

Newzoo Trend Report 2022

VR Games Market Report

An Overview and Outlook of Virtual Reality
in Games and Beyond

Virtual Reality's Success Story Is Just Beginning

Gaming has been and will continue to be the key driver of VR's growth

When **Meta** (formerly **Facebook**) acquired **Oculus** in 2014, it triggered a huge influx in VR interest from investors and companies. Yet, VR did not quite live up to expectations; headsets were based on very early technology, and the hardware required to run software was extremely expensive. A **vicious cycle began**. Developers were unwilling to create VR content due to the market's small audience, while the audience was unlikely to grow because of a lack of content—a true chicken-and-egg problem.

However, the tide is turning. The VR market enjoyed a resurgence in 2020. **Pandemic-related stay-at-home orders boosted demand for gaming** in general, as consumers craved escapism and social features. Gaming acts as the major touchpoint between consumers and VR, so the platform attracted many (new) users via immersive experiences and social activities in virtual environments. VR also saw its first AAA killer app with the highly anticipated release of **Half-Life: Alyx**. Meanwhile, Meta's affordable and untethered **Quest 2** headset made VR more accessible to the masses.

Growth continued even after 2020's resurgence. Several VR developers shared record player numbers across the holiday season in 2021. Metaverse hype and investment also contributes to VR growth, as VR is a gateway to the metaverse. Some of the world's biggest technology companies, including **Apple**, are working hard on the next generation of headsets. Meanwhile, PlayStation is reigniting its involvement with its upcoming PS VR2.

VR's chain reaction for success has already begun. Now, the VR install base is growing faster than ever before, VR is becoming a more sustainable platform for developers, and even more high-quality content is imminent. We will see further developments in VR hardware, software, and use cases (in and outside of gaming) in the coming years. **More (affordable) headsets will lead to more players, resulting in more engaging VR content.** In turn, **this content will attract even more players.**

To explore this growth, this report looks at VR's latest developments in gaming and beyond.

+42.0%

CAGR 2019-2024 of the global active VR HW install base.

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Terminology & an Explanation of the Consumer VR Ecosystem - Games

A definition of the key terms used in the VR market

Extended Reality (XR)

XR is a term that encompasses any technology that alters reality by adding digital elements into a physical or real-world environment to any extent. It refers to any technology that blurs the lines between the physical and the digital worlds. Currently, the term XR encompasses all of VR, MR, and AR technologies.

Virtual Reality (VR)

The computer-generated simulation of a three-dimensional image or environment that users can interact with in a seemingly real or physical way via special electronic equipment, such as a headset with an internal screen or controllers/gloves fitted with sensors.

Mixed Reality (MR)

MR connects physical and digital worlds, using sensory and imaging technologies. The blended world allows users to interact with physical items, digital items, and environments using their own hands. All of this happens while wearing a headset.

Degrees of Freedom (DoF)

The number of directions of users' positional tracking in VR. The positional tracking relies on built-in or external sensors to capture movement. While 3DoF tracking only measures three types of directional rotation (rolling, pitching, and yawing), 6DoF adds three further directional movements (elevating, strafing, and surging), allowing players to physically move around in a virtual space rather than simply standing in one spot.

VR-Only Games / VR-Integrated Games

VR-only games refer to VR games/apps that can only be played through VR (e.g., Half-Life: Alyx, Beat Saber). VR-Integrated games refer to VR games/apps that can be played outside and inside VR devices (e.g., Resident Evil 7, Star Wars: Squadrons).

Consumer VR Ecosystem - Games (P7)

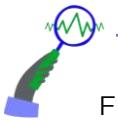
- **VR Headset Manufacturers:** Manufacturers of consumer VR headsets, that are capable of 6DoF positional tracking and are required for consumers to engage with VR games.
- **VR Digital Storefronts:** Content distribution platforms that offer players easy access to VR games. Platforms include the Meta Quest Store, Steam, and the PlayStation Store.
- **Haptics & User Immersion:** Manufacturers of peripherals that provide haptics and/or enhance user immersion in the consumer VR gaming experience (excl. location-based VR). These peripherals include, for example, controllers, haptic gloves, full-body tracking suits, and treadmills.
- **Social Platforms:** Gamified virtual spaces whose core focus is meaningful player interaction and socializing, rather than on traditional gaming experiences.
- **Developers & Publishers:** Studios that are responsible for planning, developing, and releasing VR games and apps to consumers.
- **Development & Infrastructure Tools:** Tools and services that enable and support the development of VR games and apps. They range from game engines like Unreal Engine or Unity, which support the development of VR games/apps, to computer graphics software applications like Blender, which are used to model and simplify the planning and development processes of VR game/app development.
- **Cloud Services & Infrastructure:** Cloud services and infrastructure that aim to increase access via cloud to high-end VR titles without requiring users to purchase the latest and most expensive VR devices. These technologies should theoretically enable players to stream high-fidelity PC VR-level games onto their standalone VR headsets through their internet connection.
- **Chip Providers & Manufacturers:** Providers and manufacturers of the key hardware components that allow a VR headset to function by properly processing and executing commands. These include Qualcomm's Snapdragon CPU chipset (found in every Meta Quest headset), Intel's processing cores, and NVIDIA's GPUs for PC VR.

Newzoo's VR Market Sizing Scope & Definition

The methodology behind Newzoo's active VR hardware install base & VR games revenues



Newzoo's VR market-sizing scope covers consumer VR headsets capable of 6DoF positional tracking and VR games revenues generated through these headsets. Our definition of the active VR hardware install base is headsets being used at least once in the past 12 months. This distinguishes our active install base numbers from estimated numbers in production, shipment, and retail sales.

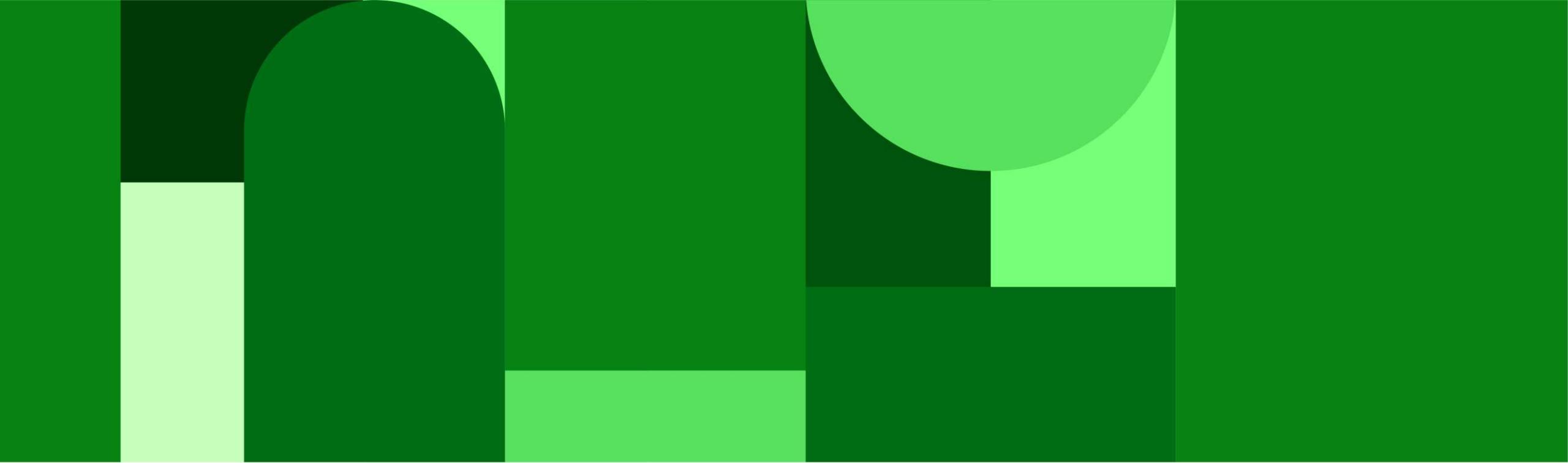


First, Newzoo's VR market-sizing scope covers **consumer VR headsets capable of Six Degrees of Freedom positional tracking and VR games revenues generated through these headsets**. Therefore, we **exclude enterprise headsets** that can also be used to play VR games. Degrees of Freedom (DoF) refers to the number of directions of users' positional tracking in VR. The positional tracking relies on built-in or external sensors to capture movement. While 3DoF tracking only measures three types of directional rotation (rolling, pitching, and yawing), 6DoF adds three further directional movements (elevating, strafing, and surging), allowing players to physically move around in a virtual space rather than simply standing in one spot. We believe that 6DoF is essential for immersive VR gaming experiences. Therefore, we **exclude headsets that use only 3DoF tracking**; for example, all smartphone-based VR headsets (Samsung Gear VR, Google Daydream, and Cardboard) and entry-level standalone headsets such as Oculus Go.

Our definition of the active VR hardware install base is **headsets being used at least once in the past 12 months** at the end of each year. This means that we **exclude headsets replaced and/or consumers simply stopped using**. For example, if an Oculus Rift owner purchased a Meta Quest 2 in 2020, the Oculus Rift would not be counted as an active install base if the owner did not play the Oculus Rift in 2021. Furthermore, in order to count headsets as part of the active install base, headsets need to be produced by manufacturers, shipped by the manufacturers to retailers, sold by the retailers to consumers, and activated/played by the consumers. This distinguishes our active VR hardware install base numbers from estimated numbers in production, shipment, and retail sales that some research firms use for reporting.

We categorize consumer VR headsets into the following **three ecosystems**: PlayStation VR, PC VR, and **standalone VR**. PC VR includes consumer VR headsets that require a VR-ready PC to run software, such as the **Valve Index** and **HTC Vive**. Examples of standalone VR include the **Meta Quest 2** and **Pico Neo 3**, which do not necessarily require a PC or connecting the headset to a PC to play games.

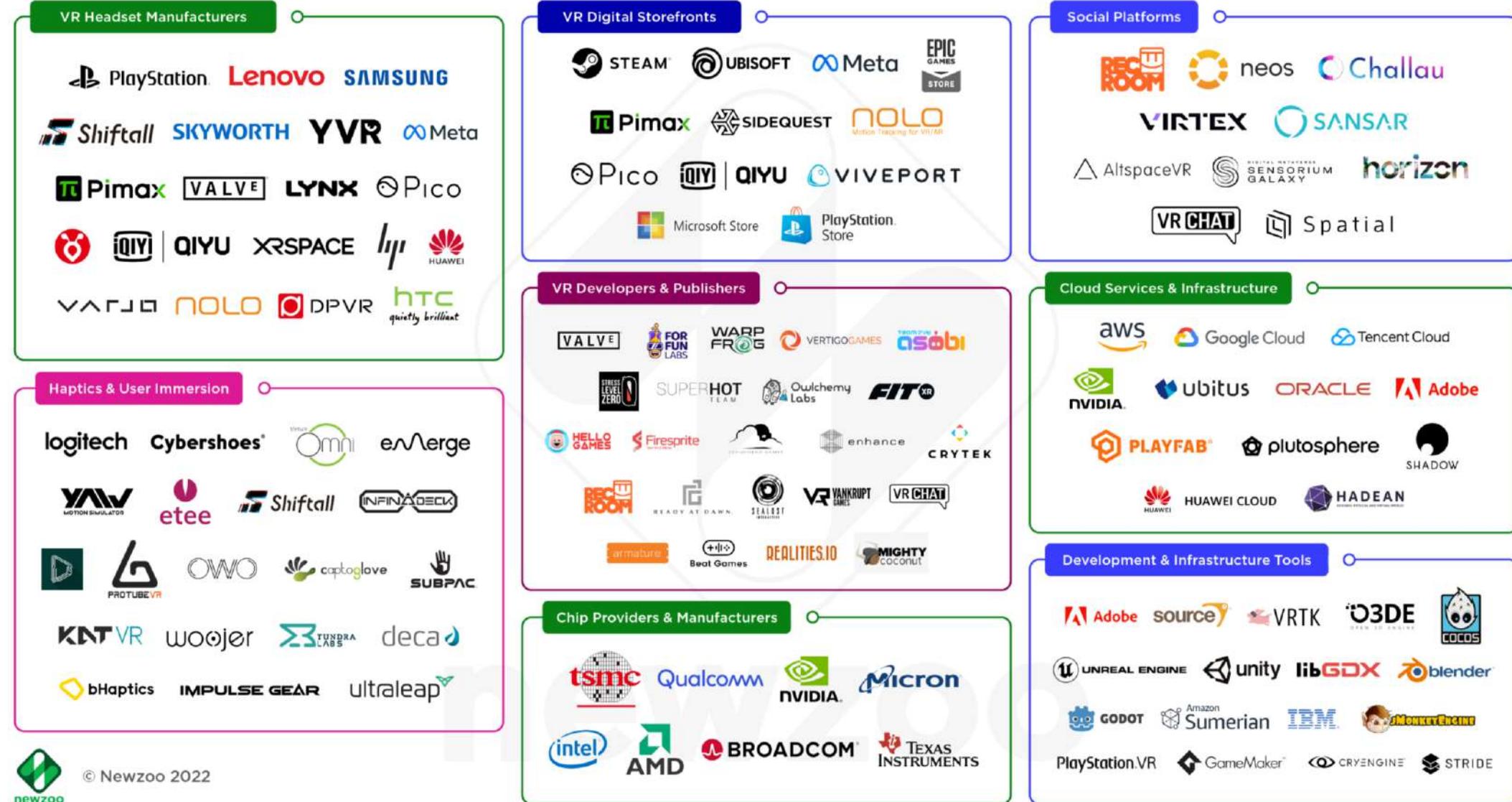
Lastly, our forecasts only include potential successors of existing brands and works confirmed or hinted at by new brands or suppliers. Both the new entry of game-changing headsets (brands) and introductions of high specs with aggressive prices could easily affect the market situation. To that end, Newzoo will continue monitoring the market closely and reflect the latest developments into our forecasts at the best possible time.



