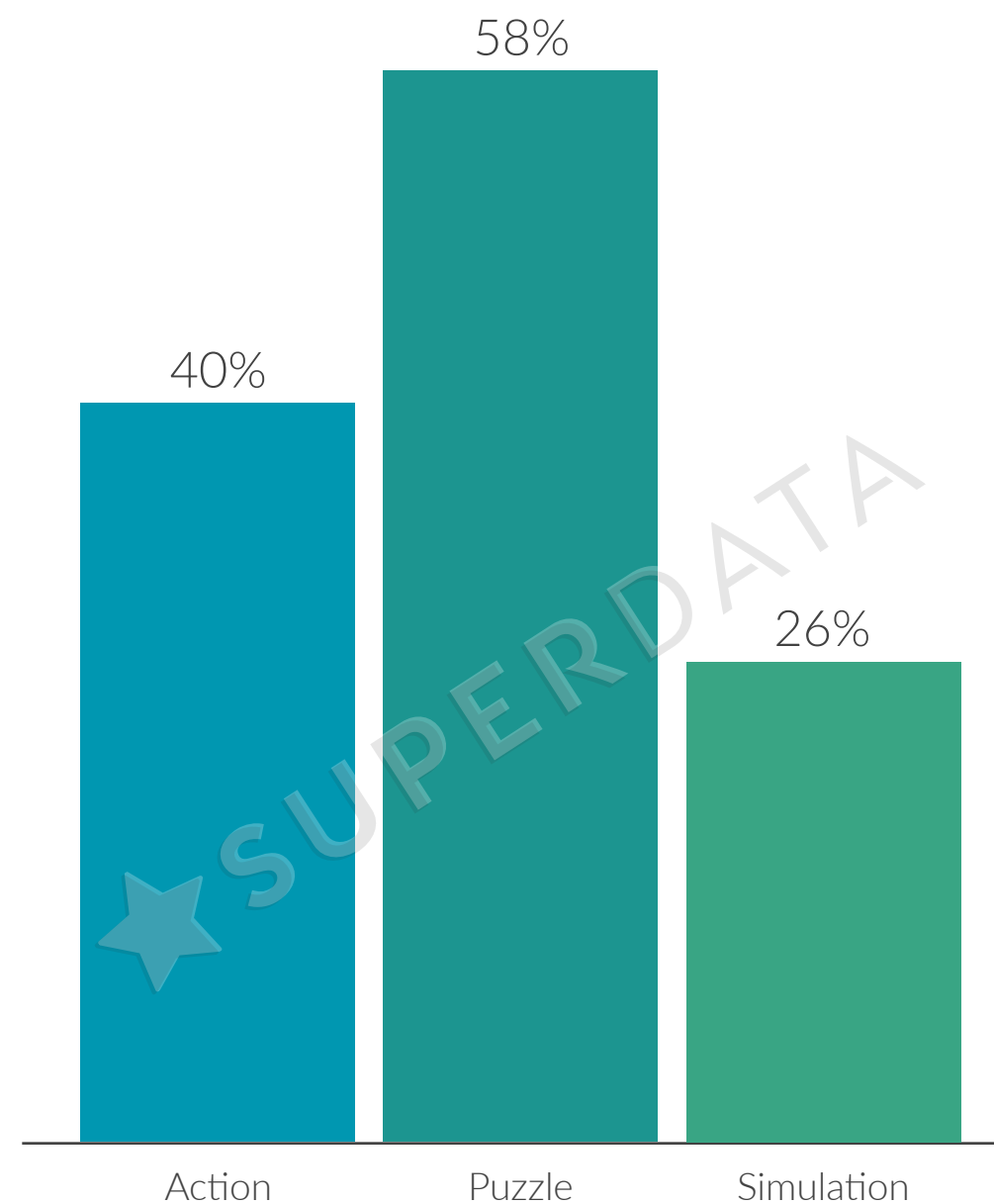
Live long and process: lower the processing power to keep battery life going.

Users with high-powered phones tend to be higher spenders as they are willing to pay top dollar for their phone. Games with graphics that require high processing power should be targeted at those with top shelf phones like iPhones and the Google Pixel. But affordable Android phones are still the global standard, so developers looking for a wider audience should aim to run on the range of duo-core processors clocked at around 1.6GHz.

