

AUGMENTED REALITY MARKETING AND ADVERTISING 2018

**Adding Virtual Value to the
Real World**

SEPTEMBER 2018

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AUGMENTED REALITY MARKETING AND ADVERTISING 2018: ADDING VIRTUAL VALUE TO THE REAL WORLD

Though the term “augmented reality” (AR) was coined in 1990, the technology is only now hitting its stride. The breakout success of Pokémon Go in 2016, and innovative ad formats popularized by Snapchat, have piqued the interest of consumers and brands alike. Now, marketers in a variety of industries are experimenting with new applications of AR.

■ How is augmented reality different from virtual reality?

AR is often lumped together with virtual reality (VR), but they are distinct technologies with different use cases. Unlike VR, which requires specialized headsets and places users in virtual worlds, AR involves overlaying information on real-world views and is accessible via everyday mobile devices.

■ What is driving augmented reality development?

The 2017 introduction of Apple’s ARKit and Google’s ARCore software development kits (SDKs) has signaled the tech industry’s confidence in—and future support of—AR experiences. This has spurred brands, developers, startups, agencies, platform companies and publishers to accelerate activity.

■ What devices support augmented reality?

The availability of AR on smartphones is bringing the technology into the mainstream. However, AR will eventually be experienced via glasses or headsets that can potentially provide better user experiences.

■ How soon before augmented reality advertising becomes mainstream?

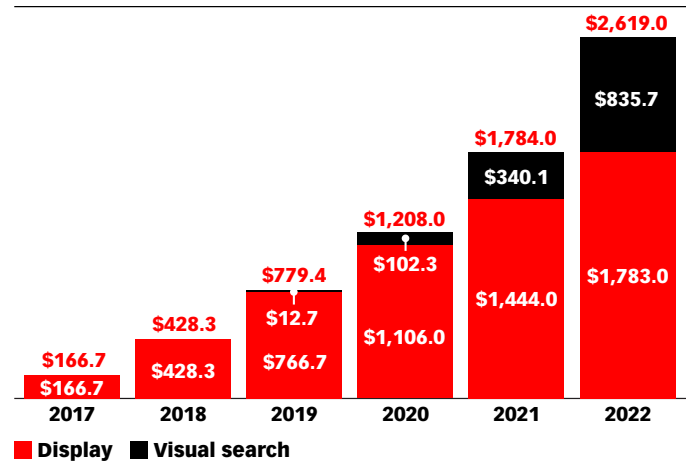
AR advertising will grow quickly over the next several years. It is currently dominated by social media companies—including Snapchat and Facebook—which are aggressively building out their offerings and measurement models. New self-serve options, which are relatively easy to experiment with, are easing AR adoption among both brands and consumers.

■ How can brands get the most from augmented reality?

Brands that want to make their AR experiences “stick” long term will eventually need to pivot from novelty to utility. Winners will use AR to meet their audiences’ specific needs for information, convenience and entertainment.

WHAT’S IN THIS REPORT? This report examines the current state of the augmented reality (AR) market, and AR’s growing use in marketing and advertising.

Global Augmented Reality Ad Revenues Expected to Top \$2 Billion by 2022
millions



Source: ARTillery, “The Camera is the New Search Box: Ads in AR,” Aug 1, 2018

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KEY STAT: Global AR advertising revenues are expected to grow quickly over the next five years. One recent forecast anticipates a jump from \$428 million in 2018 to \$2.6 billion by 2022.

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AR COMES OF AGE

After years of development, AR technology—and its growing list of use cases—is on the brink of mainstream adoption. Several factors are responsible for this surge.

First, the technology has evolved. Doing AR well involves pairing high-powered machine learning, computer vision, image processing and location-mapping technologies with devices that can handle them. “For the first time, the hardware is able to deliver on the promise of AR,” said Ben Gaddis, president of ad agency T3. “When you overlay things, they’re accurate and fast; they’re not jerky and don’t make you want to throw up when you look through your phone.”

There’s also more data available to developers than ever before. For example, location-based, weather and crime-rate data can be streamed and visualized as part of AR projects. “We’re able to take a lot of static information and start to overlay that into real world experiences,” Gaddis said.

Additionally, AR has gotten a big boost from the world’s largest tech companies—and a longer list of startups—working across the global ecosystem. “All of the big players are in, they’re all invested and they’re all putting money into the space,” said Tom Emrich, partner at Super Ventures, an early-stage AR fund.

Finally, consumers are warming to AR, thanks to their smartphones. “We’ve been walking around with a piece of glass that we tap on for about 10 years now, and when the iPhone first came out, it had capabilities for AR, but we didn’t understand it yet,” Emrich said. “Now, people look at their devices and ask what more they can do with them.”

In research published in January 2018, AR-focused research firm ARTillery Intelligence and Thrive Analytics found that mobile AR users represented a variety of demographics, but tended to skew female, millennial and high income.

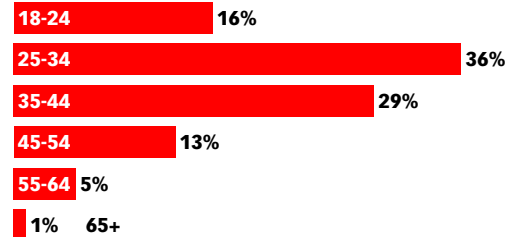
Demographic Profile of US Mobile Augmented Reality Users, Jan 2018

% of total

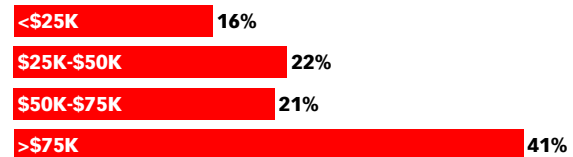
Gender



Age



Household income



Note: n=703

Source: ARTillery, "Intelligence Briefing: Mobile AR Usage & Consumer Attitudes" in partnership with Thrive Analytics, March 15, 2018

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AR, VR and MR: What's the Difference?

As new technologies emerge, there is often an initial period of confusion as pioneers in the space attempt to create terminology they hope will stick. In a May 2017 article titled, “The VR future is here but no one can agree on a name for it,” Scott Stein, senior editor at CNET, attempted to explain the “XR” market, where Google calls the spectrum that spans from real reality to virtual reality “immersive computing,” while Microsoft refers to the same continuum as “mixed reality.” Other terms, including “hybrid reality” and “extended reality” are also common. Here are the definitions we use:

Virtual reality: VR fully immerses a user inside a simulated, nonfixed visual environment (a virtual world) that is separate from the real world. According to the Virtual Reality Society, VR involves “a three-dimensional, computer-generated environment which can be explored and interacted with by a person who becomes part of, or immersed in, the virtual world and can manipulate objects or perform specific tasks.” In its simplest form, VR includes 360-degree images or videos. More sophisticated forms of VR use head-mounted displays or other multi-projected environments to generate interactive images, sounds, smells and other sensations. Examples of VR headsets include the HTC Vive, Oculus Rift and Oculus Go, Google Daydream View, PlayStation VR and Samsung Gear VR. VR is popular for video gaming, sports, education and adult entertainment, but also has applications in other industries and in situations that are too expensive, risky or implausible to experience in real life.

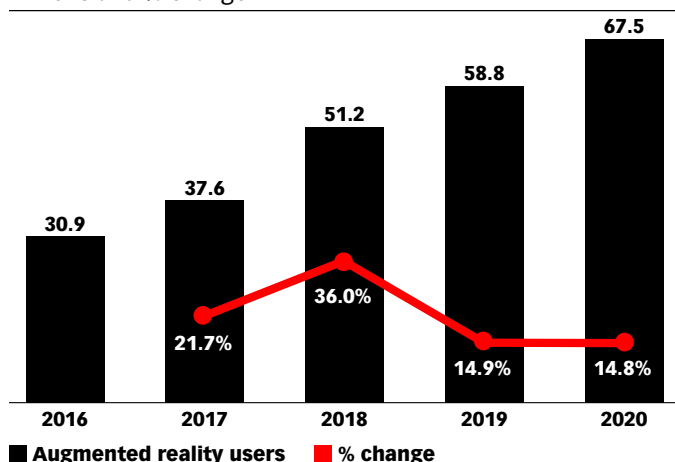
Augmented reality: AR experiences enable users to see and interact with virtual objects and other digital information overlaid onto images or views of the real world. AR experiences can be app-, web-, or headset-/glasses-based or available through head-up displays and other specialized hardware. Currently, app-based AR experiences on smartphones and other mobile devices are most prevalent. Examples of AR activities include using filters and lenses for images and videos; playing games; interacting with objects and 3-D product demos; viewing information related to location; and viewing projections via headsets, smart glasses and head-up displays.