1. VR Games Market Overview

Ecosystem and market sizing

Consumer VR Ecosystem - Games



Source: Please read P4 for an explanation of the Consumer VR Ecosystem (Games).

The Active VR Hardware Install Base Is Growing Faster Than Ever

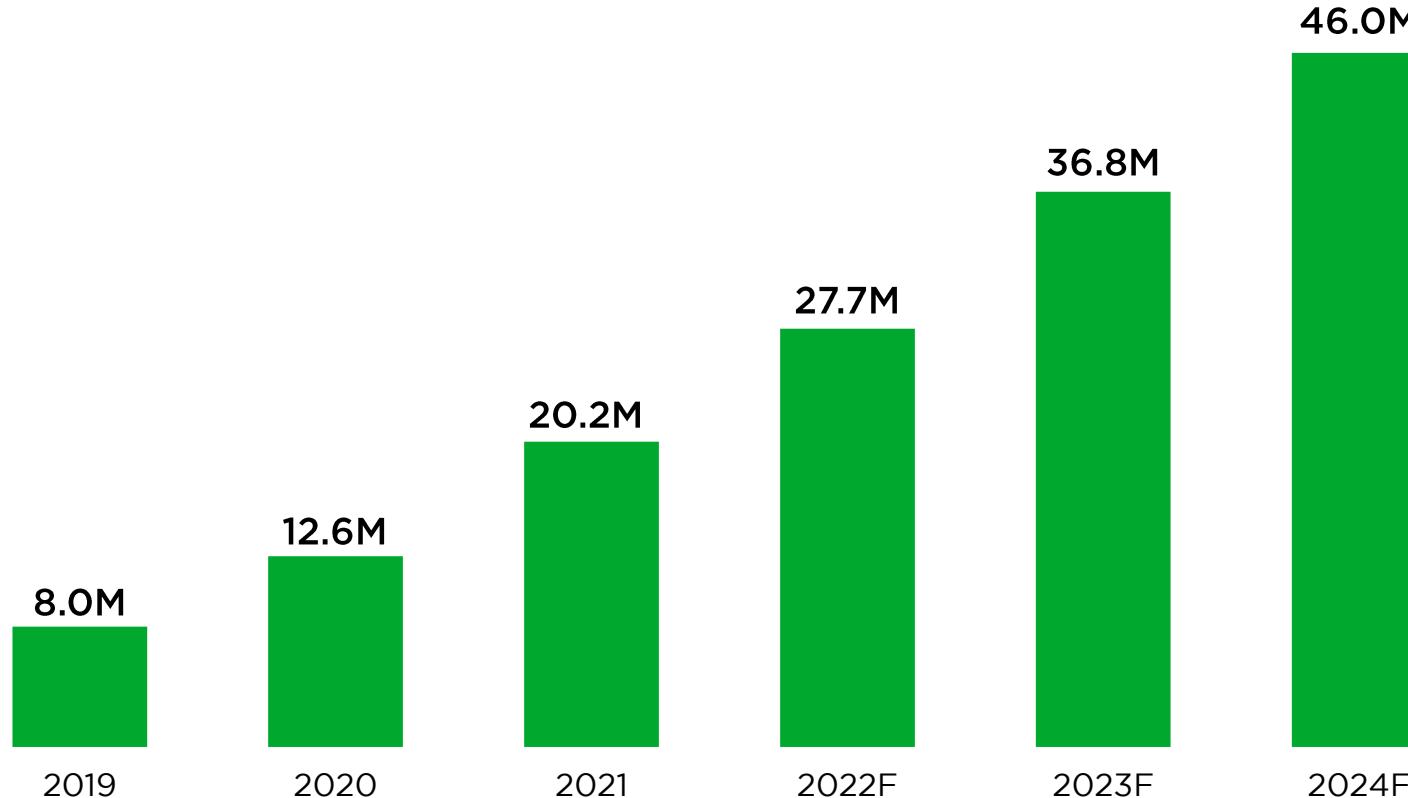
Thanks to affordability and easy set-up, standalone VR headsets will continue to drive further VR adoption

Active 6DoF VR Hardware Install Base Growth

Global | 2019-2024

+42.0%

CAGR 2019-2024



Newzoo's VR market-sizing scope covers consumer VR headsets capable of Six Degrees of Freedom (6DoF) positional tracking and VR game revenues generated through these headsets. We exclude enterprise headsets that are compatible with VR games and headsets that use only 3DoF tracking, including all smartphone-based VR headsets and entry-level standalone headsets such as Oculus Go. We define the active VR hardware install base as the number of headsets that are used at least once in the past 12 months. This distinguishes our active install base numbers from estimated numbers in production, shipment, and retail sales. Please see P5 for further details of our VR market-sizing scope.

VR Game Revenues Will More Than Double From 2021 to 2024

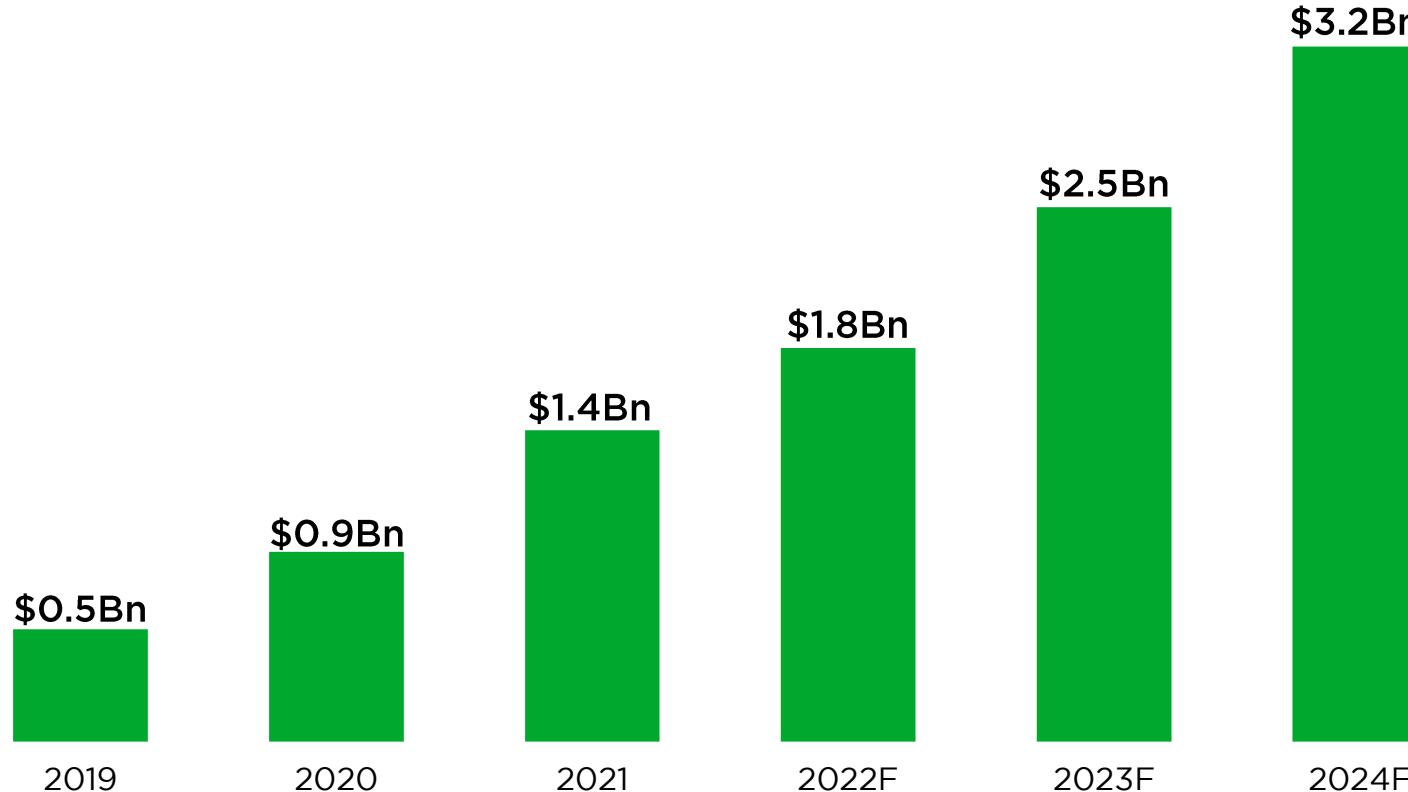
Growing active VR headset numbers will lead to more spending, while average revenues per player will also grow