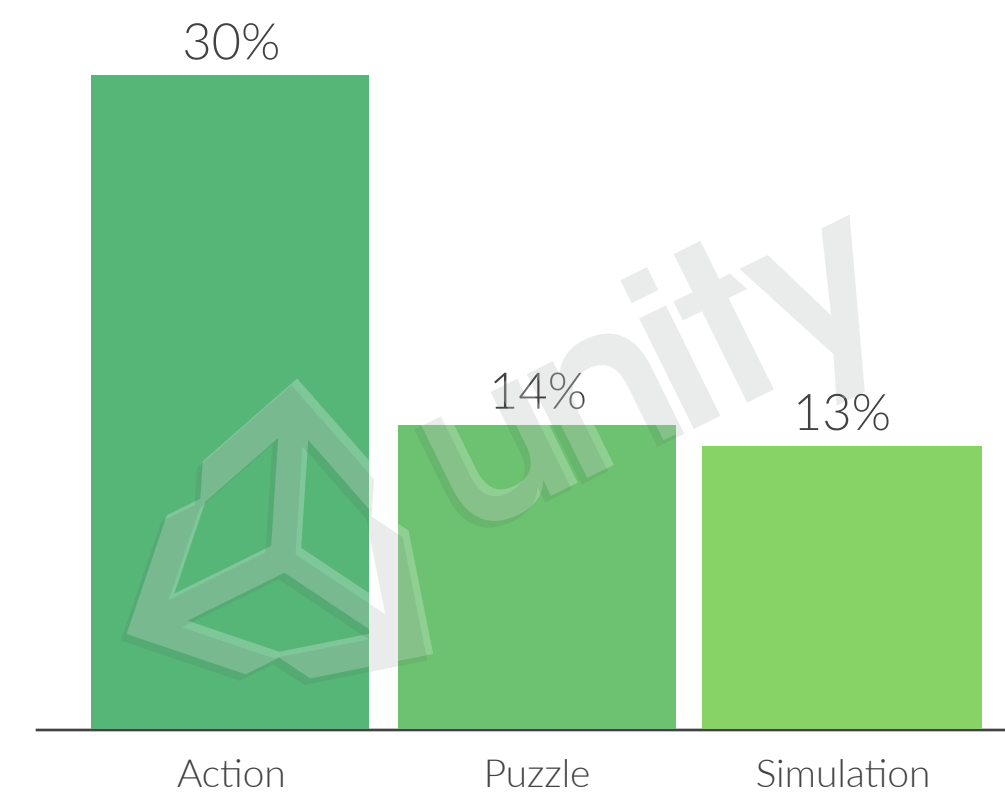
Top 3 genres installed on U.S. smartphones

Action, puzzle and simulation games make up 57% of all installs in the U.S.

Percent of U.S. mobile gamers who play each genre



Global share of installs by genre



More American mobile gamers played puzzle games than any other genre.

Puzzle games don't require high-level graphics and are ripe for on the go play. Their level-based linear gameplay commits players to one title, so they will avoid switching games so they don't lose their progress. While match 3 games have largely been dominant in the space, new and innovative content has emerged. Square Enix brought some of its biggest IP to the genre with their Go series, including *Hitman*, *Lara Croft* and, in 2016, *Deus Ex*. Released alongside the franchise's newest cross-platform title, *Deus Ex Go* is an example not only of a game that amplified the release of a full-length title, but one that coupled a beloved franchise with new genre innovation.

One in three apps on a smartphone in 2016 was an action game.

Unlike puzzle games, action games are often quick to play through and retain players at a rate 70% higher than that of puzzle games. They are also second in terms of popularity and benefit from the same opportunity for monetization that puzzle games do in offering purchases that expedite progression.