Mixed Reality: Like AR, MR involves superimposing or projecting virtual images onto the physical world. However, experts who distinguish the two say the difference is in MR's ability to let virtual images interact with the real environments onto which they are overlaid. For example, an MR headset user could view one hand in the real world and one hand in a virtual world. Today's MR is virtually all experienced via headset. Microsoft's HoloLens—a head-mounted holographic computer that was made available to developers in 2016—is the most well-known example, though Magic Leap debuted its highly anticipated Magic Leap One MR headset this year.

THE AR BASICS

Our most recent forecasts anticipate that by the end of this year, 51.2 million people in the US, or 15.5% of the population, will use AR—on any type of device—at least monthly. By 2020, that figure will reach 67.5 million. Notably, these forecasts include social media users who apply lenses and filters, but do not include those who only view images created by others.

US Augmented Reality Users, 2016-2020
millions and % change



Note: individuals of any age who experience augmented reality (AR) content at least once per month via any device
Source: eMarketer, March 2018

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Several types of devices can be used to access AR. Each comes with its own benefits and challenges:

■ Smartphones, tablets and handheld devices:

Currently, most AR is consumed via smartphone and tablet apps. The number of apps with AR functionality is growing, and includes AR games (e.g., Pokémon Go, Real Strike and the forthcoming Harry Potter Wizards Unite), social media apps (Snapchat and Facebook), third-party AR platforms and apps (Thyng, Blippar, Zappar, Vertebrae, Augment, HP Reveal), GPS and navigation apps (Sygic, AR City) and first-party branded apps (Ikea, Sephora). Mobile AR experiences can be created with many software development kits (SDKs) and application programming interfaces (APIs). Despite their ubiquity, mobile AR experiences are less sophisticated than those on headsets. It's also tiring to hold mobile devices up for long periods of time to look through the camera window.

■ Head-mounted displays (HMDs) and glasses:

These wearable devices—such as Snapchat Spectacles camera sunglasses, Glass Enterprise Edition (formerly Google Glass), Microsoft HoloLens, Epson Moverio, the Vuzix Blade AR, and the Magic Leap One—provide the highest-quality AR experiences. However, most are expensive, clunky or unusual looking. While the HoloLens and Glass Enterprise Edition have seen experimental uptake in business and industry, most AR and MR wearables are not ready for prime time. However, practitioners believe AR consumption will gradually shift from mobile to wearables, possibly even someday replacing smartphones.

■ Head-up displays:

These transparent displays augment users' real-world views with useful data about what's in front of them. They enable users to keep their heads up and focused forward rather than looking down and refocusing on instruments. Originally developed for military aircraft, head-up displays are also used in commercial aircraft, automobiles and a variety of enterprise applications. They are available to consumers, primarily for navigation, but are not yet widespread.

- **Systems at the point-of-sale:** AR content can be accessed in a variety of locations via kiosks, mirrors and special screens that help users learn about products and services, create different configurations and try things out. These novelty solutions are custom-built and often used in retail settings. For example, Lego introduced AR kiosks that showed in-store shoppers who held a Lego kit in front of a screen how the completed project would look; Nike let customers in several European stores view and change sneaker colors projected onto white shoes; and Uniqlo, Neiman Marcus and Rebecca Minkoff have offered fitting rooms with AR-enabled mirrors that let shoppers learn more about items, view different combinations and instantly place orders.
- **Web-based AR:** Efforts are underway to develop and refine web-based AR, which enables users to load and view AR experiences across different mobile and desktop browsers. A number of companies are working in this area, which has particular appeal because it doesn't require specialized hardware or apps. Blippar, an AR mobile app and ad platform, developed its own Augmented Reality Digital Placement (ARDP) ad unit that uses a mobile or desktop camera to enhance web-based rich media banner ads with AR features. Google is working to develop a "WebXR" standard for immersive reality experiences and introduced Article, a prototype of a 3-D model viewer that lets users share interactive AR assets via desktop and mobile browsers. It also announced it was testing an application programming interface (API) that lets developers create AR experiences viewable through an experimental version of Chrome and ARCore.

MOBILE AR: SACRIFICING SOPHISTICATION FOR SCALE

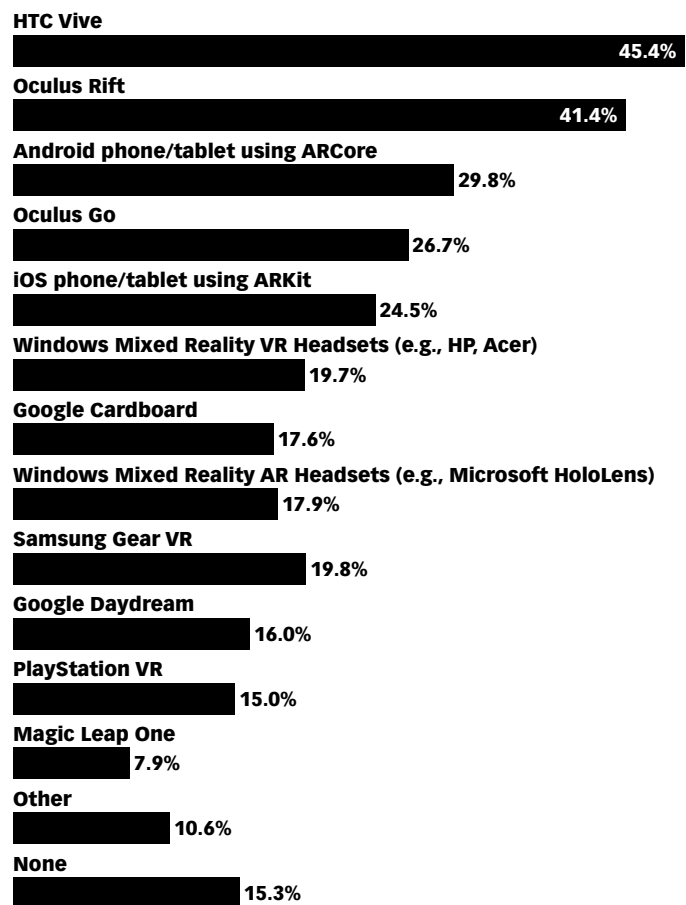
The industry consensus is that mobile-based AR will prevail in the near term. "What makes mobile AR so attractive for brands is that people can access the advanced content through devices they already own," said Jeff Lucas, vice president and head of Americas sales and global teams at Oath.

Research released in March 2018 by international law firm Perkins Coie found that 82% of the developers surveyed either agreed or strongly agreed that they would focus on creating AR applications for smartphones in the year following the survey.

Smartphone-based AR got a huge boost last year with the introduction of two open-development platforms. The rollout of Apple's ARKit in June 2017 and Google's ARCore two months later have signaled that these heavy-hitters are serious about supporting long-term development of the technology. The response from developers has been enthusiastic. A July 2018 survey of AR and VR developers worldwide (also known as XR developers) by UBM Technology Group found that 30% of respondents were already developing AR/VR for Android phones using ARCore, and nearly one-quarter were developing for iOS mobile devices using ARKit.