VR Game Revenue Growth

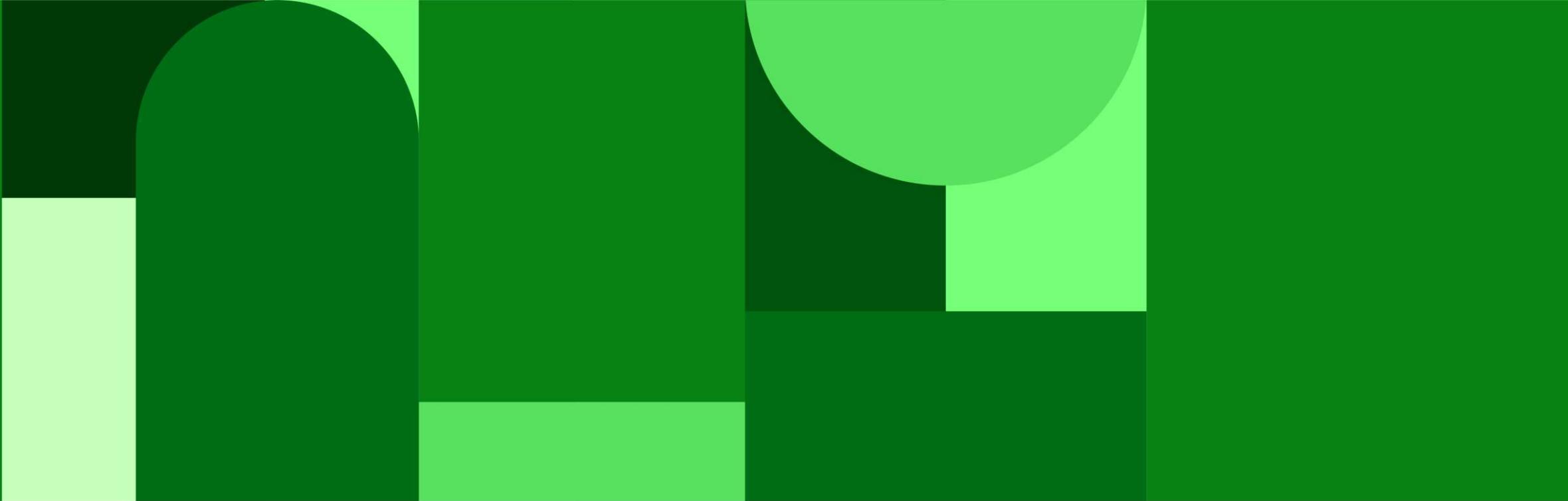
Global | 2019-2024

+44.0%

CAGR 2019-2024

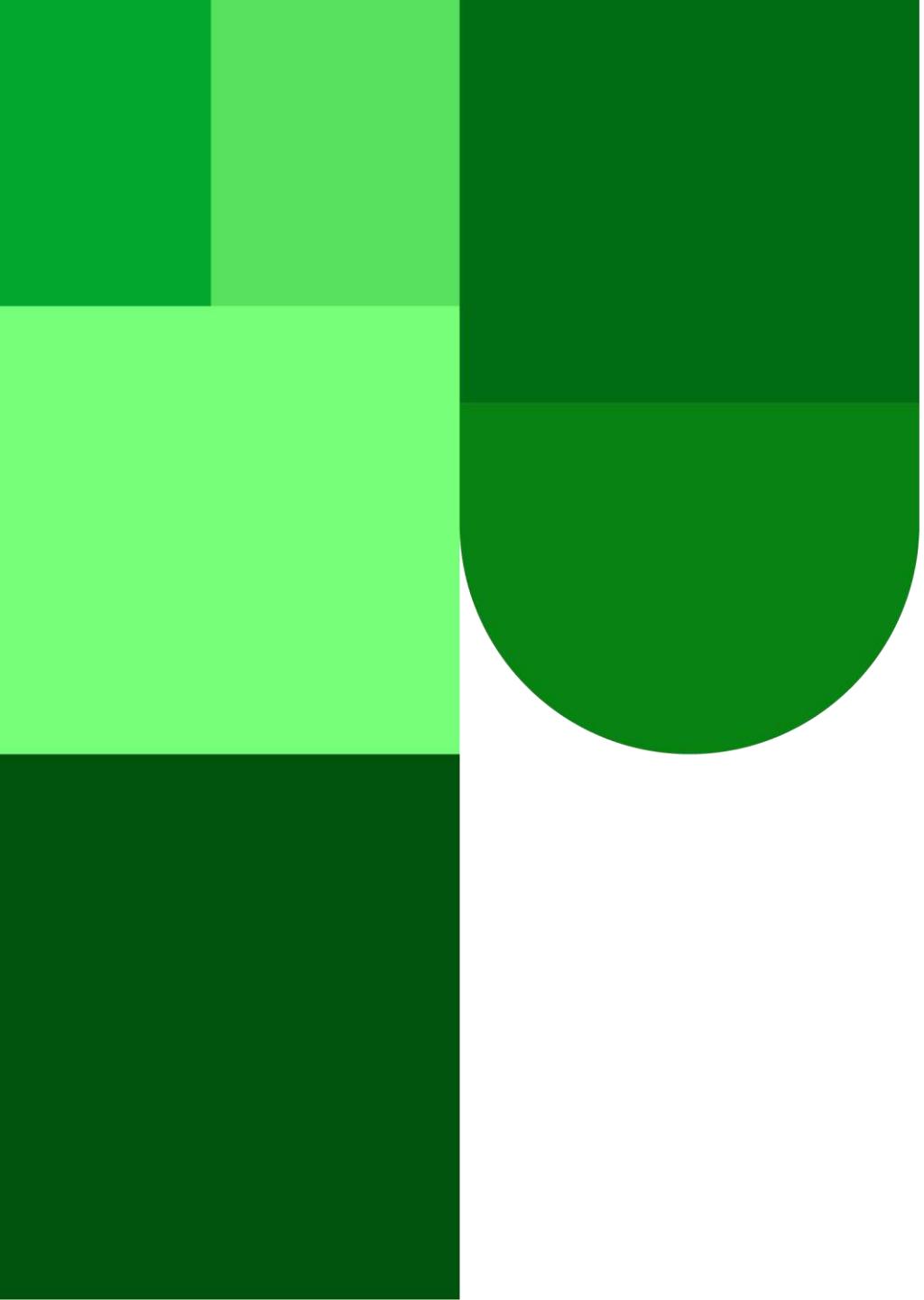


Newzoo's VR market-sizing scope covers consumer VR headsets capable of Six Degrees of Freedom (6DoF) positional tracking and VR game revenues generated through these headsets. We exclude enterprise headsets that are compatible with VR games and headsets that use only 3DoF tracking, including all smartphone-based VR headsets and entry-level standalone headsets such as Oculus Go. We define the active VR hardware install base as the number of headsets that are used at least once in the past 12 months. This distinguishes our active install base numbers from estimated numbers in production, shipment, and retail sales. Please see P5 for further details of our VR market-sizing scope.



2. Consumer Insights

Demographics, VR usage, and general gaming behavior: VR headset owners & VR gamers



All data and analysis in this session are based on Newzoo's online survey conducted in the U.S., the U.K., China, and Japan. We surveyed 5,797 respondents aged 10-50 across these four markets. Based on respondents' VR headset ownership and usage, we define three groups of consumers as follows:

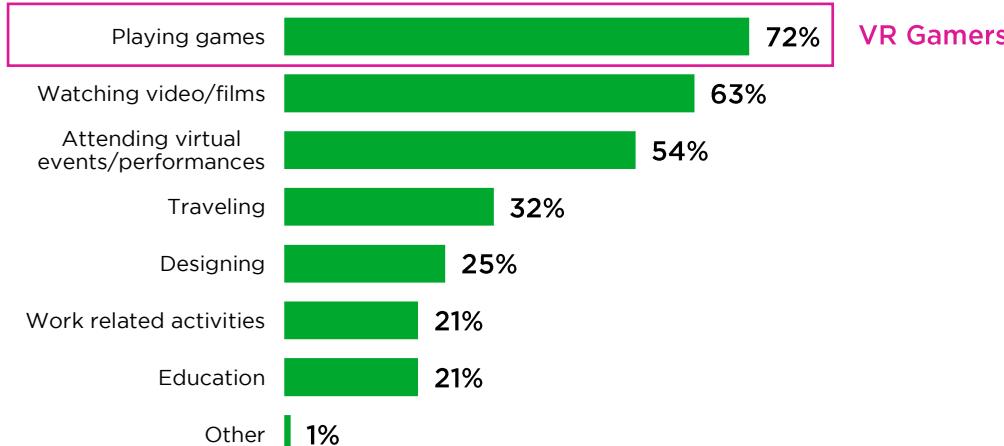
- **VR headset owners:** Respondents who report owning any VR headsets.
- **VR gamers:** VR headset owners who report gaming as one of their top 3 use cases.
- **Non-VR headset owners:** Respondents who don't own any VR headsets.

Gaming Is the Top Use Case for VR Headset Owners

Nearly 60% of VR gamers use their headsets at least once a week

Most Preferred Use Cases of VR Headsets

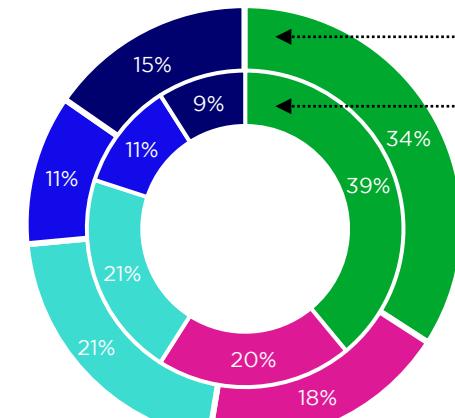
Use cases that are ranked among top 3 by VR headset owners



Gaming is by far the most preferred use case for VR users. This is unsurprising, as gaming is a major consumer gateway to VR. 72% of VR headset owners report gaming as one of their top 3 most preferred use cases. We define this subset of VR headset owners as **VR gamers**. 39% of VR headset owners state that gaming is their #1 use case.

Use Frequency of VR Headsets

VR headset owners vs. VR gamers



VR Headset Owners

VR Gamers

VR Headset Owners VR Gamers

- Several times per week **34%** **39%**
- Once a week **18%** **20%**
- Several times per month **21%** **21%**
- Once a month **11%** **11%**
- Less than once a month **15%** **9%**



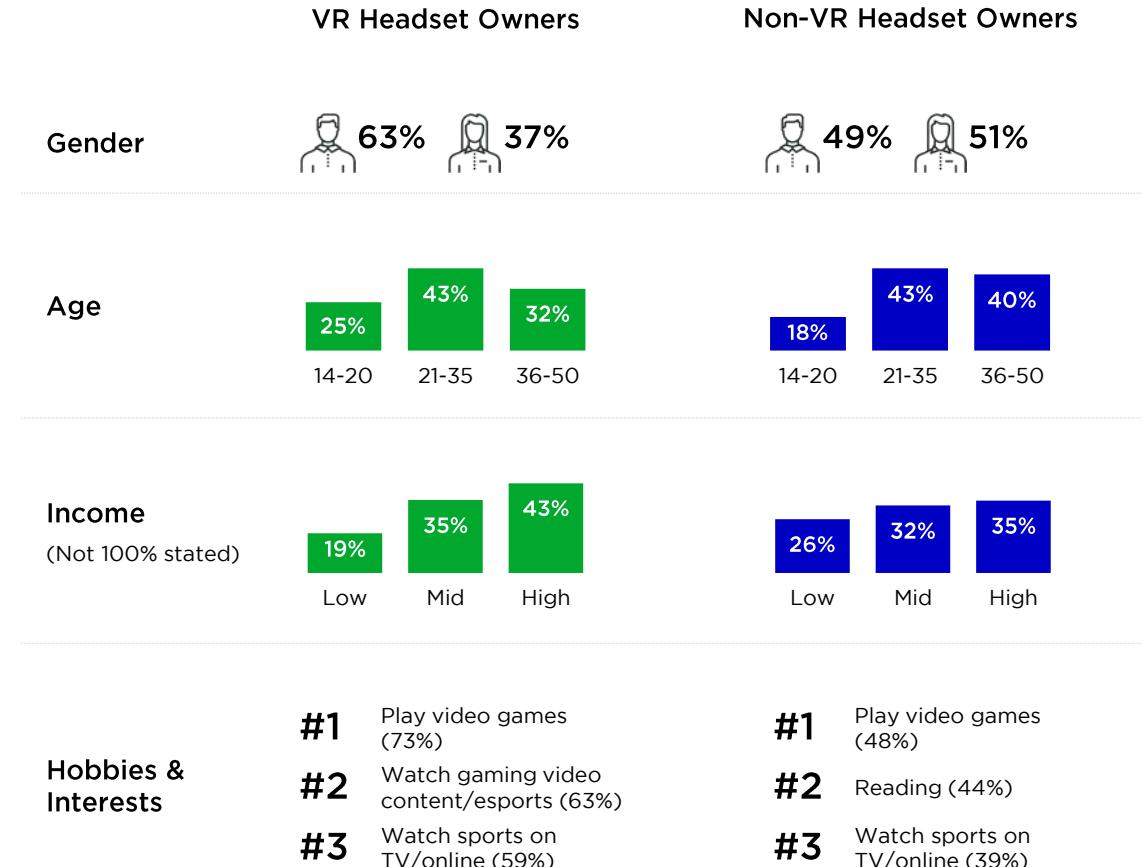
Overall, VR gamers use their VR headsets **more often** than general VR headset owners. VR gaming's diverse content offering, combined with VR gamers' general love for games, explains why VR gamers use the headsets more often. Around **4% of VR headset owners do not use their headsets anymore**.

VR Headset Owners Skew Young, Male, and Have High Income

As early adopters, VR headset owners share a similar profile to tech-savvy consumers

Key Demographics

VR headset owners vs.
non-VR headset owners



Across the four key markets, VR headset owners are demographically quite different from non owners. VR headset owners skew male, while the gender split among non-VR headset owners is more balanced (slightly skewing female). VR owners tend to earn more, which makes sense as VR headsets and content can be expensive. With the introduction of more affordable devices (e.g., Meta Quest 2, even after its price bump), the gap may become narrower.

In terms of hobbies, VR headset owners show substantially higher interest than non owners in video games, both playing and watching.

VR Headset Owners Are More Likely to Play Games Even Outside VR

They are also more likely to continue/start playing in the future

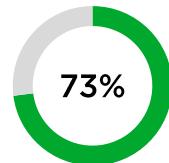
General Gaming Behavior Outside of VR (Gaming)

VR headset owners vs.
non-VR headset owners

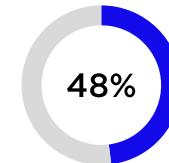


Player Share
(Excl. VR gaming)

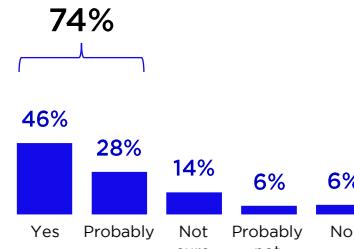
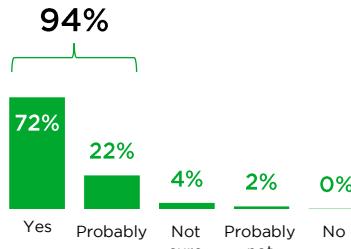
VR Headset Owners



Non-VR Headset Owners



Intention to Play in the Future



Motivations to Play

- 1 To relax/unwind (33%)
- 2 Excitement of playing (28%)
- 3 Socializing with friends (26%)
- 4 Expressing creativity (21%)
- 5 To fill time (21%)

- 1 To relax/unwind (42%)
- 2 To fill time (28%)
- 3 Excitement of playing (24%)
- 4 Socializing with friends (18%)
- 5 Escaping from everyday life (17%)

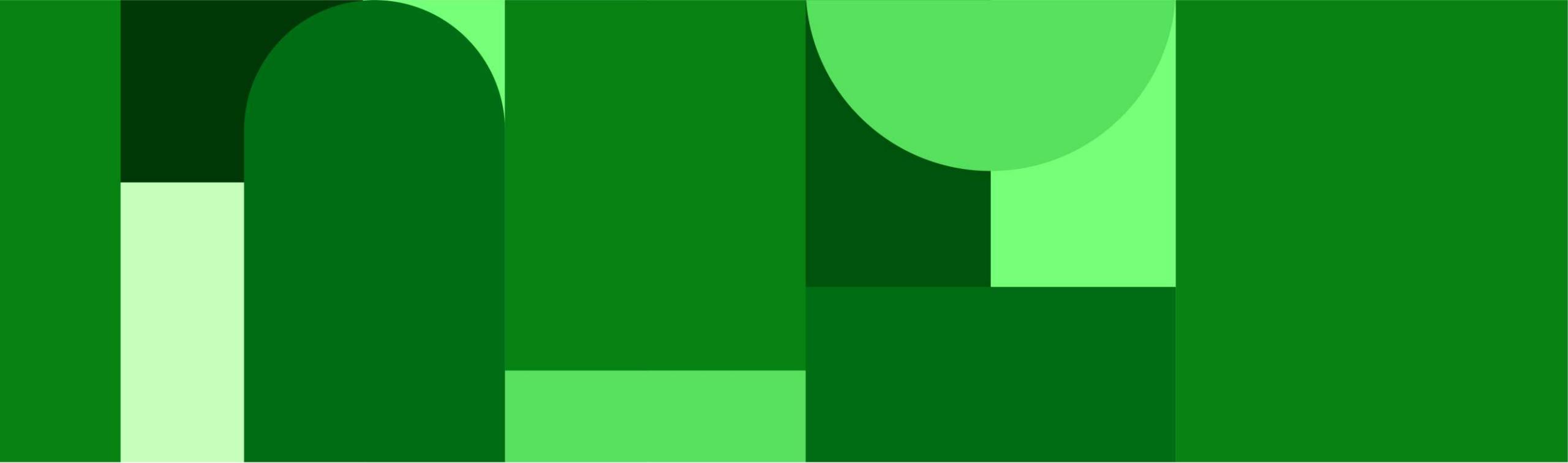


VR headset owners **play non-VR games more actively** than non owners (73% of existing players among VR headset owners vs. 48% of non owners). Their intention to **continue/start playing** in the future is also higher (94% vs. 74%).