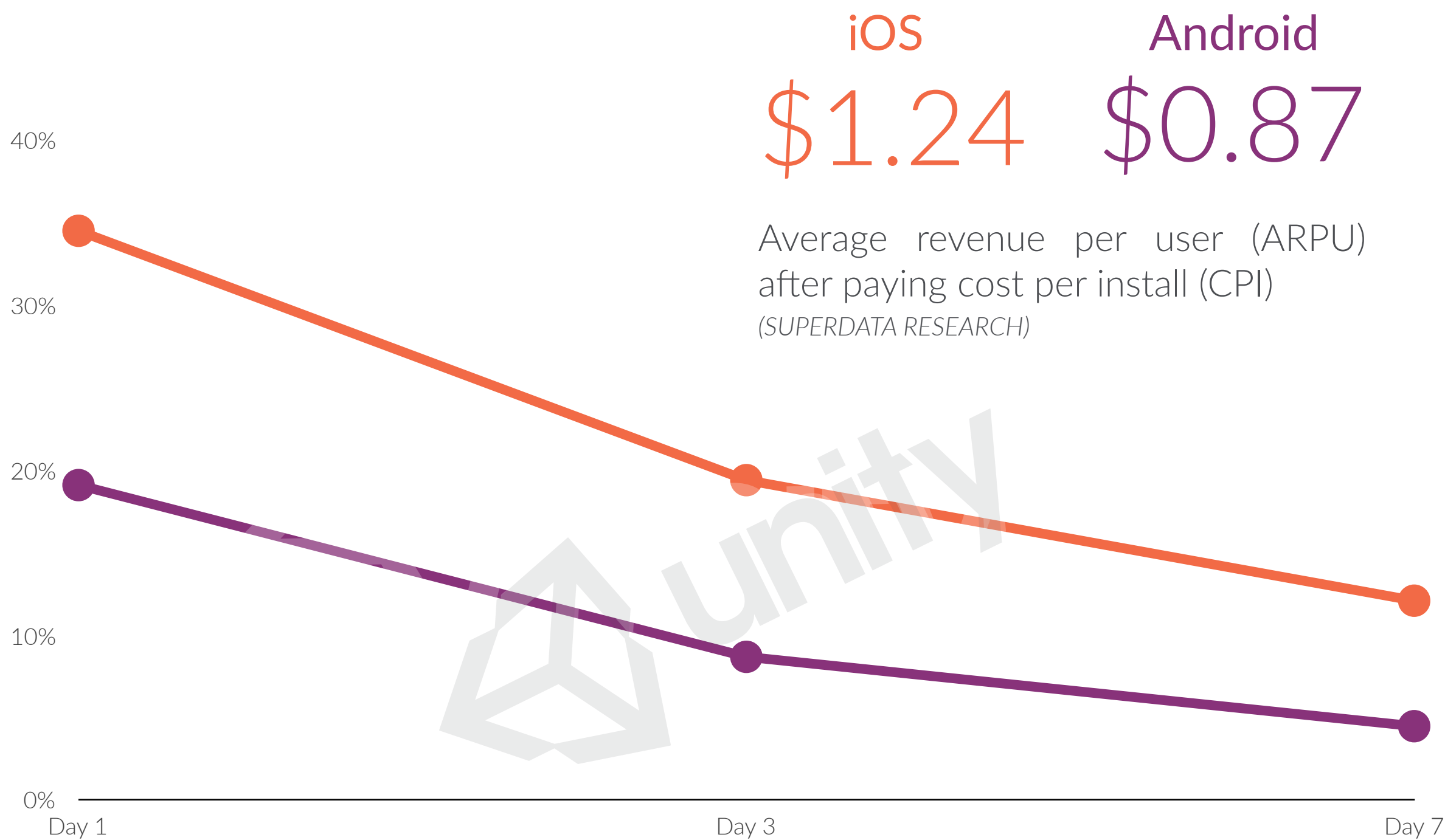
*Top genres refer to those with the highest share of installs in December 2016: Action, puzzle and simulation

“The U.S. is the only country with more players on iOS than Android.”

More players or more payers?

Android begins to drive more per-player spending, chipping away at iOS's competitive edge in 2016.

Average American player retention for the top 3 genres*



Games on iOS retained almost twice as many American players on day 1 as those on Android.

Retention can guide monetization strategies by showing developers how long they have access to potential payers. Because Android players are so fleeting, developers need to maximize their paid content while they can. Offering specials early on can help front-load monetization and capture the most revenue early on. Meanwhile, iOS is a slower burn so rolling out rare items over time, for instance, can continuously access key players.

The U.S. was the only country with more players on iOS than Android.

Android is particularly attractive to developers because of its global dominance: Android gamers account for almost 80% of the global market. However, iOS continues to yield higher spending, so developers who rely on advertising revenue could look to Android on a global scale, but iOS in the U.S.

In the U.S., developers made on average 45% more on an iOS player, but in Android players in China were worth eight times more than on iOS.