Software Development Platforms Used by Augmented/Virtual Reality Developers Worldwide, July 2018

% of respondents



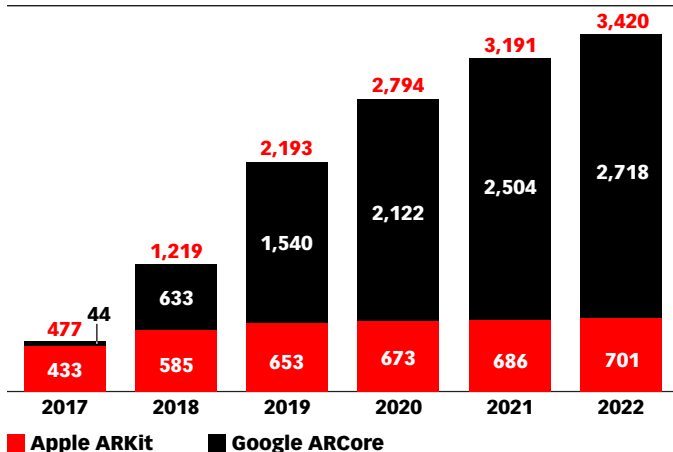
Note: among professionals involved in the development of augmented, virtual and mixed reality
Source: UBM Technology Group, "XRDC AR/VR Innovation Report," Aug 1, 2018

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In a company blog post, Mike Boland, founder and chief analyst at ARtillery Intelligence estimated that as of July 2018, there were already 762 million Android and iOS devices worldwide that were compatible with ARCore and ARKit. He expects this number to grow to 1.2 billion by the end of 2018, to 2.79 billion by 2020 and eventually swell to 3.42 billion by 2022.

Installed Base of Smartphones Worldwide that Are Compatible with Google ARCore and Apple ARKit, 2017-2022
millions



Note: numbers may not add up to total due to rounding
Source: ARtillery as cited in company blog, July 25, 2018

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Despite this activity, mobile AR represents just a fraction of the technology's full potential. However, the AR community seems to have sacrificed sophistication—in the form of software that can run on high-end, expensive HMDs—for “good enough” quality that scales to the mass market. In the longer term, many industry practitioners hope consumers will find AR on mobile devices compelling enough to demand the higher-quality experiences that are possible on wearables.

WEARABLE AR: THE WAVE OF THE FUTURE

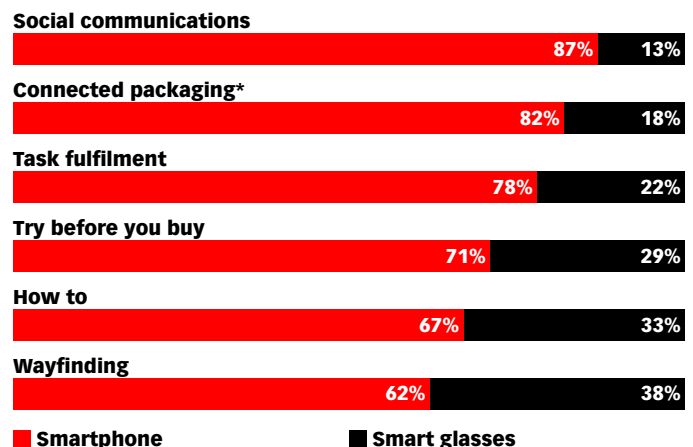
While some AR glasses and HMDs, including Microsoft's HoloLens and Google Glass Enterprise Edition, are gaining traction in business settings, consumer adoption has been slow. Over the next several years, most industry practitioners believe that AR experiences will migrate from mobile devices to HMDs or glasses (and perhaps even contact lenses), especially if major technical challenges—including battery life, continuous network connectivity, a viable app distribution system and cultural acceptability—can be overcome. “Within five years, we'll

have wider adoption of head-mounted displays,” said Keith Soljacich, vice president of experiential technology at Digitas. “It'll be a game changer to take the device out of your hands and put it in front of your eyes.”

“In five years, it will be very common to have AR experiences beyond the phone, said Adam Fingerman, co-founder and chief experience officer of mobile app developer ArcTouch. “We'll start having head-up displays in our cars and in tiny glasses headsets. This will not only help consumers, but will be useful in the enterprise space and in retail as well.”

There's a reason why Google continues to refine Glass and Snap keeps upgrading Spectacles, despite their initial flop: The shift to wearables will eventually happen. A Mindshare Futures survey of UK smartphone owners conducted in April 2018 found that the majority of respondents still preferred smartphones for AR. However, the percentages that would choose smart glasses for such things as wayfinding (38%) and “how to” (33%) were relatively high.

UK Smartphone Users Who Prefer Using Smart Glasses vs. Smartphone for Select Augmented Reality Activities, April 2018
% of respondents



Note: n=1,000 ages 18+; *scanning objects to create an interaction with consumers or deliver more utility, e.g., how-to guides for product usage and assembly instructions
Source: Mindshare Futures, “Layered - The Future of Augmented Reality” in partnership with Zappar, April 25, 2018

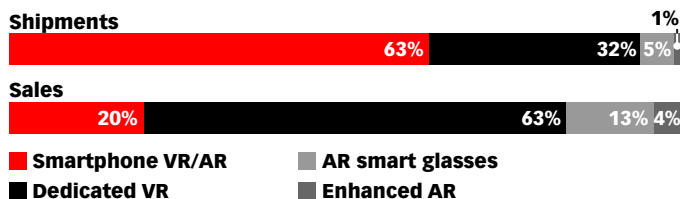
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Market forecasts also suggest a migration to wearables, though there is disagreement on long it will take. In an April 2018 press release, mobile research firm CCS Insights predicted that AR smart glasses would comprise 5% of AR and VR device shipments and 13% of sales by 2022.

Virtual and Augmented Reality Device Shipment and Sales Share Worldwide, by Device Type, 2022

% of total



Note: numbers may not add up to 100% due to rounding
Source: CCS Insight as cited in press release, April 9, 2018

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International Data Corporation (IDC) predicted more aggressive adoption. The firm anticipates that the share of shipments for standalone head-mounted AR displays, which currently make up just 2.2% of total AR devices shipped, will grow to 21.1% by 2022.

Virtual & Augmented Reality Device Shipment Share Worldwide, by Device Type, 2018 & 2022

% of total

	Virtual reality		Augmented reality	
	2018	2022	2018	2022
Tethered head-mounted display	42.5%	21.8%	1.0%	18.4%
Screenless viewer	34.5%	4.6%	5.0%	1.0%
Standalone head-mounted display	14.8%	33.0%	2.2%	21.1%

Note: numbers may not add up to 100% due to rounding
Source: International Data Corporation (IDC), "Worldwide Quarterly AR and VR Headset Tracker" as cited in press release, June 19, 2018

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THE MARKET IS GROWING

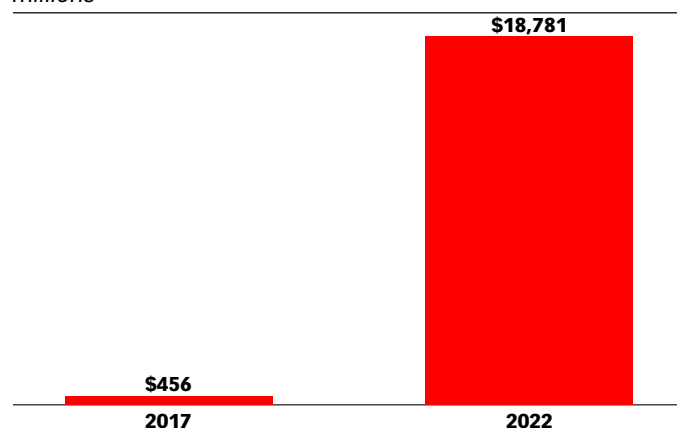
Forecasts for AR market size vary wildly and change often, but all agree it is growing. At this point, it's difficult to pinpoint the trajectory without knowing what future hardware will look like, how much it will cost and how quickly it will be adopted. Several companies have tried:

- MarketsandMarkets estimated that the global AR market (including hardware and software) was worth \$4.21 billion in 2017 and that it would grow to \$11.14 billion in 2018 and to \$60.55 billion by 2023, at a compound annual rate of 40.29% during the six-year forecast period.