VR headset owners and non owners share similar gaming motivations. However, if we zoom in on **VR gamers** (VR headset owners who claim gaming as one of their top 3 VR use cases), **exploring the game's world and storyline (immersive experience)** is among the top 5 most important gaming motivations for them. This is in line with the unique gaming experience that VR provides.

Base: Online population aged 10-50 across US, UK, CN, JP (n=5,797)
VR headset owners (n=797), non-VR headset owners (n=5,000)

Source: Newzoo Consumer Insights – Mini Survey: Metaverse and VR | June 2021



3. VR Games Analysis & Case Studies

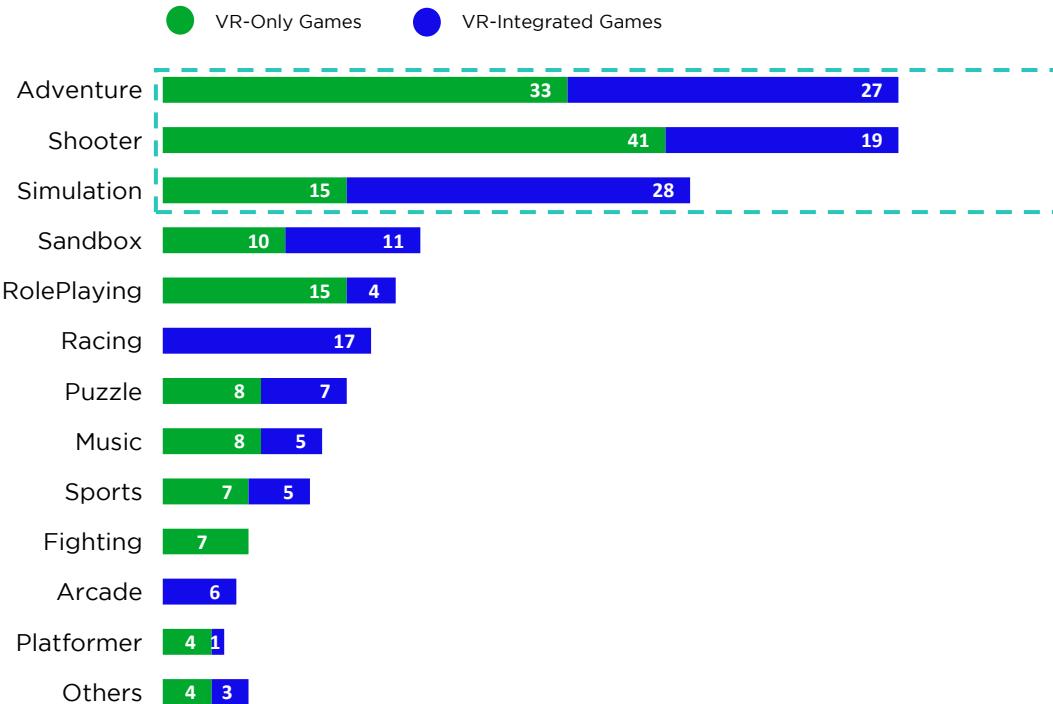
Top 100 VR game analysis,
VR headsets overview & case studies on VR games

Adventure, Shooter, and Simulation Are VR's Most Popular Game Genres

Traditionally popular subgenres (action-adventure) and niche, immersion-based ones (survival horror) are also prevalent

Genres Among Top 100 VR Games by Average MAUs

of Games | Steam & PlayStation | July 2021 – June 2022



The most popular genres on VR seem to follow a similar trend to traditional games. Adventure, shooter, and simulation are the top genres for VR-only games (on VR platforms alone) and VR-integrated games (on multiple platforms) alike.

Top Subgenres Among Top 3 Genres

Ranked by # of Games | Steam & PlayStation | July 2021 – June 2022

Top Subgenres	Popular Games in Subgenres
#1 Survival Horror	The Walking Dead: Saints & Sinners
#2 Narrative Adventure	A Fisherman's Tale
#3 Action-Adventure	Trover Saves the Universe
#1 First-Person Shooter (FPS)	Superhot VR
#2 Vehicular Combat	Star Wars: Squadrons
#3 Third-Person Shooter (TPS)	Rez Infinite
#1 Vehicle Simulator	Microsoft Flight Simulator
#2 Job Simulator	Job Simulator
#3 Social Metaverse	Rec Room

The most popular subgenres for VR games include many traditionally popular game types, such as action-adventure and FPS, but also niche subgenres like survival horror and job simulation games (benefiting from VR's immersion).

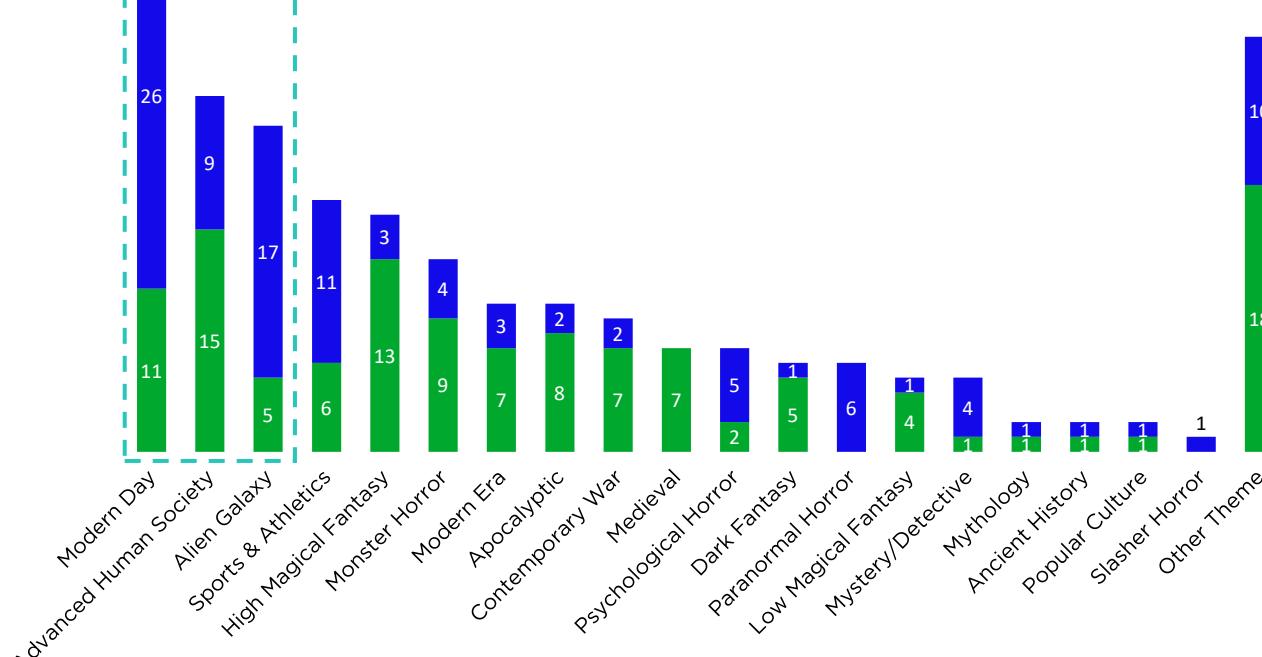
VR's Top Game Themes Are Rooted in Reality, Fantasy, or Science Fiction

Unlike top genres, top themes for VR-only games and VR-integrated games vary

Game Themes Among Top 100 VR Games by Average MAUs

of Games | Steam & PlayStation | July 2021 – June 2022

● VR-Only Games ● VR-Integrated Games



#1 Modern Day (Microsoft Flight Simulator)

Games that mostly take place in and around Earth and in a modern-day environment.



#2 Advanced Human Society (BONeworks)

Games based in a futuristic setting that resembles human society, with significant technological advancements and possibly other societal developments that have a large impact on human society.



#3 Alien Galaxy (No Man's Sky)

Set mainly or entirely in outer space and including alien races. The emphasis is on space warfare, alien interaction, adventure, or interplanetary battles/exploration. These games usually involve conflict between opponents with advanced abilities, futuristic weapons, and other sophisticated technology.



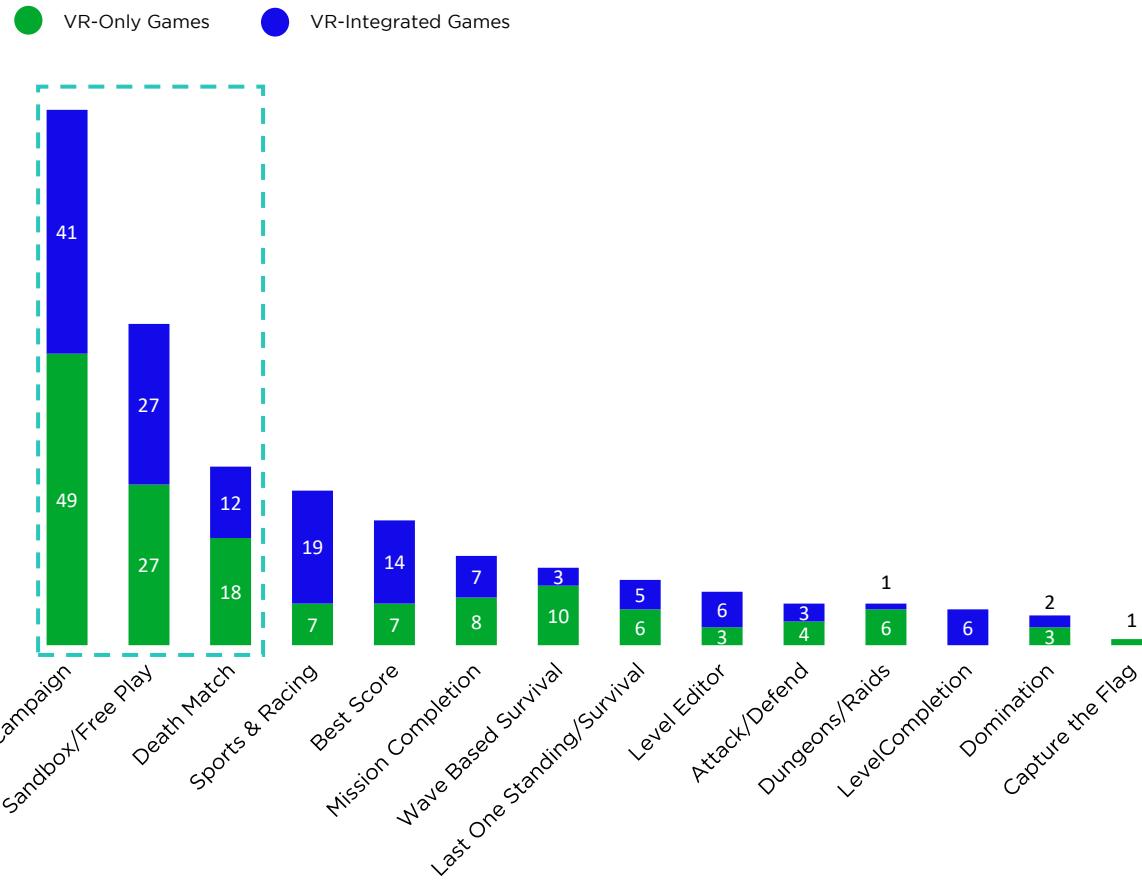
Compared to genre, there is more variance across the top themes for VR-only and VR-integrated titles. For example, VR-only includes more high magical fantasy themes than modern day ones, and VR-integrated has more sports & athletics than advanced human society.

VR's Top Game Modes Focus on Narrative, Creation, and Competition

Game modes for top VR titles are distributed evenly across VR-only and VR-integrated titles

Game Modes Among Top 100 VR Games by Average MAUs

of Games | Steam & PlayStation | July 2021 – June 2022



#1 Story Mode/Campaign (Half-Life: Alyx)

Story modes—or campaigns—see the player following a narrative, story, or an otherwise progressive path to an ending. The sequence of moving from start to a certain ending in the story, narrative, or path is key.



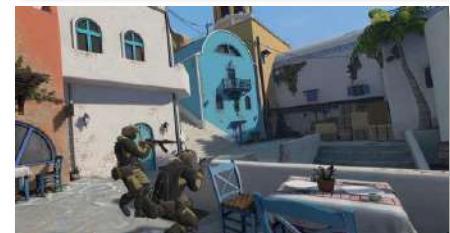
#2 Sandbox/Free Play (Rec Room)

There is no defined win condition in sandbox or free play modes. Instead, players are largely permitted to do what they want (if they adhere to the rules of the game).



#3 Death Match (Pavlov VR)

Death match is a game mode where the objective is to defeat opponents, eliminate or defeat the opponents' units/army, or eliminate the opponents as many times as possible to win the game. Defeating opponents is the sole win condition.