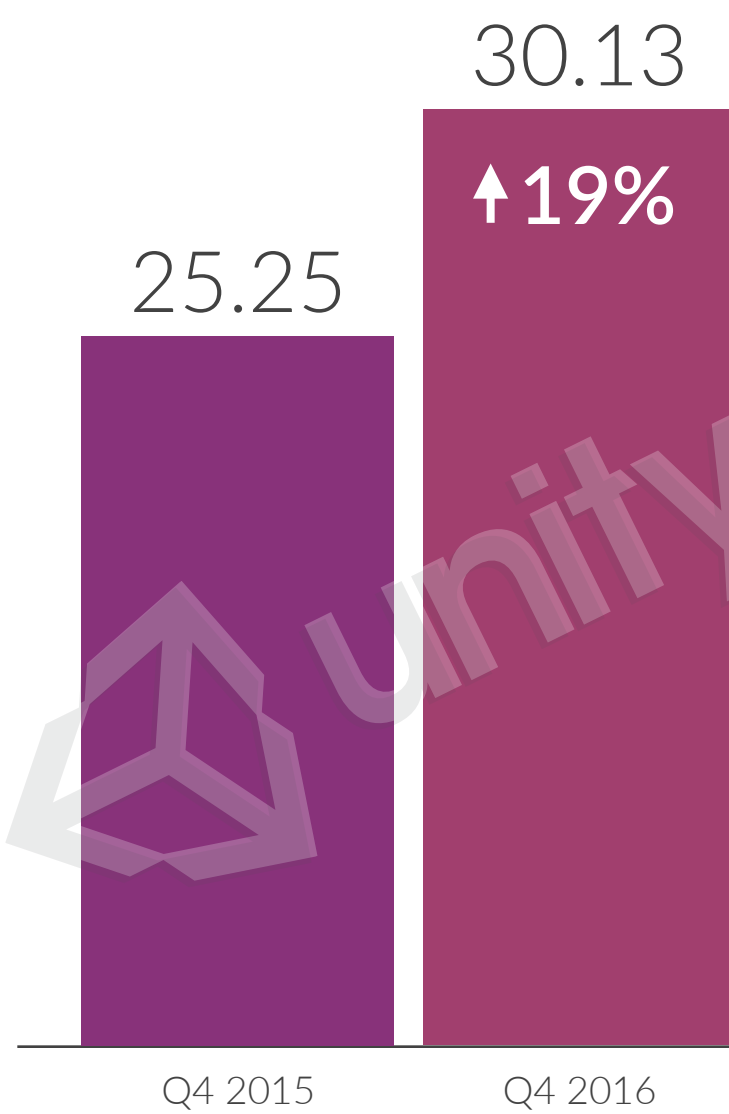
iOS players spent on average roughly 25% more than Android gamers did worldwide. And the percentage of iOS players who purchased content in many key markets was between 5% and 20% more. However, a few outliers exist – mainly China. Not only are there almost 40% more paying users on Android, CPI on iOS is 80% higher but spending per user is only greater by 20%.

*Top genres refer to those with the highest share of global installs in December 2016: Action, puzzle and simulation

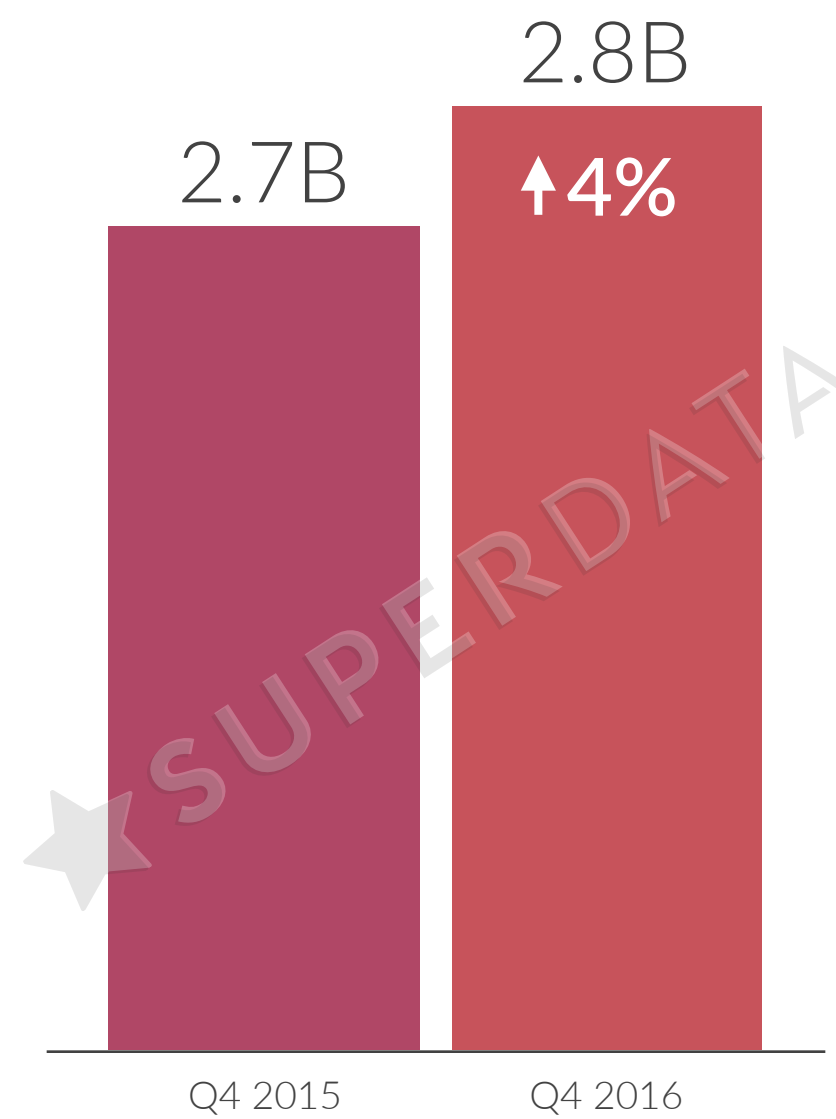
The more gamers play, the more they pay

Increased session length led to 7% more spending and 14% more revenue in Q4 year over year.