- Digi-Capital predicted that AR would see a global installed base of more than 3 billion devices by 2022, with the potential to generate \$85 billion in revenues. The firm anticipates the technology will begin to scale in 2019, and believes there is untapped potential in ecommerce sales, sales of AR hardware, advertising spending, game and non-game apps, enterprise applications and location-based entertainment.
- In 2017, Greenlight Insights anticipated global spending on AR HMDs and AR content will grow from \$3.4 billion in 2019 to \$36.4 billion by 2023. Separately, the firm predicted that global spending on HMDs alone would reach \$12.9 billion by 2020, though the "tipping point for adoption is still several years away." The firm anticipated that the number of head-mounted AR displays would balloon to 30 million by 2023, up from just 2 million in 2019.
- ARtillery's forecasts illustrate the effect that introducing a mass-market wearable could have on AR revenues. It estimated that consumer-focused hardware and software—AR glasses, premium apps for mobile phones and glasses, and in-app purchases—generated \$456 million in revenues in 2017, primarily from in-app purchases. However, the anticipated introduction of AR glasses by Apple in 2021, which it said would "start slow but warm consumers to AR via halo effect," could catalyze the market. At the same time, new apps will continue to emerge, including "the first major social AR killer app." By 2022, revenues will top \$18 billion, still dominated by in-app purchases, but with a higher percentage driven by glasses and glasses-based apps.

Consumer Augmented Reality Revenues Worldwide, 2017 & 2022

millions



Note: includes revenues from hardware, premium games/apps and in-app/game purchases; includes AR for mobile phones and glasses; excludes enterprise AR
Source: ARtillery as cited in company blog, June 19, 2018

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Types of AR: Marker vs. Markerless

Most AR experiences fall into one of two main categories: marker-based and markerless. Most of what's been commercialized over the past few years has been **marker-based**. This involves pointing a device's camera at a specially encoded image, object or printed code to trigger some type of AR functionality. Marker-based executions are good choices for older devices and when brands want to guide users from real-world situations toward deeper digital engagement. QR codes were early examples, but today's markers can be a wide variety of things.

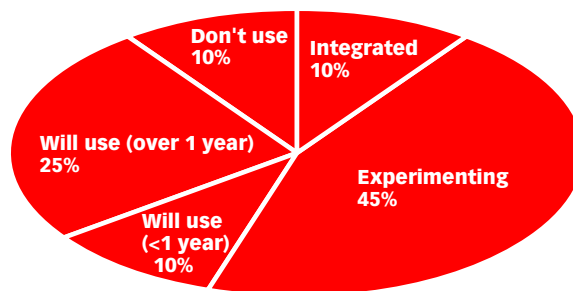
Markerless AR, sometimes known as location-based AR, is more sophisticated. It requires a higher-quality camera and often uses more of a device's sensors, including GPS, gyroscope, accelerometer and compass. It lets users place virtual objects into a camera-screen view of the real world and hold them at fixed points in space without requiring any pre-programmed knowledge of where they are being used. Using SLAM (simultaneous location and mapping) technology, it can construct a map of an environment—including walls, floors and flat surfaces—and keep track of a user's location within it. Markerless AR enables placing and scaling objects and furniture in rooms, viewing items from catalogs in 3-D and using location to trigger AR experiences based on proximity to specific places or events. While markerless AR is not new, it has been supercharged by ARKit and ARCore, which enable faster and more stable object tracking.

MARKETING AND ADVERTISING: A HOTBED OF ACTIVITY

Marketers increasingly use AR to help them connect with their customers. "There are finally enough tools out there, and the cost is low enough to allow these tools to work together," said Jacob Taylor, founder and CEO of Civitas Marketing. A January 2018 survey commissioned by Snap Inc. and conducted by Boston Consulting Group (BCG), found that 10% of the US senior marketing executives at the top 200 US advertisers it polled had already integrated AR into their marketing efforts. Another 45% were experimenting, and 35% of respondents had future plans to use it.

State of Augmented Reality Marketing at Their Company According to US Senior Marketing Executives, Jan 2018

% of respondents



Note: n=55 among the top 200 US advertisers

Source: Boston Consulting Group (BCG), "Augmented Reality: Is the Camera the Next Big Thing in Advertising?" commissioned by Snap, April 13, 2018

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Other research supports continued marketing-related development. UBM Technology Group found that nearly 25% of worldwide XR development work was related to branded experiences, and Perkins Coie found that 20% of XR professionals in the US expected marketing and advertising to be one of the top three areas for AR and VR investment in the 12 months following the survey.

Sectors that Will See the Most Augmented/Virtual Reality Investment According to US AR/VR Professionals, July 2016 & Jan 2018

% of respondents

	July 2016	Jan 2018
Gaming	78%	59%
Education	30%	26%
Healthcare and medical devices	24%	26%
Real estate (e.g., virtual showings, construction)	18%	21%
Marketing and advertising	-	20%
Live events (e.g., sports, concerts)	34%	19%
Military and defense	15%	19%
Movies and TV	40%	18%
Retail (e.g., shopping)	7%	18%
Manufacturing and automotive	-	17%

Note: respondents selected up to 3; in the next 12 months

Source: Perkins Coie, "2018 Augmented and Virtual Reality Survey Report," March 20, 2018

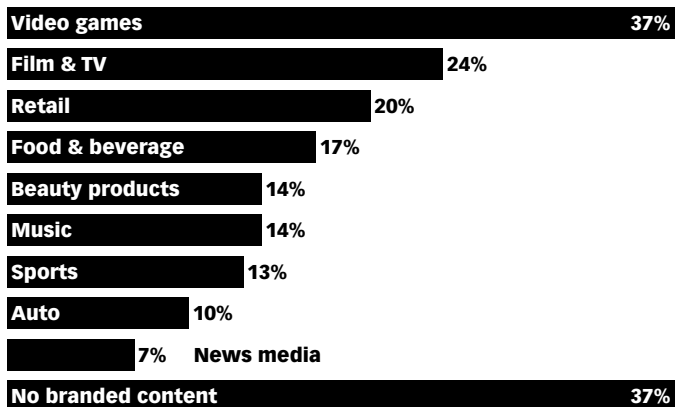
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August 2018 research by mobile AR ad provider Vertebrae found that 63% of the US internet users polled had consumed some type of branded AR. The majority of these experiences were related to video games, entertainment, retail and food and beverage.

What Types of Branded Augmented Reality Content Have US Augmented Reality Users Accessed? Aug 2018

% of respondents



Note: n=126
Source: Vertebrae, Sep 2018
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THE AR ECOSYSTEM: A FRAGMENTED ARRAY OF CHOICES

Today's AR-for-marketing ecosystem is nascent, coming together through a matrix of games, platforms, apps, SDKs and content-creation tools. "There are a lot of players doing a lot of things, so it's kind of confusing to understand how it all fits together," said Ed LaHood, CEO of cloud based AR platform Thyng.

As a result, there is no one way to get started. However, marketers tend to pursue two primary approaches: buying AR advertising or sponsored content and/or creating customized AR branded experiences using first- or third-party apps.

Versatility is one of AR's big draws. "AR is particularly exciting for advertising and marketing because of its ability to meld the physical and digital worlds and give us use cases that can span the funnel," ARTilly's Boland said. "It can enhance upper-funnel awareness and product engagement, but it can also work in the lower funnel to contextualize products at or near the point of purchase."

The following is a sampling of common types of AR experiences currently being created. It's important to note that many of these can be accomplished in different ways (e.g., through ads, third-party apps or branded apps) and are not mutually exclusive. They can also cut across rigid definitions of advertising, marketing and ecommerce tactics and have more than one goal.