Game modes for top VR titles are fairly evenly distributed across VR-only and VR-integrated titles. Narrative, creation, and competition are some of gaming's core concepts, and VR's can amplify all three.

Key VR Headset Specs Overview & VR Game Case Studies



PlayStation VR2

Meta Quest



PICO

Pimax

SKYWORTH VR



Specs Overview of Four of the Market's Key VR Headsets

Valve Index, PlayStation VR2, Meta Quest 2, and Meta Quest Pro



(Last updated on November 2, 2022)

Headset	Valve Index	PlayStation VR2	Meta Quest 2	Meta Quest Pro
Release date	June 28, 2019	February 22, 2023	October 13, 2020	October 25, 2022
Price	\$999 (with controllers and 2 base stations)	\$549	\$299 → \$399 from Aug 2022 (128GB model with controllers)	\$1,499
Additional hardware required	VR-ready PC	PlayStation 5	PC optional	PC optional
Connection to additional hardware	Cable	Cable	Optional (Cable/wireless to play PC VR content)	Optional (Cable/wireless to play PC VR content)
Lenses	Fresnel	Fresnel	Fresnel	Pancake
Display	LCD	OLED	LCD	QD-LCD
Resolution per eye	1440 x 1600	2000 x 2040	1832 x 1920	1800 x 1920
Refresh rate	Up to 144Hz	Up to 120Hz	Up to 120Hz	Up to 90Hz
Tracking	Outside-in	Inside-out	Inside-out	Inside-out (with self-tracking controllers)
Other features	Color passthrough	Black & white passthrough, eye tracking, foveated rendering	Black & white passthrough, hand tracking	Color passthrough, hand tracking, eye tracking, foveated rendering, face tracking
Primary content store(s)	SteamVR	PlayStation Store	Quest Store, SteamVR	Quest Store, SteamVR

Specs Overview of Three Key Chinese VR Headsets

Pico 4, Pimax Crystal QLED, and Skyworth Pancake 1C



(Last updated on November 2, 2022)

Headset	Pico 4	Pimax Crystal QLED	Skyworth Pancake 1C
Release date	September 27, 2022 (China) / October 18, 2022 (Europe & Asia)	Q4 2022	August 26, 2022 (Presale)
Price	CN¥2499 / €429 (128GB model)	CN¥ to be announced / \$1,599	CN¥2999 / \$450
Additional hardware required	Optional (VR-ready PC to play PC VR content)	Optional (VR-ready PC to play PC VR content)	Optional (VR-ready PC to play PC VR content)
Connection to additional hardware	Optional (Cable or wireless to play PC VR content)	Optional (Cable or wireless to play PC VR content)	Optional (Cable or wireless to play PC VR content)
Lenses	Pancake	Aspherical	Pancake
Display	LCD	QLED	LCD
Resolution per eye	2160 x 2160	2880 x 2880	1600 x 1600
Refresh rate	Up to 90Hz	Up to 160Hz	Up to 90Hz
Tracking	Inside-out	Inside-out	Inside-out
Other features	Color passthrough	Eye tracking, foveated rendering, hand tracking, passthrough (optional add-on)	Black & white passthrough
Primary content store(s)	Pico Home, SteamVR	Pimax Store, SteamVR	In-house Store, SteamVR

Half-Life: Alyx – VR Gaming's First AAA Killer App

Half-Life: Alyx has laid down the gauntlet for AAA VR games, and it will inspire future AAA VR content



Release:

2020

Platform(s):

PCVR, various headsets

Publisher & developer:

Valve

Genre(s):

Shooter

Pricing (US\$):

\$59.99 at launch

Game's overview:

Half-Life: Alyx is a VR first-person shooter that leverages one of PC gaming's biggest franchises. Valve developed the game specifically for its proprietary premium VR headset, the Valve Index (launched in 2019). Alyx **takes full advantage of the Index's high-end VR features**, including finger tracking. However, the title is compatible with a range of VR headsets. The series' **physics-based puzzles and survivor-horror elements** translate well into VR, leading the game to be well-received. It also supports mods.

- Key Success Factors

1

Leveraging the Half-Life IP and its many fans



Fan-favorite characters in a gap-bridging new story attracted many fans.

Fans were practically begging for a new Half-Life game for over a decade. Making Alyx exclusive to VR was a **clever way for Valve to draw fans to the VR market** (and its Index headset). Valve took the tried-and-true linear first-person-shooter formula and packaged it in VR, taking inspiration from proven VR mechanics. This resulted in a seminal VR game, one of the most polished and well-rounded VR experiences on the market.

2

Upping the immersion with extra interactivity



A player using an in-game marker to doodle on a window (all optional).

What sets Half-Life: Alyx apart from many other titles is how much it lets players interact with the environment. Players can essentially **hold, drop, throw, and manipulate most objects**, adding to the immersion.

Finger tracking in Valve's own Index headset only makes the game more immersive, thanks to extra layers of interactivity like crushing soda cans and even playing a fully interactive piano.

3

High-fidelity AAA gameplay in VR



High-end graphics and a sense of scale let players see familiar locales like new.

Alyx's impressive visual fidelity, including **detailed environments, fluid character animations, and believable scale** makes the game more immersive.

However, these features limit the title's total addressable market, as players not only require a compatible VR headset but also a gaming PC powerful enough to run Half-Life Alyx. The game's recommended **PC specification requirements are demanding**.

Puzzling Places – A Genre-Defining Game for the VR Puzzle Genre

The game empowers people to discover cultural heritage sites and enrich their worldview via XR and photogrammetry



Release:	Late 2021
Platform(s):	Meta Quest, PSVR, Pico
Publisher & developer:	Realities.io
Genre(s):	Puzzle
Pricing (US\$):	\$14.99 - \$19.99
Game's overview:	

Puzzling Places is a relaxing 3D VR jigsaw puzzle game that uses a mix of **XR technologies and photogrammetry** to render **hyper-realistic miniature puzzles** of beautiful places from around the globe. An early prototype was initially launched in **April 2020 on SideQuest** before the app was officially released, to critical and commercial acclaim, in **Sept 2021 on the Quest and Dec 2021 on PS Store**. Realities.io continues to update and optimize the game with periodic releases of new puzzles, either added for free or as DLC packs.

- Key Success Factors

1

Realities.io is a tech studio that blends 3D scanning and immersive technology

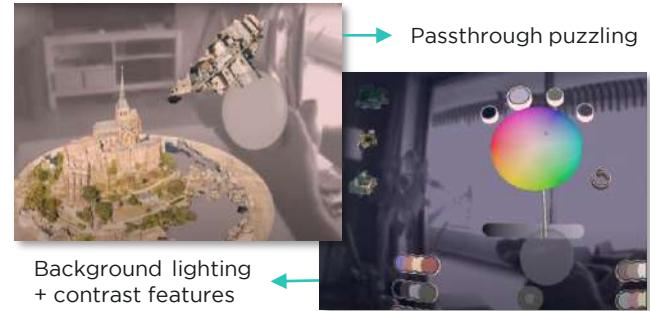


Puzzling Places is the result of Realities.io's desire to share astounding global sites with players, aiming to **enrich their worldview while promoting the company's own values of promoting cultural heritage**.

The game received acclaim for its **accessible controls, immersive soundscapes, the visual fidelity of its puzzles, and its simple and meditative gameplay**. It is one of the highest-rated games on the Quest Store. It currently features 21 unique puzzles created from detailed photogrammetry 3D scans of real locations. Puzzles are available in **25, 50, 100, 200, and 400 pieces**.

2

Puzzling Places has been optimized to take advantage of the latest in VR technologies



Passthrough puzzling
Background lighting + contrast features

The game uses the **Quest's MR passthrough feature**, enabling players to continue playing while stepping outside the VR environment to see a real-time view of their surroundings. The game is also **playable via the Quest's hand-tracking feature**; though, it is currently restricted due to Quest's hardware limitations.

Future plans include the **implementation of eye tracking** to make the player experience smoother and take full advantage of the latest in XR headset technologies. In addition, the developers plan to continue supporting the game by adding a **multiplayer mode** and aiming to further diversify the current puzzle library.

FitXR - Subscription-Powered LiveOps Keeps Players Returning to Fitness

Standalone VR headsets complement fitness better; manufacturers like Meta are marketing their headsets as a fitness tool



Release (rebranded): 2020 (formerly BoxVR)

Platform(s): Meta Quest

Publisher & developer: FitXR

Genre(s): Simulation

Pricing (US\$): \$9.99/month

Game's overview:

FitXR is a VR fitness app that gamifies boxing, HIIT (high-intensity interval training), and dance workouts, featuring licensed/license-free music. The app adds one new workout every day, with classes hosted by professional trainers. A real-time multiplayer mode allows play sessions with up to six friends, and players can also join the official community on Facebook to find players. The app launched with a one-off purchase and optional DLC, but it shifted to a subscription model in April 2021.

- Key Success Factors

1

Cordless standalone VR headsets fit better as a fitness device



Oculus Move on mobile

Oculus Move in VR

2

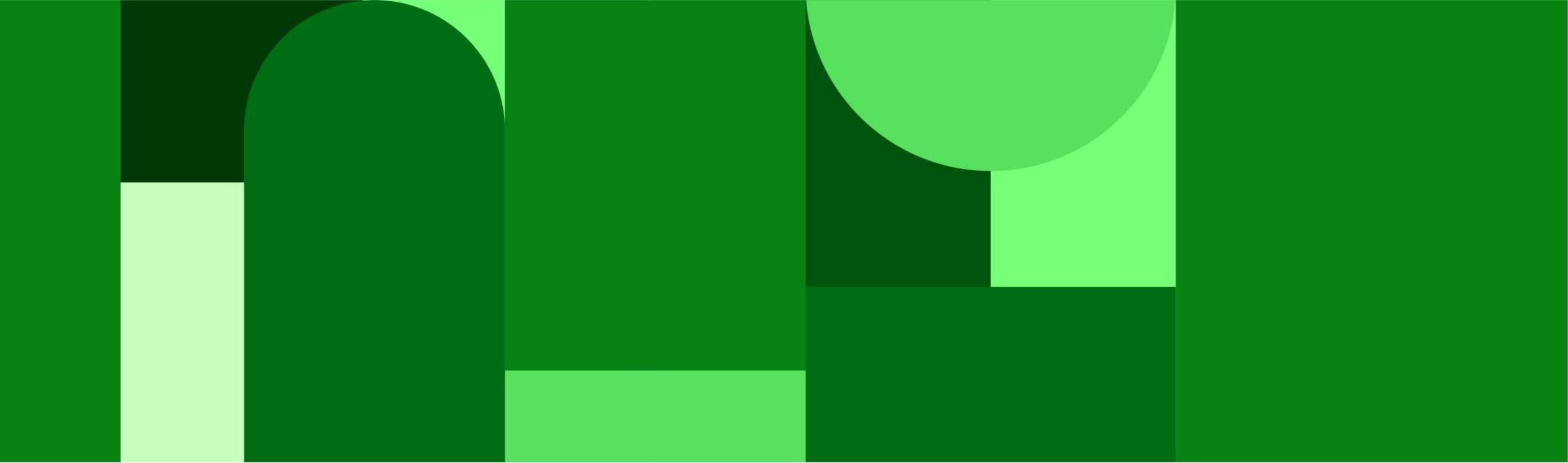
FitXR's frequent updates and gamified workouts keep players returning to fitness



Pandemic measures saw gyms closing and people confined to their homes. However, VR fitness apps filled a gap for many people looking to stay fit from home. The launch of **cordless and lighter standalone headsets**, and the related success of the Quest 2, boosted the growth of VR fitness. Meta is even promoting **the Quest 2 as a fitness device** and launched a **proprietary fitness tracker, Oculus Move**. The tracker allows users to monitor stats such as calories burned across different fitness apps e.g., FitXR and Supernatural, enhancing the usability of VR headsets as a fitness tool.

Monotonous workouts make working out long term a big commitment, in the real world and VR alike.

FitXR's shift to a subscription model allowed its developer to monetize players stably for longer, keeping things fresh with new workouts, modes, and music. VR fitness games quantify workouts via scoring and **gamify them through leaderboards** based on these scores. Along with such features, FitXR's **real-time multiplayer mode creates social stickiness**, motivating players to aim for a higher score than their friends, building engagement and retention.



4. Opportunities & Challenges

Key developments in VR software, hardware, and technologies

Standalone VR Headsets Have Helped Lower VR's Barrier to Entry

However, performance and fidelity are somewhat lacking compared to higher-end traditional PC VR

Opportunities & Challenges in Standalone VR

Meta launched its first 6DoF standalone headset, the **Quest**, in May 2019. One of the major USPs for standalone headsets is **accessibility**. They don't require a powerful PC/console or cables. The Quest has all the required components for computing, tracking, and sustaining power built directly into the headset unit, allowing users to essentially **play anywhere**. This easy setup, boosted by its successor the Quest 2's **affordable price**, helped lower VR's barrier to entry. Furthermore, continuous developments in adopted lenses (e.g., pancake lenses) will make headsets lighter and more compact and optimize the wearing experience. Thanks to these advantages, standalone headsets will further **democratize VR gaming for general consumers** in the future.

Standalone headsets like the Quest 2, use **inside-out positional tracking**, which tracks movements through headset-mounted cameras. Inside-out tracking does not require setting up external tracking devices (base stations). On the other hand, **outside-in tracking** (like the **Valve Index**) has base stations track movements, leading to **enhanced tracking accuracy** and **lower latency**. Users can also install multiple base stations for **full 360-degree tracking**.