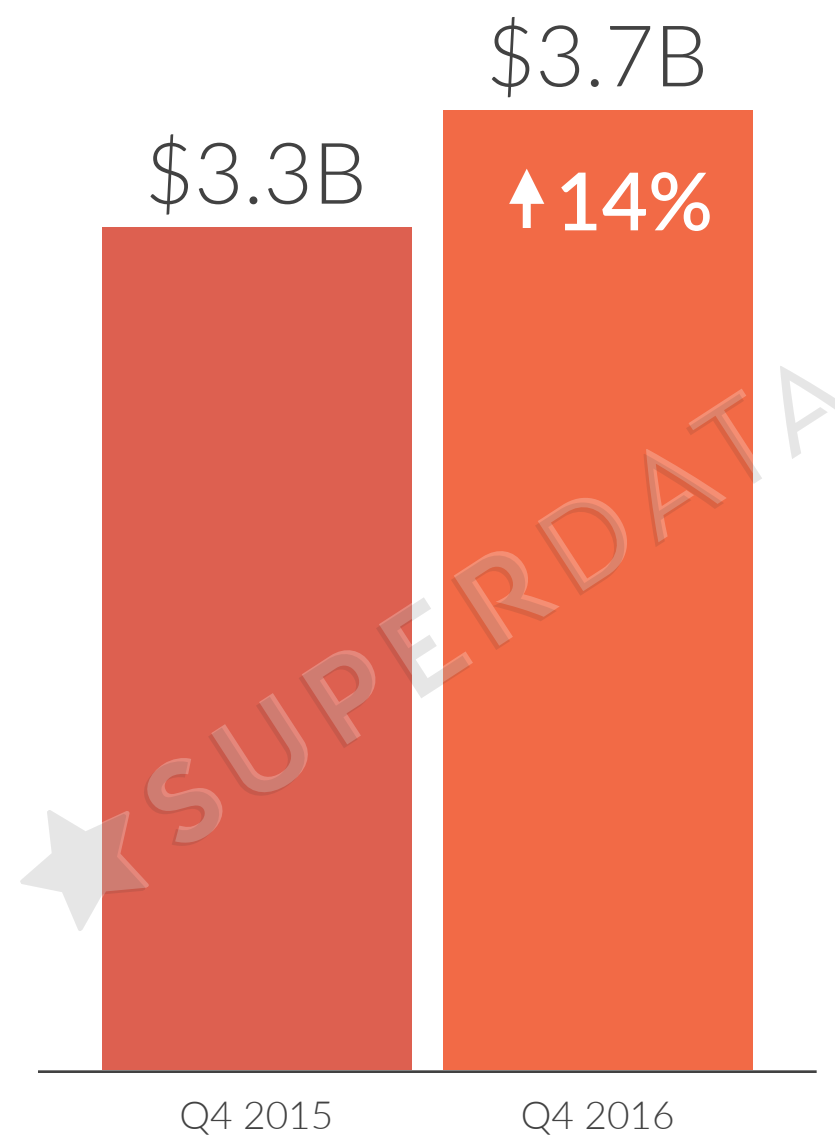
Total average time spent in mobile games daily (minutes)



Average monthly active users



Average monthly revenue



Engagement on mobile grew 19% year over year.

Unlike most other entertainment media, mobile gamers logged on in Q4 2016 an average of three times a day, spending 10 minutes playing each time. Mobile users prefer quick spurts of gameplay so titles that offer access to short sessions are most likely to retain players -- especially if each session offers something that entices users to come back.

Revenue for mobile games increased 14%, largely due to Android, which saw a 32% uptick in earnings and a growing share of users from emerging markets.

While user numbers only showed marginal growth, the added time those users spent playing translated into more spending. Android users in particular showed a much higher inclination to spend, with players converting into payers in the last quarter of 2016 at a rate 17% higher than the same quarter in 2015. Likewise, average revenue per paying user went up 7% across all mobile users, causing overall revenue to gain a 14% boost.