Lenses, filters and camera effects. These AR experiences let users personalize selfies and photos as well as videos of real-world objects and scenes by overlaying creative elements. Filters, lenses and camera features from Snapchat and Facebook are the most common. For example, Warner Bros. and Bud Light both used Snapchat's sponsored World Lenses to overlay interactive content on camera views of the real world. The Warner Bros. lens featured a flying car to promote its "Blade Runner 2049" movie, while Bud Light's lens included an animated street vendor selling bottles of beer. In another example, Thyng used ARKit to build more than 75 AR animations of college logos and mascots for teams participating in the 2018 NCAA March Madness basketball tournament. Users could access these assets through the cloud-based Thyng app, place them into real-world scenes and share them with others.

Informational content overlays. This represents the largest category of AR and involves layering educational or promotional content over real-world views of products or scenes. It can include "how to" information, such as instructions or techniques for cooking or assembling items. Through its Mercedes AR app, for example, the German automaker is experimenting with replacing owner's manuals for its vehicles. Launching the app inside a real vehicle triggers the smartphone camera to scan the environment and place interactive numbers over specific components. Tapping these numbers launches information about each feature, including how-to videos and other digitized content. This category also includes scanning objects or packaging to contextualize products. Australian winemaker 19 Crimes developed Living Wine Labels, an app that enables consumers to scan its wine bottle labels featuring vintage photos of convicts sent to the penal colony Down Under. After their pictures are scanned, the criminals "come to life" and tell their stories.

Gamified content. This type of content prompts users to engage by competing, playing games or completing challenges using AR features. For example, Mars Inc.'s M&M's brand worked with AR platform Blippar to turn New York's Times Square into an AR "ARcade" for the launch of its new caramel candy. Participants who downloaded the Blippar mobile app could scan local billboards and access a variety of traditional arcade games. Tanya Berman, vice president of chocolate for Mars Wrigley Confectionary US, said that more than 26,000 consumers participated in the experience, including many who downloaded the app. Those who weren't in New York City could scan candy bags to access the same features. In another example, 7-Eleven partnered with 20th Century Fox to help promote the movie "Deadpool 2." It added an AR experience to its app that featured the popular comic antihero. Tapping the camera icon on the app's home screen while inside a 7-Eleven store triggered Deadpool to appear and guide users through the store. The experience gave users the ability to take a selfie with the character and scan in-store codes, which reward points and unlocked activities.

Product visualization. These applications include overlaying information in a "try before you buy" format that helps users see how different products will look before purchasing them. They include measuring things, moving and placing objects in real-world environments or on faces or bodies and—in some cases—facilitating purchases. The beauty industry has seen a flurry of activity in this area: ModiFace and Meitu are third-party AR apps that let users virtually try on makeup, while beauty-oriented brands Sephora, L'Oreal and CoverGirl have their own. And in the retail space, Amazon recently added "AR View" to its app. The feature lets users overlay thousands of Amazon items, including furniture, devices and lamps onto their existing living space and move and rotate them to get 360-degree camera views. The company said it has seen "millions of items virtually placed in rooms" since AR View launched on Apple devices in November 2017, and noted that "customers are more likely to purchase a product after they view it with AR view." Lacoste, Wayfair, Michael Kors and Ikea are among a growing list of other companies offering product visualization experiences.

Product introduction. This involves creating an AR version of a product before its official introduction to build excitement and anticipation. German automaker BMW worked with Snapchat to create a 3-D, AR version of its X2 crossover and made the vehicle available in an Augmented Reality Lens before its launch. Swiping on an ad for the brand or using a Snapcode opened users' cameras and revealed a gold-colored X2. They could then change several details of the car—including its color—place it in their own physical environment and take a peek inside.

AR portals. Entertainment brands are keen on these AR "doorways" that let users step into 360-degree views and videos of experiences. For example, Netflix worked with Snapchat to create a World Lens to promote the second-season release of its "Stranger Things" series using a Snapcode. The social media platform rolled out a special "secret" lens that transported users to the alternate dimension featured in the popular series. Users could unlock the lens using the AR marker and explore the room and several interactive features. In another example, the NBA's branded AR app features doorways that transport users to 360-degree views of basketball scenes, including pregame and warmup vignettes and game highlights.

AR tours. These overlays help guide a tour of a product, event or location and see additional details. They include touring the inside of a car, an event space or the aisle of a store, or using an animated character overlay that guides the tour. In May 2018, Google announced it had added 100 different AR tours to its Expeditions app, including tours of the human body, outer space and underwater. This category also includes wayfinding, which uses pathways and markers on maps to guide users to desired or relevant information. Apps have been developed for theme parks, airports and retail environments, as well. For example, a Lowe's app lets consumers add items to a shopping list before guiding them through a store to locate them.

AR translation. Brands are exploring more ways to use a device's camera and/or microphone to capture and translate text on printed materials, photos, videos or speech in the real world. It can also be used to help break down and explain complicated ideas or concepts by overlaying 3-D models. Google's Word Lens, which works with more than 30 different languages, uses a smartphone's camera to translate menus, signs and other printed items in real-time.

Augmented live experiences. AR can be used to enhance many types of real-life experiences. For example, artists Eminem and U2 both launched apps that let fans experience augmented content at live concerts and on-demand. And TV network Nickelodeon announced Screens Up, a similar app that lets viewers use their phones to augment TV viewing experiences. After downloading the app, viewers can hold their phone's camera up to the TV when prompted and access additional content and features.

Shoppable AR. This involves giving users direct-response channels to purchase, view or download within AR experiences. Snapchat recently added a "Shop Now" button to its AR Lenses that, depending on the campaign, links to shoppable web pages, long-form videos or app installations. It trialed these features with high-profile brands, including Clairol (to test and purchase hair coloring), adidas (to buy running shoes), STX Entertainment (to watch a movie trailer) and King (to download a game). In the same vein, a Michael Kors campaign on Facebook gave users the ability to try and buy the brand's sunglasses.

Shift From Novelty to Utility

Though many early consumer AR apps are fun and entertaining, there is more long-term potential for those with enduring value. Most practitioners interviewed for this report agree that high-quality experiences that resonate with users are the best bet to attract repeat customers. "There are a lot of experiments right now: Some will stick and some won't," ArcTouch's Fingerman said. "Those likely to survive will be those that are useful, delightful and that create momentum."

"One of the bigger pain points right now is that marketers are trying to take gimmicky experiences that don't make sense for AR and push them into the channel," T3's Gaddis said. "For me to find and download an app, open it up, point it at something, and then just see a poster on a wall, is not really that helpful."

Indeed, a November 2017 multi-country survey by Accenture found that worldwide internet users showed high interest in useful AR/VR applications, such as those that provide information about a place they are visiting (67%) and help them gain new skills or techniques (67%). Visualizing how clothes might fit (61%), viewing 3-D manuals (58%) and shopping (54%), also piqued respondents' interests.

Augmented/Virtual Reality Applications that Interest Internet Users Worldwide, Nov 2017

% of respondents

Learn more about a place they are visiting	67%
Learn new skills or techniques	67%
Visualize how clothes might fit	61%
View 3-D manuals	58%
Shop for household items and furniture	54%
Play games	47%

Source: Accenture, "2018 Accenture Digital Consumer Survey" conducted by Harris Interactive as cited in "Time to Navigate the Super Myway: Giving Consumers Exactly What They're Looking For," Jan 8, 2018

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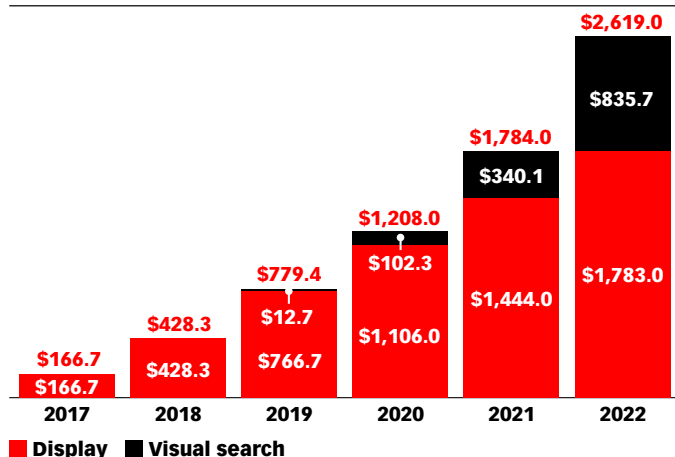
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AR ADVERTISING STARTING TO SHOW RESULTS

Paid advertising represents just a portion of total AR-related marketing and promotional activity, but the ecosystem is rapidly expanding. ARTillry's Boland believes that AR will play a major role in the evolution of digital advertising. Over time, he sees it shaking out into two major formats: AR display and visual search. In ARTillry's most recent forecast of global AR advertising revenues, paid AR ad spending will grow from \$166.7 million in 2017 to more than \$2.6 billion in 2022. AR search (e.g., paid opportunities that will someday be available via Google Lens and/or Bing) will start to pick up in 2020, though display will still comprise the majority of ad spending throughout the forecast period. ARTillry's definition of AR advertising revenues includes money spent on direct, paid AR ad buys and excludes other marketing spending and app development.