However, standalone VR's minimal setup has sacrifices in terms of performance. Standalone headsets use similar chipsets to smartphones (e.g., Quest 2 uses **Snapdragon XR2**). While continuous improvements in performance are expected, these chipsets currently have less processing power compared to a gaming PC (which is necessary for PC VR). As a result, even though many high-profile VR games were ported and launched for standalone headsets, there are certain high-fidelity games, like **Half-Life: Alyx**, that simply cannot run on the market's current standalone headsets.

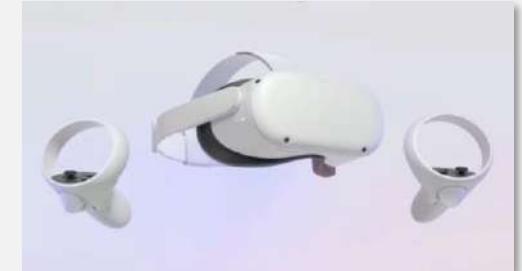
Different Tracking Systems Lead to Varying Precision and Convenience

Valve Index VR Kit (PC VR)



Headset and two base stations (connected to a PC via a cable) and two controllers.

Meta Quest 2 (Standalone VR)



Headset and two controllers.

Outside-In Tracking



Two (or more) base stations. Players place them at the best angles to track movement.

Inside-Out Tracking



Movement must be within the sight of the head-mounted front cameras to track effectively (not behind the player).

Game Engines Show Growing Support for VR App Development

As the market for VR games grows, tools and support for VR app development also grow

A Growth in the Toolkit Available for VR Game & App Development

1 Unity and Unreal Engine remain the most popular options for VR app development

Both Unity and Unreal Engine expanded their offerings to facilitate VR app development as early as 2015/2016. **Unity is popular due to its ease of use and optimization for mobile**, making it an effective option for VR game development as VR must render two views of the same scene (one per eye). Therefore, developers **must optimize VR content for lower-end devices due to the additional processing power requirement** for PC and standalone VR alike. Unity also benefits the Meta Quest line, which runs on an Android OS and a Snapdragon chipset and is currently the market's most popular VR headset.

Unreal Engine 4 has recently grown to become a more popular option for VR app development, as VR hardware becomes more powerful (via better chipsets in VR headsets and better usability on PC VR). These advancements allow developers to take advantage of **Unreal Engine's faster post-processing speed and much higher level of graphical fidelity** vs. Unity. This allows for more complex and immersive experiences on VR platforms like the Quest, especially for bigger titles on PC VR.



2 VR growth is expanding the number of engines and services supporting VR app development

Notable engines that support VR development include **Crytek's CryEngine** (used for their 'The Climb' games), **Valve's Source 2** (used for Half-Life: Alyx, for which Valve even added VR mod support), **Amazon's Open 3D** (successor to Amazon Lumberyard which was built upon the back of CryEngine), and **Godot** (a free open-source engine with VR support since 2018 which received funding from Meta Reality Labs in 2020). This list is by no means definitive. As the VR market grows, the number of options available for VR app development will also increase.

The high costs associated with developing an engine may limit the total number of stakeholders in the market to a select few. However, the growth in the VR market has encouraged other services, like **Blender** and **Adobe Medium** (originally Oculus Medium), to increase support for VR app development. These services have lower costs and risks associated with them as against developing a new engine, and many offer functionality beyond VR gaming. For example, the services above look at sculpting and modeling in VR, which benefits from the extra dimensionality VR adds.



Local and Cloud Streaming Could Improve VR's Usability and Accessibility

While emerging technologies have a way to go, they have the potential to unlock PC VR content for a wider audience

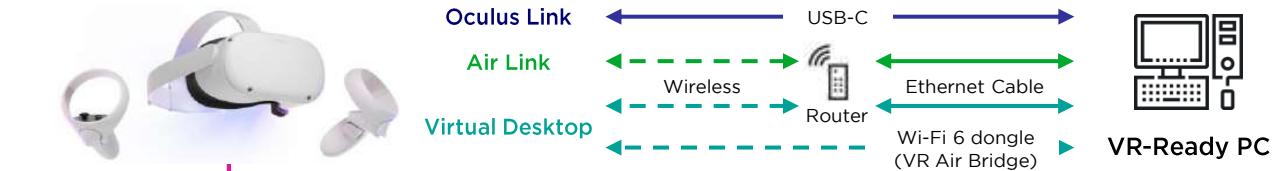
Opportunities & Challenges With Local/Cloud Streaming

These days, most standalone headsets can also play PC VR (e.g., **SteamVR**) content through connecting to a VR-ready PC wirelessly or via a cable. For example, Meta provides two official methods, **Oculus Link** (via a USB-C cable) and **Air Link** (wireless). There is also a third-party alternative, **Virtual Desktop**. As is often the case, wired connections are more reliable. Wireless connections can be less stable and reliable depending on several factors, including how many other devices are connected and custom user settings.

High-fidelity PC VR gaming has been mostly exclusive to people who own a powerful PC. This high barrier to entry might be lowered in the future, thanks to VR cloud gaming. In fact, **NVIDIA** created its own VR cloud streaming infrastructure called **CloudXR** to bring VR cloud gaming capabilities to other cloud gaming services. As of July 2022, there are two VR cloud streaming services available for consumers, **PlutoSphere** and **Shadow**, for the Quest headsets.

However, cloud gaming is dependent on a strong internet connection. Every millisecond counts in gaming for a player to send a command to and receive a response from the server via cloud-streaming. Immersion is important for VR, and latency caused by poor connections can limit immersion. Once these latency challenges are solved, cloud gaming could open PC VR content for a much wider audience. It could also help reduce the size and weight of headsets, as processing is handled via remote servers.

Diagram of Local & Cloud Streaming for Playing PC VR Content



Availability: Early access as of October 2022

Pricing: Base rate starting at \$1.99/hour; 128GB subscription options starting at \$9.99/month

Requirements for internet connection:

Over 50Mbps download speed, under 100ms ping required & 50ms ping recommended, 5GHz WiFi network (WiFi6 recommended)



Availability: Early access for VR and its Quest app is in beta as of October 2022

Pricing: Monthly subscription, starting at \$30/month (256GB storage included)

Requirements for internet connection:

Over 50Mbps download speed, under 20ms ping, 5GHz WiFi network

R&D in Interactivity and Immersion Tech Is Improving VR Experiences

Further improvements in headsets, controllers, and peripherals pave the way for more immersive and higher-fidelity VR experiences

Cutting-Edge Technologies Will Enhance VR Experiences

What makes VR gaming distinctive from flatscreen gaming is a heightened sense of immersion and meaningful interaction with virtual worlds both via input and feedback. In this context, VR controllers play a pivotal role in the experience. These controllers track users' hand and finger movements and translate them into the virtual world. Some headsets, such as the **Quest 2**, also support controller-free hand tracking.

Most early controllers are only capable of basic vibration feedback, and the Quest 2's hand tracking does not give any type of haptic feedback. These basic features, along with limited tracking capabilities, can limit the potential of immersion in VR.

However, headsets and controllers are continuing to improve. For example, **PlayStation VR2** is capable of eye tracking, and its controller adopts haptic feedback and adaptive trigger features like those in the PS5's acclaimed DualSense controller. Its eye tracking will not only enhance avatar experiences, but it also supports foveated rendering. This innovative rendering tech enables higher-resolution graphics with a faster performance by concentrating graphics processing in the screen areas that the user is looking at directly.

Furthermore, several companies are researching, developing, and promoting peripherals like haptic gloves and suits, and treadmills (to simulate walking). Most of these peripherals are expensive, take up a lot of room, and are B2B focused (some have limited B2C features). While it will take years for compelling haptic and full-body tracking to become affordable for consumers, improvements are certainly incoming.

Haptics Gloves: Consumer Experiences & Latest Technologies for Enterprises



bHaptics launches a haptic glove, **TactGlove**, for consumers at \$299 per pair in Q4 2022. The glove uses actuators on tips of fingers to deliver a sense of touching objects in VR via simple vibration on each finger (e.g., guitar strings in *Unplugged*).



Enterprise and research prototype gloves go much further than the consumer experiences. **Force feedback gloves**, such as **HaptX Gloves DK2** and **Meta's prototype gloves**, resist against player finger movements when they touch an object in VR (e.g., resistance of airplane controller). This enables them to feel the textures and properties of virtual objects (e.g., grabbing something and crushing it with realistic resistance).

Passthrough Features Seamlessly Mix Real and Virtual Worlds

More VR apps will integrate mixed reality experiences, thanks to technological enhancements in upcoming headsets

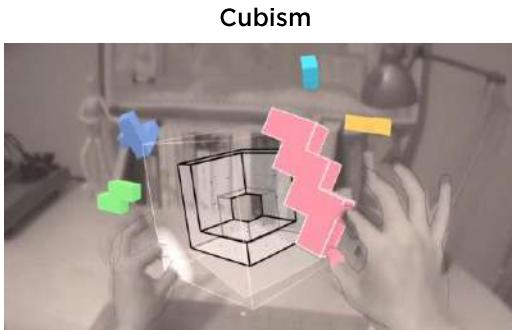
Passthrough Feature's Technological Growth

The **passthrough feature** in VR headsets enables users to see a real-time view of their surroundings through head-mounted cameras. Meanwhile, AR glasses let users see the real world through transparent lenses. Passthrough features in VR headsets seamlessly blends real and virtual worlds, opening new possibilities for **mixed reality (MR)** experiences in VR apps.

The **Quest 2**'s passthrough feature can currently only capture a low-resolution black-and-white view (e.g., used for drawing safety boundaries while using VR). **Meta** added the experimental passthrough API for developers in July 2021 and fully released it later that year. Since then, several VR games—such as **Blaston**, **Cubism**, and **Puzzling Places**—have already integrated MR experiences into games via the Quest 2's passthrough feature.

Meta's new high-end headset, the **Quest Pro**, is capable of **high-resolution color passthrough**. To that end, we expect more VR apps and games will be using the feature, thanks to new innovations in upcoming headsets. Some developers, such as **Schell Games** and **Resolution Games**, have already announced new games or updates on existing games that use the color passthrough tech, including **I Expect You To Die: Home Sweet Home**, **Demeo In Mixed Reality**, and **Spatial Ops**.

Black & White Passthrough



It lets players solve puzzles with their virtual or actual hands (via hand tracking) in their environment.



It turns a real-world space (e.g., living room) into a custom arena.

Color Passthrough

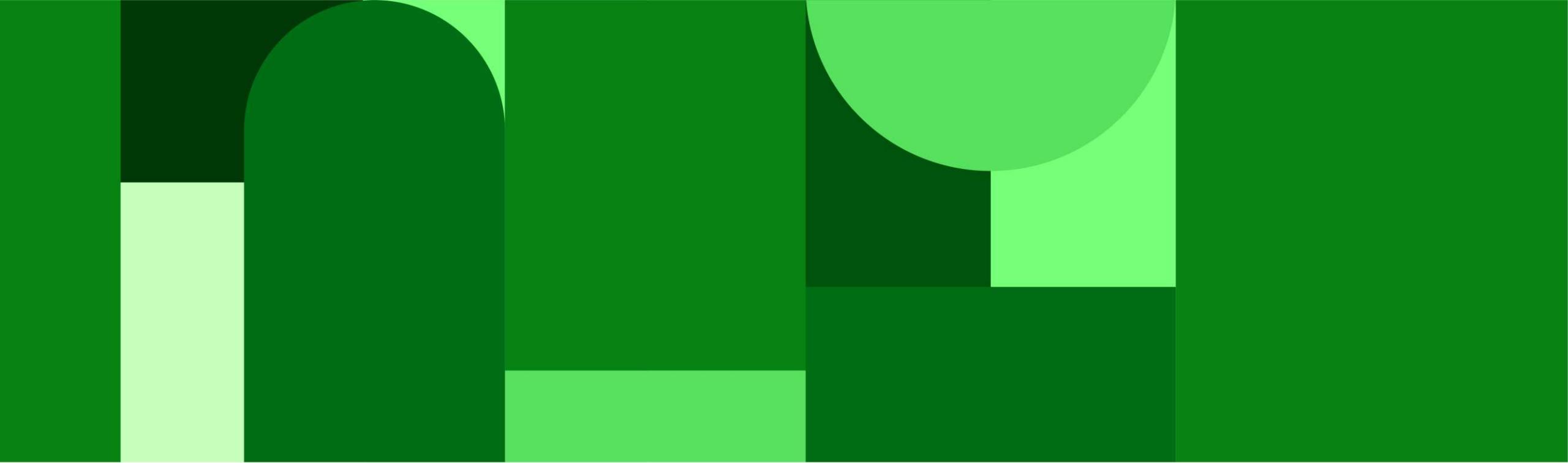


Spatial Ops is a multiplayer FPS game that users can play with others in the same physical location.

Demeo In Mixed Reality



The mixed-reality mode enables players to place the in-game board on a physical table.