*Mobile activity refers to data based on sessions that were shorter than 60 minutes. Sessions longer than 60 minutes were shown to be outliers. For more information about Unity Analytics, visit <http://unity3d.com/analytics>.

“An average VR session was about as long as a mobile gaming session, and users came back roughly 40 times a month.”

2016 was VR's year of experimentation

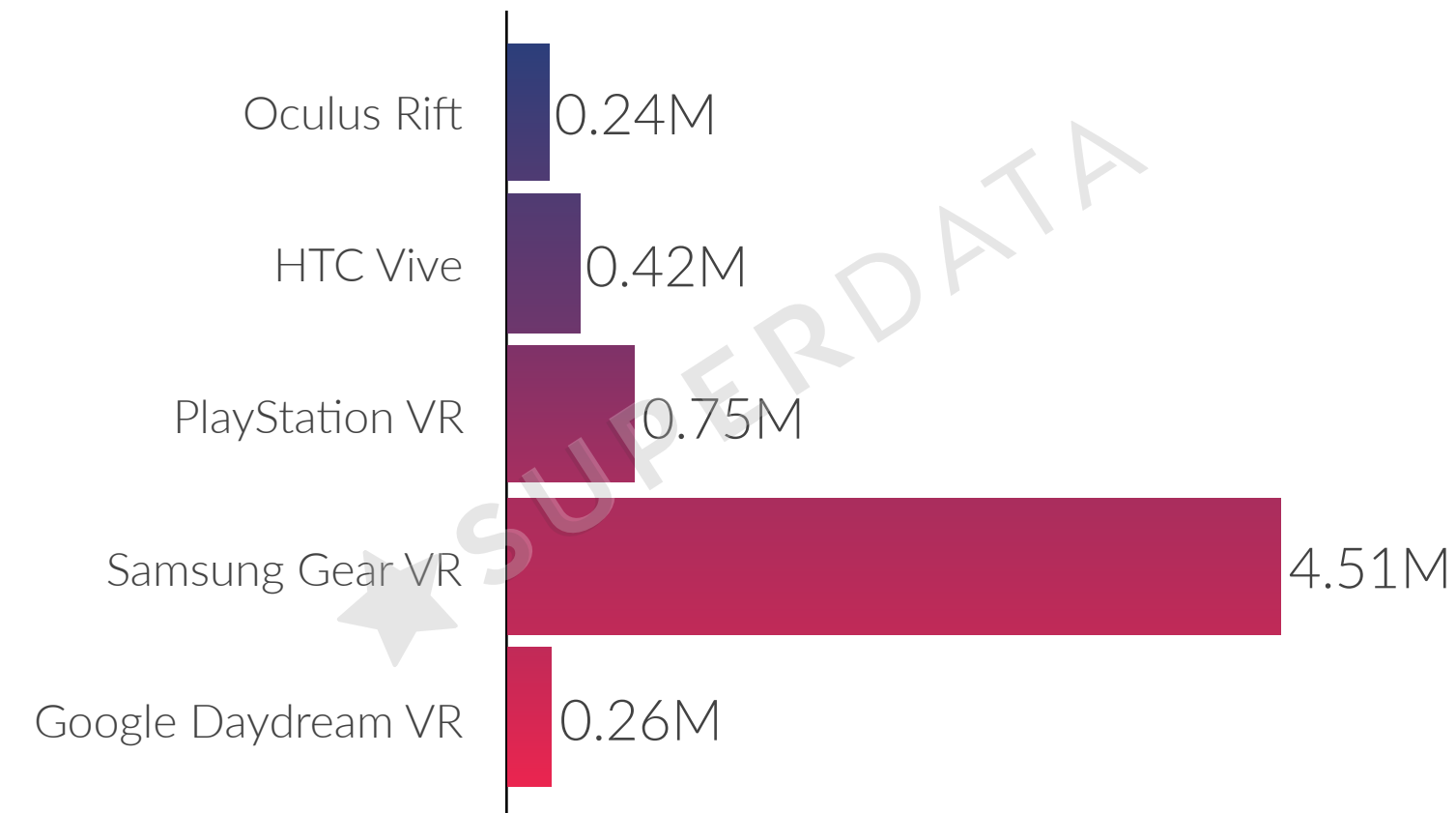
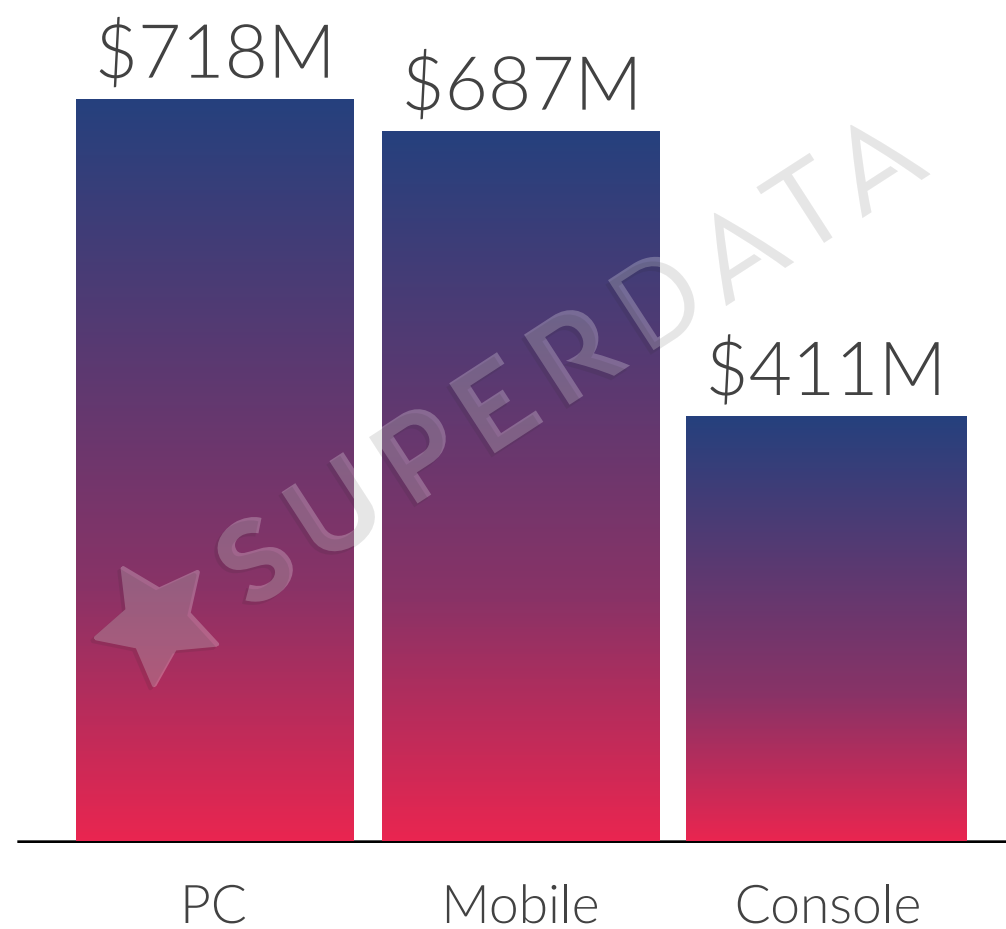
2017 will be the year of VR implementation.