Global Augmented Reality Ad Revenues Expected to Top \$2 Billion by 2022

millions



Source: ARTillry, "The Camera is the New Search Box: Ads in AR," Aug 1, 2018

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To hear additional perspectives on AR and advertising spending, listen to eMarketer's July 2018 podcast, ["AR, Meet Ad Spending."](#)

Display Advertising

So far, experiments with AR display ads have yielded higher awareness and engagement than regular display.

For example, Blippar recently tested its new ARDP ad units with Jaguar Land Rover and Unilever's Magnum Singapore ice cream brand. The Land Rover ad launched from a banner and let users sit in the driver's seat of a new car, explore its features in 360 degrees and look out the windows. Magnum Singapore let users pile various toppings onto an ice cream bar, then receive a coupon and directions to a store. In an April 2018 blog post, Chris Bell, Blippar's regional director and commercial head of APAC, said the new units had increased brand engagement by 30% and increased dwell time elevenfold over standard Google rich media ads.

Oath, the Verizon-owned amalgam of what used to be AOL and Yahoo, is testing novel takes on older formats. Working with The Home Depot, it developed a new unit that would launch from a banner ad in its Yahoo Mail app. The ad enabled viewers to interact with and place various holiday decorations on a Christmas tree that could be viewed in their own home. "The ultimate goal [was] driving traffic to [The Home Depot's] website so customers could further explore the range of products

available," Oath's Lucas said. Results were positive: Users spent more than 2 minutes interacting with the AR ad, "10 times more than the benchmark for mobile rich media."

Carolina Arguelles, product marketing manager at Snap Inc., said her company closely studies how AR drives impact in all parts of the marketing funnel and provided an example of some mid- and upper-funnel statistics. "From the hundreds of campaigns that have run, we've seen that, on average, our Lens campaigns drive a 19-point increase in awareness," she said. "It's a really sticky impression. You're spending an average of 10 to 20 seconds with the brand compared with just seeing a mobile banner ad."

There are also indications that AR is preferable to other ad formats. The Vertebrae research found that 78% of the US internet users who had experienced AR would prefer to interact with it as opposed to watching a 30-second video.

Visual Search

Within the next several years, visual search, which ARTillry's Boland describes as a "close cousin of AR," will be widely available from a variety of companies, including Google, Microsoft, Amazon and Pinterest. One example of such a tool, the Google Lens app, uses artificial intelligence (AI) and cloud-based data to display additional information about an object or location that a user is pointing a device at. In September 2018, Google announced it was integrating Lens directly into its search engine and revamping the way image-oriented searches are conducted to make better use of visual information. "As AR becomes more common, your phone will ideally be an 'always-on' lens, like a magnifying glass," T3's Gaddis said. "You'll just point it, and it will always be displaying what you're looking for."

On the same day as Google's announcement, Snap Inc. and Amazon announced a partnership through which Snapchat users can identify products with their device's camera, then buy them via Amazon. These initiatives are significant, because they signal a shift in the way people will find information. "The rise of computer vision, AI and AR has fundamentally changed the purpose of the camera," Arguelles said. "Now you can start using your camera for things like exploration and entertainment, without an intent to even take a picture. People are using the camera as a starting point for context."

To learn more about visual search, see eMarketer's September 2018 report, [Visual Search 2018: New Tools from Pinterest, eBay, Google and Amazon Increase Accuracy, Utility](#).

As this technology evolves, industry watchers believe that Google, Bing, Amazon and others will begin offering paid visual search opportunities that let brands sponsor information about various things the camera identifies. This information would pop up in AR. "I think [Google is] going to have a similar model to what they have now with search; their intent for going into AR is to feed into their main business, and a lot of that is search based," Boland said.

Snapchat and Facebook: Competition Moves Market Forward

Consumers are seeing more AR advertising on the largest social media platforms, thanks to aggressive efforts by Snapchat and Facebook. "The competition is helping the space to evolve," said Lavall Chichester, CMO of marketing agency JumpCrew.

Snapchat, which is working to turn a profit after its initial public offering, is considered the pioneer in AR advertising and has positioned itself as a "camera company." By rolling out geofilters in 2014, free face filters in 2015, and World Lenses and 3-D Bitmoji lenses in 2017, it introduced millions of users—including many in the coveted millennial and Gen Z demographics—to various overlays and 3-D characters, including the infamous dancing hot dog.

In 2016, it began selling custom sponsored characters and lenses, and in 2017 launched Lens Studio to let brands create and share their own 3-D objects that could be placed inside photos and videos on the platform, and see related metrics. In addition to Sponsored Lenses, other AR ad options soon followed: Sponsored Geofilters, On-Demand Geofilters and Snap to Unlock (which uses "Snapcodes" as AR markers to unlock secret content within the app) formats.

Snapchat also has its eye on social commerce. In April 2018, it launched Shoppable AR lenses that let advertisers add "Shop Now" buttons to Sponsored Lenses. These "give brands a new way to leverage our unique scale to drive real and measurable ROI [return on investment], whether that's through sales, downloads, lead gen, or video views," Peter Sellis, Snap's director of revenue product told Business Insider in April 2018.

In August 2018, it announced new AR lenses that respond to a user's voice. For example, saying words like "love," "wow" and "okay" will trigger the lenses to animate. And a month later, it announced a partnership that lets users identify products through visual search and purchase them via Amazon.com.

Facebook has its own collection of AR tools. While it appears to be playing "catch-up" to Snapchat right now, it has a larger user base and more advertising experience and shouldn't be counted out. In 2016, it began testing a variety of new AR camera effects in Facebook, Messenger, Instagram and WhatsApp, and announced in April 2017 that it would offer AR ads on both Facebook and Instagram. The same month, it launched its Camera Effects developer platform, and subsequently introduced Snapchat-like AR face filters on Instagram, World Effect AR tools for Messenger and gave 3-D artists and third-party developers access to AR Studio, a tool within Camera Effects that enables the creation of interactive photo and video effects.

At the 2018 F8 conference in May 2018, Facebook announced it would support third-party AR filters in Messenger, Instagram and Facebook and that it was giving several brands—including Sephora, Nike and Kia—the ability to test the feature in Messenger. It also announced that specific influencers, including Ariana Grande, Kylie Jenner, Vogue and the NBA, would test unique Instagram filters. Most recently, in July 2018, the company revealed that it was working with Michael Kors on AR ads with shoppable features in the Facebook newsfeed.

To learn more about Snapchat's AR advertising initiatives, look for eMarketer's upcoming October 2018 report: [Snapchat and Twitter 2018: Many Challenges, But a Few Things Advertisers Still Like](#).

CLEARING THE HURDLES: WHAT'S NEXT?

AR has the potential to transform digital marketing and advertising, but it's not quite there yet. The technology is still nascent, the ecosystem is fragmented and the full range of possibilities has yet to be realized. Marketers can increase their chances of success by understanding the current challenges.