5. Trends & Outlook

VR gaming and the metaverse

Platform Holders Hone First- and Third-Party VR Content Strategies

More engaging (IP-based) content will drive further adoption of VR headsets, leading more developers to enter VR



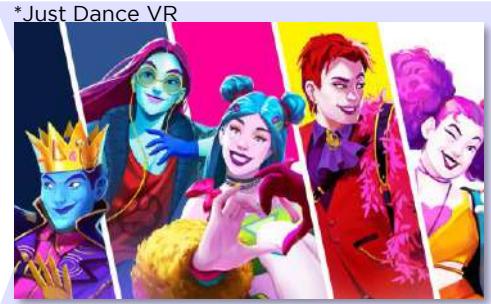
2018



2020



2021



2023



2023



Release Date TBA

- VR is growing into a financially sustainable platform, thanks to its growing active install base. For example, one of the most iconic VR games Beat Saber earned nearly \$100 million* in 2021 alone, thanks to licensed DLC and the game's status as a VR must-have.
- With the **Quest 3** in development and **PS VR2** on the way, **Meta** and **Sony** will further boost their VR content strategies via first- and third-party studios (and their already popular IP).
- For example, a **Grand Theft Auto: San Andreas** port is in development for the Quest headsets, following the well-received **Resident Evil 4** port in 2021. Meanwhile, **Horizon Call of the Mountain** is due for the PS VR2, and we expect to see **PlayStation** leveraging more first-party IP like Horizon.
- Pico is also rapidly investing in its VR content library, supporting VR developers in porting their content to Pico. Pico will also have its first major exclusive game, **Just Dance VR**, through a partnership with **Ubisoft**.
- As always, content is king, so these companies' increasing investment into VR content will attract more players, leading to more entries, investments in the space, and bigger-budget game announcements (some based on renowned IP) toward 2024.

VR Monetization & Acquisition Take Cues From the Wider Games Market

VR games and apps follow the latest trends seen in traditional gaming, including hybrid-monetization mechanics

Initial Acquisition/Monetization Cycle for VR Games

Pay-to-Play

- **Premium Games:** Players must pay upfront to access the base game. Most VR apps started off with this model, and the majority still use it (e.g., **Beat Saber**).
- **DLC:** Pay to access an extension of the original game. DLC is becoming one of the main strategies to monetize VR apps over time (e.g., **Beat Saber**).

Free-to-Play

- **Free-to-Play:** The game is free to download and start playing. These games are typically monetized via purchasing in-game items such as in-game currencies, cosmetics, and items (e.g., **Rec Room**), as well as via subscriptions/passes (e.g., **Echo VR**) and other unique services such as theatre performances in **The Under Presents**.

Recurring Monetization Mechanics Found in VR Games

In-Game Purchases

- **In-Game Purchases:** Pay for in-game items such as in-game currencies, cosmetics, items, etc. This technique is used in a wide array of VR games, both free-to-play and premium, but it is more common in live operation games/apps.

Examples:



Content Passes

- **Battle Pass:** Tier rewards of in-game items/cosmetics based on player's spend or achievement during a set time frame.
- **Season Passes:** One-time payment to access current/future content. This has only been in a few VR games so far.

Examples:



Subscriptions

- **Subscriptions:** Pay a recurring fee to play the game/app. This is especially popular with fitness and social apps.

Examples:



Insight: App Store Fees

All game/app-related purchases are monitored by the digital storefront the app is downloaded from. The Steam and Quest stores both charge a flat 30% fee on full game purchases, with additional levies charged on subscriptions, passes, and in-game purchases.

Monetization Design in VR Games Is Maturing and Optimizing

VR games/apps are rapidly experimenting with new and more complex hybridized monetization mechanics

Evolution of Monetization Mechanics in VR Games/Apps

The last decade has seen massive innovations in all types of VR games and apps, from the early days of free-to-play casual VR games on Google Cardboard to complex and in-depth games/apps such as Half-Life: Alyx, Echo VR, and The Under Presents.

Added complexity enables more complex, hybridized monetization strategies. For example, many premium games now add extra DLC content to boost revenue, retention, and engagement of their game/app over time.

This experimentation shows the VR market is moving away from singular strategies such as one-off purchases or being monetized via ads alone, as seen in early smartphone-based VR games. Now, we see more VR games/apps adopting a variety of hybridized monetization strategies, an evolution that took the traditional games market decades to accomplish. These hybrid strategies allow VR developers to better monetize and support their game/app for longer.

Developers have also used monetization strategies, such as free-to-play, to improve user acquisition and discoverability. To that end, some VR titles offer free early-access and trial periods. Many apps found popularity this way via Meta's App Lab (a way for developers to add content to the Quest store without going through Meta's curation process) or the SideQuest platform (a platform that allows players to sideload content onto the Quest), including the likes of Pavlov VR and Gorilla Tag.

In the future, we will likely see developers exploring even more diverse monetization options for VR games/apps, including play and earn, events/live performances, and ad-based monetization. Trends like the metaverse and Web 3 are only underlining these monetization options further.

Innovative Monetization Mechanics in VR Games/Apps

Horizon Worlds x Content Creators



Meta is testing new mechanics that allow creators to sell virtual items/effects within their worlds e.g., accessories for a Fashion World.

The Under Presents x Live Performance



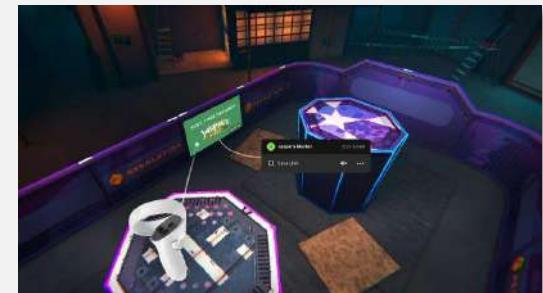
An immersive theatre experience in VR, that sold tickets to its live-performance VR show.

Zenith: The Last City x In-Game Purchases



Zenith is an MMO that monetizes through Pay-to-Play/In-Game Purchases; it was funded on Kickstarter.

Blaston x In-Game Ads



Initially poised to test Meta's in-game ad features but withdrew due to fan backlash because Blaston is a pay-to-play game and ads could disrupt gameplay experiences.

VR Technology Serves As A Catalyst for Metaverse Adoption

A rising interest in inter-human VR communication is incentivizing game developers to shift their focus to social games

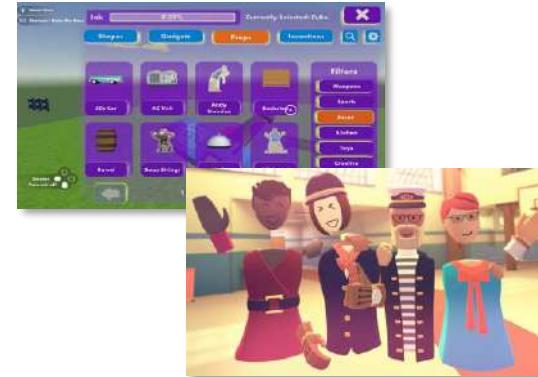
What is the Metaverse and How Can We Access It?

Though often used interchangeably, the metaverse and virtual worlds are separate concepts. While the metaverse will be comprised of many individual and interconnected virtual worlds, no singular virtual world can and will be the metaverse (for now). We further define the **metaverse as an interconnected and interoperable network of persistent virtual worlds that have their own economic system(s)** and that are populated by large numbers of users who interact with each other via their 3D digital avatars. The metaverse, therefore, offers a **heightened sense of immersion and presence**, which is also one of VR's use cases. In the future, the metaverse will be accessible through different devices—or gateways—like mobile, PC, console, or VR headsets.

As more companies focus their efforts on the next evolution of gaming—and as players start gravitating towards ever more immersive experiences—**VR is poised to become one of the major gateways into the metaverse**.



VR Social Platforms Gain in Importance



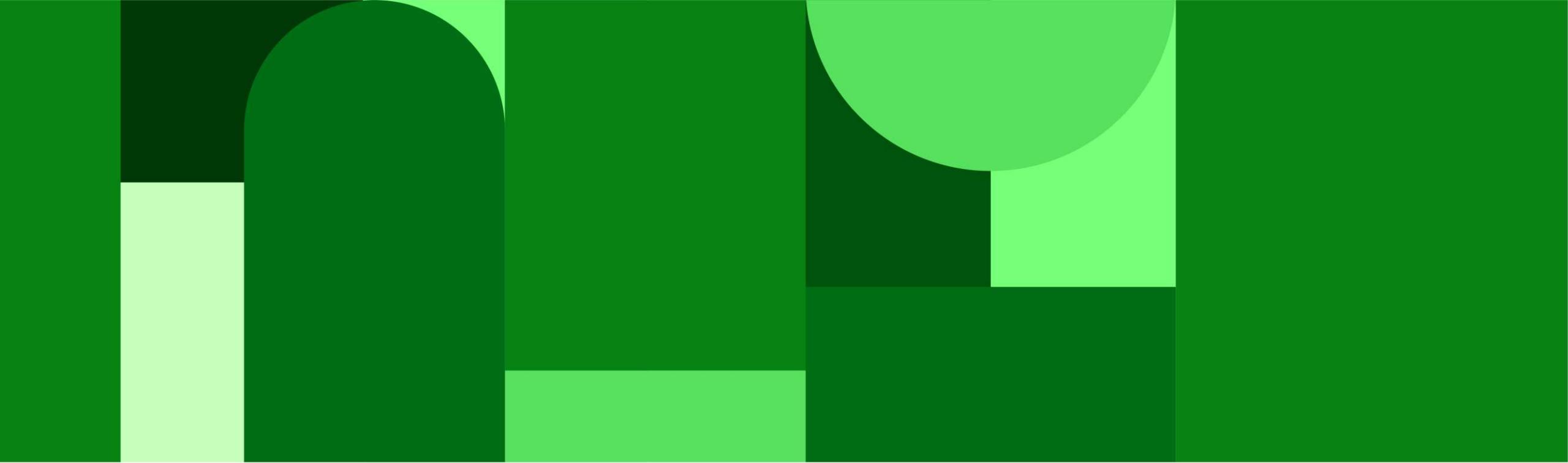
Rec Room provides users with a platform to play, socialize, trade, and create their own (VR) games from the ground up.



Glitch Mob performed a **virtual concert** in Sansar, a VR social platform. Shows inside virtual worlds have already become commonplace for many traditional artists.

Outside of VR, social games like Roblox, Minecraft, or Fortnite are currently some of the world's most popular franchises. We have seen this trend starting to emerge in VR as well. Rec Room—a social platform which attracted over 3 million VR MAU in April 2022 ¹—is currently one of the most popular VR apps. **The growing popularity of social VR platforms is only likely to accelerate and attract further developer interest**, as other titles like Meta's Horizon Worlds, Microsoft's AltspaceVR, or VRChat try to build more engagement.

This focus on social experiences makes sense. Compared to traditional platforms, **socializing in VR offers users an increased sense of presence and can feel more natural and akin to real-life interactions**. These aspects are crucial for meaningful interactions in the metaverse.



6. VR's Future Beyond Gaming

VR's use cases beyond gaming

VR's Future Extends Beyond Gaming, Touching Almost All Sectors

VR technology can prove essential for many industries, from retail and healthcare to education and tourism

VR Is Pushing Boundaries for Several Sectors

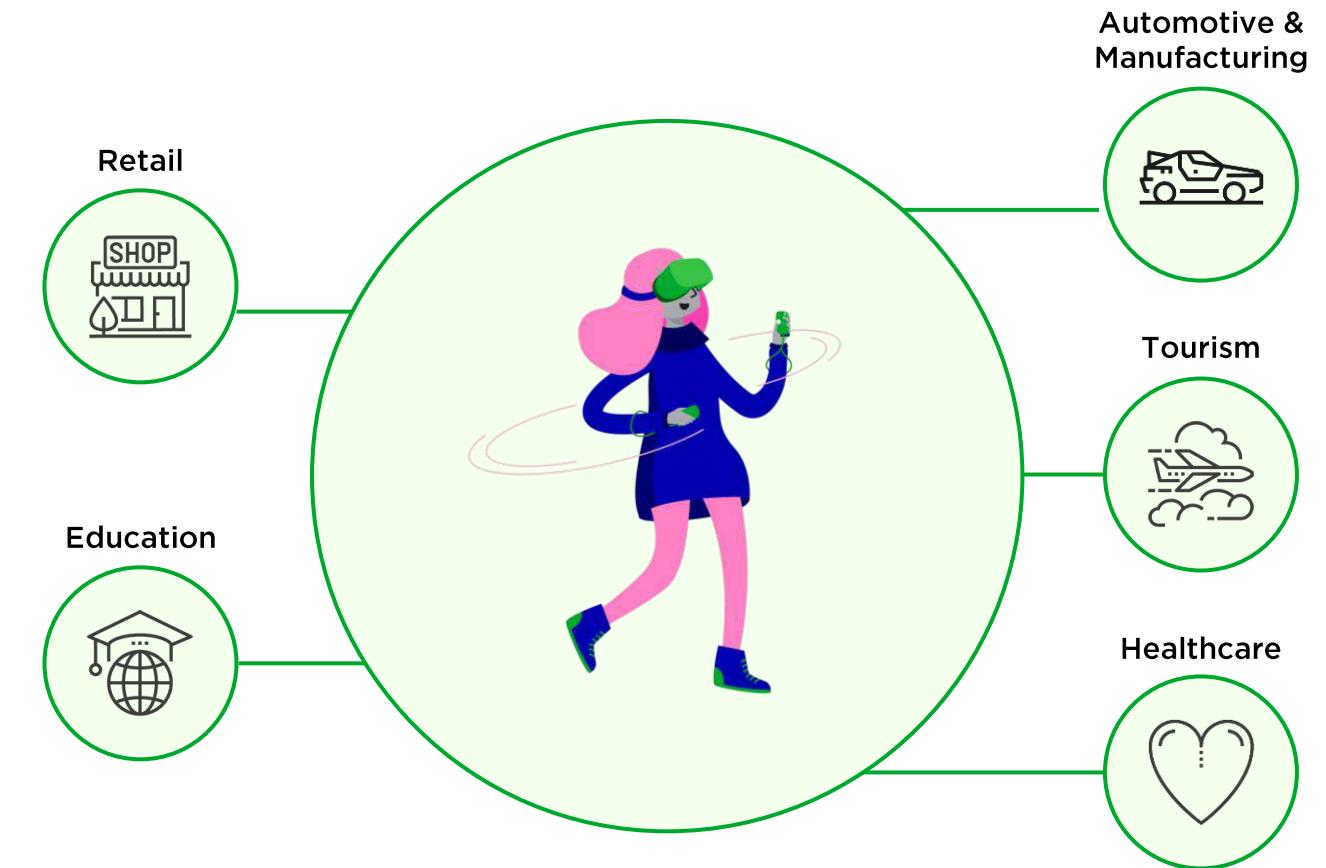
While VR is beginning to reach mainstream audiences through gaming, it also has other use cases that extend far beyond entertainment. Simply put, VR is already starting to benefit society, and this will continue to be the case.