Total VR revenue, 2016

\$1.8B

Total devices shipped, 2016

6.3M



Virtual Reality made \$1.8B in its first commercial year.

As with any new medium, consumers were slow to adopt VR. However, it gained widespread awareness due to the caliber of companies getting involved: Facebook, HTC, PlayStation, Samsung and Google all contributed to the 6.3M devices shipped to consumers.

Samsung Gear VR came out as the leader with 4.5M devices sold.

The low barrier to entry for mobile gave Samsung an edge over its other high-end competitors before the Google Daydream View came out. After giving away hundreds of thousands of headsets with S7 preorders, they were able to get devices into the hands of consumers at a critical time. Google's new headset has been slow out the gate, coming out late last year and compatible with only the Google Pixel. However, as more phones become compatible this year it will be stiff competition for Samsung, especially since the Daydream View is \$20 cheaper than the Gear VR.

Sony's PlayStation VR wins out amongst non-mobile headsets, approaching a million sales by the end of 2016.

Sony's headset flew off shelves, selling out virtually everywhere within a few days. The company's lack of fulfillment is an indication of a cautious start, while HTC and Oculus are going full force with their PC devices. Oculus has shown a strong interest in gaming and social applications, so consumer penetration will be most important for the Rift. Meanwhile, HTC Vive is becoming the device of choice for enterprise developers after selling more than 400K at its \$800 price point.

*Device shipments do not include Google Cardboard and refer to sell-throughs

It's about quality, not quantity

Users choose short experiences in VR, and quality content keeps them coming back for more.

VR consumer software revenue, 2016



Sessions per month

48

36

Minutes per session

7

12

Games accounted for 44% of the VR market last year.

Eighty-one percent (81%) of Americans who used VR did so to play games, so its no wonder developers aimed to make playable experiences out the gate. Innovative content by indies like Schell Games' *I Expect You to Die* and ustwo's *Land's End* showed the vast capabilities of VR across platforms. And *Job Simulator* was one of the highest grossing VR games in 2016, earning \$3M even after offering free copies with select shipments of the HTC Vive.