TECHNICAL CHALLENGES

Because AR is evolving in such a fragmented environment, the "technical burden has been a pain point," Oath's Lucas said. "Currently, there is a lack of standards and tools for AR development and deployment across in-app, mobile web and operating systems. This makes it challenging to scale across the entire mobile ecosystem."

Another issue with AR technology is the lack of object persistence, or the inability for specific objects to stay in fixed positions so they can be saved and shared with others. To address this issue, big tech companies and startups alike—including Google, Apple, Amazon, Blue Vision, 6D.ai, Placenote, Ubiquity6 and Thyng—are working on versions of an “AR Cloud,” a digital, networked repository of spatial images that promises to make AR experiences available on different devices in perpetuity and from anywhere, even after the original sessions end.

“The single biggest opportunity for AR in the next couple years will be the development of the AR Cloud,” Digitas’ Soljacich said. “It’s essentially scanning the real world and turning it into an interactive layer, similar to today’s internet. You’ll be able to walk up to a restaurant and see the menu, the hours and the reviews on your device because the AR Cloud will layer over the top.”

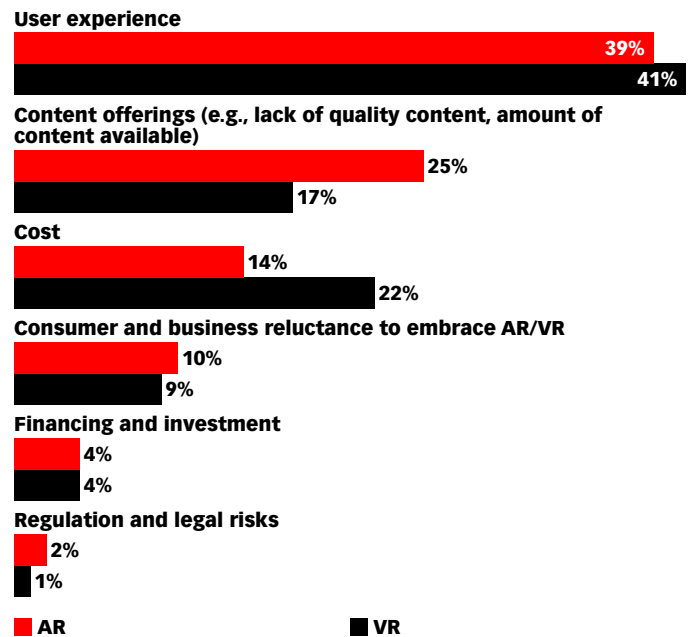
ARtillery’s Boland envisions this AR Cloud as “something with several proprietary networks with different siloes of information that developers can choose to tap into—or not,” he said. “Which information they choose will depend on the purpose of their app. If it’s navigation- or retail-based, they’ll need to decide which AR Cloud provider to use to get the layer of intelligence they need.”

However, Soljacich noted that there are also different organizations and industry groups working toward an open-platform AR Cloud that could be accessible to all and provide the same opportunity that networked internet did in the late 80s and early 90s.

PERFORMANCE AND USER EXPERIENCE

User experience remains one of the primary obstacles to mass-market AR, according to the Perkins Coie research. However, innovations in visual positioning, 3-D scene recreation and other advancements will drive better experiences. “Imagine watching a movie trailer unfold on the street as you walk by, then skipping the ticket line by choosing your seats through a virtual kiosk,” Lucas said.

Primary Obstacle to Mass Adoption of Augmented vs. Virtual Reality Technology According to US Augmented/Virtual Reality Professionals, Jan 2018 % of respondents



Note: numbers may not add up to 100% due to exclusion of “other” responses
Source: Perkins Coie, “2018 Augmented and Virtual Reality Survey Report,” March 20, 2018
237059 www.eMarketer.com

The introduction of 5G networks will also help. While large-scale buildouts are still at least a year away, 5G will be significantly faster and will help the internet of things (IoT), AR and VR run more smoothly.

Increased usage is also likely to spur a new generation of digital natives to demand better experiences with wearables: Holding smartphones up for too long can cause arm fatigue. “One of our biggest challenges is that you have to pull out your phone and look through it,” T3’s Gaddis said. “There’s a lot of onus on the individual user to get into an AR experience vs. if it was just always on.”

CREATING SCALE

Until recently, AR projects have been bogged down by their inability to scale. According to the Snap/BCG study, 42% of US senior marketing executives said that this was among their top-three barriers to increasing AR marketing spending.

Barriers to Increasing Augmented Reality Marketing Spending at Their Company According to US Senior Marketing Executives, Jan 2018

% of respondents

Market maturity

Unable to reach my audience at scale

42%

Lacks track record of results, is too new and experimental

35%

Requires too large an investment

35%

Unable to target the audience I want

4%

Impact and measurement

Impact or ROI is unclear

42%

Impact or ROI clear but low

27%

Currently do not have robust measurement capabilities

27%

Capabilities and capacity

Lack of internal expertise

31%

Lack of awareness

16%

Lack of time or people to manage another platform

8%

Unable to get what I want from agency relationship

8%

Note: n=26 among the top 200 US advertisers who currently use first- or third-party AR solutions; respondents selected their top 3
Source: Boston Consulting Group (BCG), "Augmented Reality: Is the Camera the Next Big Thing in Advertising?" commissioned by Snap, April 13, 2018

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"AR didn't take off for a long time because the business model—and the whole ecosystem—was restrictive," Thyng's LaHood said. "Most marketers spent a lot of money creating single use apps with limited life spans. People would only look at them once."

ARKit and ARCore will greatly improve things. "The inflection point for mass scale kicked off at the beginning of the year with Apple and Google launching native technologies that are widely available to the developer community," Lucas said. "Now, there needs to be a focus on producing content and experiences so mass adoption follows suit."

LaHood and others also see opportunities for non-programmers to create large-scale, ubiquitous and engaging AR. His company helps marketers create experiences using dashboards, upload them to the cloud and make them viewable to anyone who downloads the app. "Marketers can continuously update their campaigns," he said. "Because they're using the cloud, they can put a new thing on their cereal box every day and keep people coming back."

COST AND ROI

Many marketers, under pressure to show ROI, shy away from new and unproven technologies, especially if they are costly or difficult to measure. AR experiences have been both. The BCG survey found that 42% of respondents reported that "unclear impact or ROI" was a top barrier to increasing AR marketing spending.

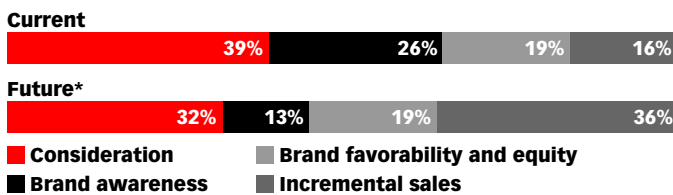
"If you're going to make an AR thing, there's a relatively high content-creation cost compared with other digital tactics," Digitas' Soljacich said. "An AR experience can't compete against a display ad campaign." This, he explained, is why some brands are still sitting on the sidelines. "If they can't prove their ROI, they're not dipping their toes in yet," he said.

In an attempt to solve these problems, some industry companies are developing cost-saving, templated tools that are easier to use. They've also created new formats and metrics for the lower funnel. Snapchat's Shoppable AR lenses are noteworthy examples, according to Jeremy Sigel, global senior vice president of content and innovation at Essence. "To date, the measurement around AR has been almost exclusively focused on brand-oriented metrics" he told Business Insider in April 2018. "By providing a host of new direct-response options, Snap is appealing to a more diverse set of marketers, who will now be able to make more apple-to-apple media comparisons."

"Our focus areas are around deepening engagement solutions for performance advertisers and democratizing AR creation and buying for advertisers," Snap's Arguelles said. This will please marketers, who see future AR efforts contributing more to the bottom line. The January 2018 BCG study found that while US senior marketing executives currently used AR solutions to increase consideration and brand awareness, they eventually wanted them to generate sales.