The internet led to the creation of new professions and the enhancement of already existing ones. Similarly, the **metaverse will bring about a wide array of new work opportunities, and VR will likely play a pivotal role**: sectors like manufacturing, automotive, city planning, and many others will benefit.

VR is already helping designers and architects virtually visualize their real-world projects via high-fidelity, true-to-life renders of buildings. These models are **helping professionals make real-world decisions, improve safety standards for workers, and make projects more efficient** for companies across the world. While on-site supervision will always be important, VR is pushing the planning process forward in the construction industry.

Accessing these environments through VR is not only safer, helping **prevent potential human casualties**, but it is also more efficient. **Stakeholders can access such plans at any point in time and from anywhere in the world** (with relative ease). As you can see on the right, the examples do not end there.

Examples of Sectors With VR Use Cases Beyond Gaming



VR's Future Extends Beyond Gaming, Touching Almost All Sectors

VR technology can prove essential for many industries, from retail and healthcare to education and tourism

Retail	Education	Automotive & Manufacturing	Tourism	Healthcare
 Digital in-store shopping will likely become more realistic and commonplace as XR and VR technologies evolve. Consumers will be able to make better-informed purchasing decisions as more photo-realistic solutions become available. These innovations are beneficial for both accessibility and sustainability, leading to longer digital shopping sessions, increased conversion rates, and lower overhead and returns.  Matterverse enables brands to create hyper-realistic virtual stores.	 As well as making education more accessible globally, VR has the potential to increase the quality of interactions between students, teachers and school curricula. Thanks to the immersive nature of VR, students can be instantly transported to various digital environments that fit the need of the educational experience, for example, detailed 3D anatomy for biology and realistic ancient civilizations for history.  Labster offers virtual science courses and simulations in VR.	 Car manufacturers like the Ford Motor company are already adopting VR technology to enhance their operational and manufacturing capabilities from prototyping and up to the production stage. Some of the benefits of doing so include improved safety standards, a more streamlined production process, and the increased ease with which stakeholders across the globe can cooperate on internal projects.  The Ford Motor Company uses VR technology as part of its vehicle design process.	 While the pandemic brought tourism across the world to a standstill, VR technologies allowed consumers to "visit" new places virtually. VR now features ever more realistic environments through techniques such as spatial photography, democratizing tourism around the world by allowing individuals to virtually visit distant places from the comfort of their own homes.  Immersion VR produces 360VR content for brands and consumers.	 Surgeons and medical professionals are already using VR devices for training, simulations (e.g., visualizing surgery's outcome possibilities predicted by AI), and even to facilitate very difficult medical procedures. VR can also be used to enhance consumer experiences such as therapy sessions . One use case is simulating stressful situations in VR to examine how people respond to stress and help them to overcome anxiety.  aNUma provides digital group therapy sessions combining VR with the science of psychedelics.

Still in Its Early Stage, VR Finds Its Use Cases in Gaming and Beyond

The gaming industry embraces innovations and cutting-edge technologies and, in return, provides a stimulus effect on the advancements of these technologies across sectors

VR's chain reaction for success has already begun.

With the technology's advancements, investments from big hardware, software, and content tech firms, and, most importantly, consumers' desire for immersive virtual experiences, VR is set to grow at a healthy pace in the coming years. We forecast that **active VR HW install base will reach 46.0 million by 2024**, boasting an impressive +42.0% CAGR (2019-2024).

VR finds its killer consumer use case in gaming. However, the technology extends far beyond gaming; VR will continue to benefit industries like healthcare, education, engineering, and other entertainment sectors. Meanwhile, **technological innovations** in motion tracking, haptic feedback, and spatial audio, among others, further enhance **VR (gaming) experiences.**

Game technology (gametech)—a set of dedicated solutions and tools that is constantly evolving and streamlining the game development process—is **an important part of the entire tech world**. Throughout the history of video games, many technologies, including graphics rendering, artificial intelligence,

and AR/VR, have been adopted to underpin the gaming experiences.

In return, thanks to its high popularity among consumers, **gaming has accelerated the development of these technologies** and driven R&D in a wide range of technological fields such as computer sciences, mobile technologies, sensor systems, and more. VR and other (game) technologies support and reinforce each other in applications across all industries.

In recent years, **game engines** like **Unity** and **Unreal**—thanks to their powerful 3D graphic capabilities—are being applied in film making, automotive design, architecture, and much more, **boosting growth and innovations in industries beyond gaming**. With the increasing support from these engines, they are likely to become the key platform for VR app development outside of gaming in the future.

We are excited to witness the groundbreaking development and growth of VR technology in the coming years, and how its immersion and interactivity will benefit gamers and consumers across all sectors.

46.0M

The global active VR HW install base by the end of 2024.

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› **Spyros Georgiou**
Lead Visual Designer

Appendix



Newzoo Games Taxonomy

GENRES / SUBGENRES

Adventure	Casino	Platformer	Role Playing	Shooter
<ul style="list-style-type: none"> Action-Adventure Narrative Adventure Hack and Slash Interactive Story Survival Horror Survival Arena Open World Survival Craft Stealth Game Action Roguelike Dungeon Crawler Geo AR 	<ul style="list-style-type: none"> Traditional Casino Meta Casino Adventure Casino Real Money Casino 	<ul style="list-style-type: none"> Puzzle-Platformer Side Scroller Metroidvania Precision Platformer 	<ul style="list-style-type: none"> Action RPG MMORPG Tactical RPG Puzzle RPG Collection RPG Narrative RPG JRPG Idle RPG Souls-like Dungeon Crawler Action Roguelike Traditional Roguelike Geo AR 	<ul style="list-style-type: none"> Third-Person Shooter First-Person Shooter Top-Down Shooter Hero Shooter Vehicular Combat Looter Shooter Arena Shooter Sniper Game Shoot 'Em Up Bullet Hell
Arcade	Fighting	Puzzle		
<ul style="list-style-type: none"> Party Game Social Deduction Endless Runner Arcade Royale Shoot 'Em Up Beat 'Em Up Bullet Hell 	<ul style="list-style-type: none"> Platform Fighter Traditional Fighter Arena Fighter Sports Fighting Beat 'Em Up 	<ul style="list-style-type: none"> Match 3 Puzzle & Decorate Bubble Shooter Jigsaw Puzzle Word Game Trivia Game Hidden Objects Physics-Based Room Escape Coloring Game Puzzle RPG Puzzle-Platformer Detective Brain Training Merge & Breeding 		
Battle Arena	Hyper Casual		Sandbox	Sports
<ul style="list-style-type: none"> MOBA 	<ul style="list-style-type: none"> Hyper Casual Runner/Racing Hyper Casual Action Hyper Casual Simulation Hyper Casual Puzzle ASMR Hyper Casual io 		<ul style="list-style-type: none"> Adventure Sandbox Game Creation Platform Social Metaverse 	<ul style="list-style-type: none"> Arcade Sports Realistic Sports Sports Fighting
Battle Royale	Idle	Racing	Strategy	
<ul style="list-style-type: none"> Third-Person Shooter First-Person Shooter Hero Shooter 	<ul style="list-style-type: none"> Idle Management Idle RPG 	<ul style="list-style-type: none"> Arcade Racing Kart Racing Sim Racing Drift Racing Combat Racing Drag Racing Stunt Racing 	<ul style="list-style-type: none"> Build & Battle Tower Defense Auto Battler Summon Battler 4X Real-Time Strategy Grand Strategy Turn-Based Strategy Battle Simulator 	
Card Battle	Music		Simulation	
<ul style="list-style-type: none"> Roguelike Deckbuilder Collectible Card Game 	<ul style="list-style-type: none"> Rhythm Game Dancing Game 		<ul style="list-style-type: none"> Life Sim Time Management Tycoon Management Merge & Breeding City Builder Romance Sports Management Vehicle Simulator Dress Up Game Job Simulator God Game Farming Sim Pet Sim Social Metaverse Battle Simulator Survival Sim 	

Source: ©Newzoo | Newzoo Expert | For details of Newzoo Games Taxonomy, please visit [here](#).

THEMES

Contemporary	Historic	Science Fiction
<ul style="list-style-type: none"> Contemporary War Sports and Athletics Modern Day Popular Culture 	<ul style="list-style-type: none"> Modern Era Western Medieval Asian Imperial Age & Dynasties Prehistoric Ancient History Industrial Era Renaissance 	<ul style="list-style-type: none"> Historic Science Fiction Advanced Human Society Alien Galaxy Apocalyptic
Fantasy	Mystery	
<ul style="list-style-type: none"> Mythology Dark Fantasy High Magical Fantasy Low Magical Fantasy 	<ul style="list-style-type: none"> Mystery / Detective 	
Horror	Other	
<ul style="list-style-type: none"> Gothic/Occult Horror Monster Horror Psychological Horror Slasher Horror Paranormal Horror 	<ul style="list-style-type: none"> Other Theme 	

GAME MODES

Story Mode / Campaign
Death Match
Wave Based Survival
Capture the Flag
Domination
Attack/Defend
Build & Battle
Base Capture
Mission Completion
Dungeons/Raids
Sports & Racing
Best Score
Level Completion
Last One Standing / Survival
Sandbox / Free Play
Level Editor

OTHERS

Art styles
Avatar number
Competitiveness
Developer/Publisher
Dimensionality
Franchise
Game Mechanics
Monetization
Perspective
Player Number

Newzoo Consumer Insights Terminology

Income Brackets | Newzoo Consumer Insights – Mini Survey: Metaverse and VR | June 2021

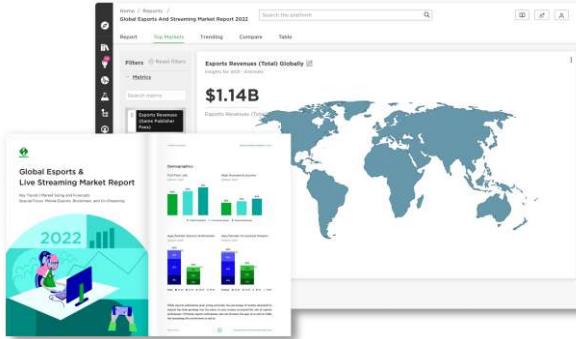
Income Brackets

Country	Time Period	Low	Medium	High
United States	Yearly	< \$40,000	\$40,000 - \$75,000	\$75,000
United Kingdom	Yearly	< £28,000	£28,000 - £49,000	£49,000 >
China	Monthly	< 7,000 RMB	7,000 - 25,000 RMB	25,000 RMB >
Japan	Yearly	< ¥4,000,000	¥4,000,000 - ¥7,000,000	¥7,000,000 >

Newzoo: The Specialists in Games Data & Insights

Reports

Trends, Market Sizing, Forecast Data



What are the key metrics and trends, and how will they change in the future?

Global, regional, market key metrics
Market sizing, trends, forecasts

Consumer Insights

Player Demographics & Psychographic Data

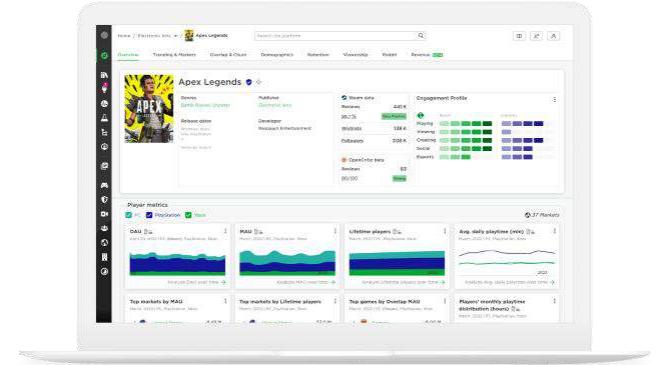


What types of players are playing these games?

75,000 Gamers surveyed worldwide
Motivations, drivers, playing behavior

Newzoo Expert

Games & Market Engagement Data



How does my game benchmark and what titles are my player base playing?

Covering Thousands of Games
PC, Console, Mobile, Viewership, Reddit

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