An average VR session was about as long as a mobile gaming session, and users came back roughly 40 times a month.

While play sessions were short -- roughly 10 minutes -- they were engaging enough to keep players coming back often. Users experienced VR more than once a day on average, with mobile VR users in particular reaching for their headset almost 50 times a month. 2017 will see content that is even easier to experience for long periods of time, allowing for lasting immersion and increased engagement.

*Mobile activity refers to data based on sessions that were shorter than 60 minutes. Sessions longer than 60 minutes were shown to be outliers. For more information about Unity Analytics, visit <http://unity3d.com/analytics>.

*Who we are,
what we do and
how we do it*

SuperData is the world's leading provider of market intelligence covering the entire interactive entertainment market across mobile, PC, console, video and virtual reality. Through proprietary data partnerships, we collect point-of-sale transactions and behavioral data on over 78 million unique consumers worldwide. This makes us the only provider to offer insights into the age of personal media using transaction-level data that is truly comprehensive and cross-platform. SuperData is headquartered in New York City and has shared a presence at major events like CES, GDC and SxSW. To learn more about our gold standard products, please visit: <https://superdataresearch.com/>

Unity Technologies powers the world's creative platform, providing the tools to create beautiful 2D, 3D, VR, and AR games and experiences across more than 25 different platforms including iOS, Android, Google Daydream, and Oculus Rift. A powerful graphics engine, fully-featured editor, and integrated services make it easier to create engaging content and lay the groundwork for ongoing success. Millions of creators around the globe, from large publishers and indie studios to aspiring filmmakers, artists, students, and VFX experts, use Unity to bring their visions to life. Unity is headquartered in San Francisco with offices across 15 countries. To learn more and discover the latest made with Unity experiences, please visit: <https://unity3d.com/>

SuperData Methodology

Every month we collect spending data on millions of unique online gamers directly from publishers and developers, totaling 50+ publishers and 450+ game titles. We combine the digital point-of-sale data with qualitative consumer insights to speak to the “why” of the market. We clean, aggregate and analyze these data to establish market benchmarks and models for all segments of digital games and interactive media. Our research covers everything from worldwide genre benchmarks to title-level KPIs, country-level deep dives and brand equity.

The mobile and VR studies were based on the following:

- 49 million unique transactions and 15 million unique gamers between January 1, 2015 and December 31, 2016
- A survey of 1,000 U.S. mobile gamers from July 2016
- Data collected from partners in the VR Data Network

For more information on our methodology, visit <http://www.superdataresearch.com>.

For more information on the VR Data Network, visit <http://www.superdataresearch.com/superdata-vr-data-network>.

About Unity Data Collection and Privacy

Unity Analytics gives you fast, easy access to important information about your game all in one intuitive dashboard. It is the only analytics solution that is natively integrated to the Unity engine and built specifically for games. Unity Analytics collects and processes game data for you, making it easy to analyze across multiple platforms. It gives you insight into player behavior that can improve the gameplay experience, and helps you get more out of your monetization strategy. For more information about Unity Analytics, please visit: <http://unity3d.com/analytics>

Unity Technologies is the creator of a flexible and high-performance end-to-end development platform used to create rich interactive 2D, 3D, VR and AR experiences. Unity’s powerful graphics engine and full-featured editor serve as the foundation to develop beautiful games or apps and easily bring them to multiple platforms: mobile devices, home entertainment systems, personal computers, and embedded systems. Unity also offers solutions and services for creating games, boosting productivity, and connecting with audiences including the Unity Asset Store, Unity Cloud Build, Unity Analytics, Unity Ads, Unity Everyplay and Unity Certification. Unity Technologies serves over 5.5 million registered developers including large publishers, indie studios, students and hobbyists around the globe. For more information, visit: <http://unity3d.com>.

Unity Analytics is a service available to mobile game developers aimed at providing greater insights on player behavior around the globe. The game developer may allow Unity to collect certain device properties and the player location when the players installs a mobile game built with Unity software. Unity compiles and publishes certain de-identified, aggregated data to help Unity, mobile game developers and mobile device companies better understand their user base and the devices they use.

Aggregated data for device properties and location was collected from customer applications from October 1, 2015 through December 31, 2016. Device counts are calculated using a “unique device identifier (UUID).” Different platforms and versions handle the UUID differently, which may result in the same device being counted multiple times due to multiple UUIDs for that device, or a device not being counted at all due to not having a UUID. As a result, iOS device counts may be over-inflated. For more information on Unity’s privacy practices, please review the Unity Privacy Policy: <http://unity3d.com/legal/privacy-policy>



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