Current vs. Future* Primary Business Objective of Augmented Reality Marketing According to US Senior Marketing Executives, Jan 2018

% of respondents



*Note: n=26 among the top 200 US advertisers who currently use first- or third-party AR solutions; *in 24 months*
Source: Boston Consulting Group (BCG), "Augmented Reality: Is the Camera the Next Big Thing in Advertising?" commissioned by Snap, April 13, 2018

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Practitioners agree that it will be a matter of time before AR shows results. "We're still in the phase of AR as a shiny object, a brand experience and not necessarily an essential channel for ROI," Soljacich said. "Very few brands are leaning on AR as a revenue driver, but this will change in the next two years with shoppable AR."

"Right now, these experiences may not pay off at the same rate that others would," T3's Gaddis said. "But if you don't get in and start to learn and build capability, you'll be three-quarters behind. At some point soon, you're going to see significant revenue come from AR experiences."

MEASUREMENT

The industry is exploring new measurement tools that will exploit AR's unique features. "Right now, it's like the early days of smartphone ads when legacy metrics were slapped on to mobile campaigns," ARtillery's Boland said. But after a learning curve, he predicts that the industry will use computer vision, biometric signals and other new metrics to gauge brand affinity and engagement.

Oath's Lucas also sees changes. "Today, brands can measure AR activations through number of clicks and time spent," but future metrics will dig deeper into the user experience. "For example, object rotation and movement of the device around an object shows whether a user is interested in seeing the interior of the car vs. the headlights, or if she is walking around to see multiple angles of the chair she just placed in her living room," he said.

Tony Bevilacqua, founder and CEO of Cognitive3D, which specializes in understanding interactions with 3-D objects and in 3-D spaces, said these things are already possible. "We look at how people are engaging with things, like tapping or touching them, and provide a lot of metrics around gaze count, gaze time, cessation time and sequence of engagement," he said. "The metrics for 3-D objects are very different than those for mobile. There's an interactive element beyond the page view or things happening within an application, and there's a lot more data that can be derived by understanding and measuring what's going on within the experience."

PRIVACY AND SECURITY

Privacy and security associated with AR hardware and software are top concerns, especially because the technology involves digital photography and relies on the collection of potentially sensitive data (such as physical behavior data and attention data. It also uses AI via potentially insecure cellular and wireless networks. May 2018 research by RichRelevance found that 35.5% of US internet users said that basic AR apps that provided additional information and recommendations about in-store products were "cool," but a slightly higher percentage (36.0%) found them "creepy."

US Internet Users' Attitudes Toward Select Retail Technologies, May 2018

% of respondents

Robots guide you to specific products within store aisles upon request

48.4% 32.0% 19.6%

Use fingerprint scanning to pay for items and get automatic home delivery, all from the store floor

46.5% 31.2% 22.4%

AR app allows you to view products in a store and then displays associated info and recommendations, including whether you need to replenish what you have at home

35.5% 36.0% 28.5%

Voice assistants within your home (e.g., Amazon Alexa, Google Home) provides personalized product info and suggested products for you and your family

31.7% 41.2% 27.1%

Computer programs (e.g., chatbots) use AI to help you with customer service questions, rather than a real person

27.0% 40.7% 32.3%

Facial recognition technology identifies you as a loyal customer and relays your preferences to the salesperson in-store

24.0% 60.9% 15.1%

Companies understand your shopping habits so well that they are able to use AI/data to choose and order products on your behalf

14.5% 69.4% 16.1%

Clothing includes sensors/tracking devices that allow retailers to track you in exchange for a discount (wearables)

10.4% 75.8% 13.8%

■ Cool ■ Creepy ■ Indifferent

Note: numbers may not add up to 100% due to rounding

Source: RichRelevance, "Creepy or Cool 2018: 4th Annual RichRelevance Study," June 20, 2018

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Though many AR-related future privacy and security issues are still unknown, companies involved with AR marketing are already taking steps to alleviate users' security concerns. According to Perkins Coie, these included limiting the amount of personal information they collect, share and use; strengthening their data security measures; updating their privacy policies; and training employees about cybersecurity.

Q&A: WHAT ADVICE DO YOU HAVE FOR MARKETERS WHO WANT TO GET STARTED WITH AR?

A group of industry experts weighs in with tips for creating and measuring effective AR experiences.

"When developing an AR program, ensure it has an authentic connection to your brand and offers an engaging, memorable moment for your consumers that allows them to experience what they love about your product in an unexpected way." —*Tanya Berman, VP, Chocolate, Mars Wrigley Confectionary US*

"Think native. Don't apply the tactics and measurement from legacy media to AR. Think of the things that AR is good at. It's highly immersive, so think about the different types of fun product visualizations you can do and work backward from there. You'll have a better chance of success if you give AR the chance to do what it does best, rather than slapping it on an existing campaign to try to enhance it." —*Mike Boland, Founder, Chief Analyst, ARtillery Intelligence*

"The opportunity is huge, the developer tools and advertising and marketing platforms are there, and the OEMs are all on board to help merchandise and market these experiences. So the time really is now to start to get an AR experience out there." —*Tom Emrich, Partner, Super Ventures*

"Start with the business goal, then look at what you want to do through the lens of entertainment or utility. Both can build awareness or drive sales very successfully. You don't have to do a big launch, but test what you do and see if it works. Then roll it out from there and adjust as you go. You should also look at whether it makes the most sense to partner with someone or build something from scratch." —*Lavall Chichester, CMO, JumpCrew*

"The old ways of needing to custom develop an AR application if you want to enter the space are changing. Look for some new and novel solutions where you can rapidly create and deploy AR content. There are a variety of interesting new ways to enter the AR space in a matter of days or hours." —*Ed LaHood, CEO, Thyng*

KEY TAKEAWAYS

- AR has a different growth trajectory than VR. Most industry analysts expect **AR's growth to accelerate** and become core to many industry applications.
- More accessible and affordable development platforms are spurring marketers to get started with AR. **More than half of the US's largest marketers have integrated it** or are experimenting with it, and another 25% have plans to try it soon.

- Marketers are taking two primary routes to AR: **buying paid advertising and developing first- and third-party branded experiences**. Projects vary from sponsoring simple information overlays to more complex executions that allow users to “try on” and purchase items. A growing list of resources is available to help create different experiences.
- Snapchat and Facebook are improving their AR advertising platforms and metrics to capture more advertising dollars. **This competition will propel the market forward** and will result in new AR innovations.
- **AR marketing is fraught with challenges** including technical problems, poor user experiences, lack of scale, high cost, immature measurement and privacy and security concerns. The industry is working to overcome them.

EMARKETER INTERVIEWS

Marketers’ Roundtable: Why It’s Now or Never for Augmented Reality



Tony Bevilacqua
Founder, CEO
Cognitive3D

Interview conducted on August 9, 2018



Tom Emrich
Partner
Super Ventures

Interview conducted on August 8, 2018



Adam Fingerman
Co-Founder, Chief Experience Officer
ArcTouch

Interview conducted on August 1, 2018



Ben Gaddis
President
T3

Interview conducted on August 9, 2018



Jeff Lucas
Vice President, Head, Americas Sales and Global Teams
Oath

Interview conducted on August 1, 2018



Keith Soljacich
Vice President, Experiential Technology
Digitas

Interview conducted on August 1, 2018



Jacob Taylor
Founder, CEO
Civitas Marketing

Interview conducted on August 2, 2018

New Tools Help Brands Conquer Tricky Augmented Reality Landscape



Ed LaHood
CEO
Thyng

Interview conducted on August 8, 2018



Carolina Arguelles
Product Marketing Manager
Snap Inc.

Interview conducted on June 4, 2018



Tanya Berman
Vice President of Chocolate
Mars Wrigley Confectionary US

Interview conducted on August 17, 2018



Mike Boland
Founder, Chief Analyst
ARtillery Intelligence

Interview conducted on August 9, 2018



Lavall Chichester
CMO
JumpCrew

Interview conducted on August 1, 2018

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