ARtilery ntellegence

Mobile AR Global Revenue Forecast, 2020-2025

An ARtillery Intelligence Briefing



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Introduction

Like many research & intelligence firms, one of the things that ARtillery Intelligence does is market sizing. A few times per year, we go into isolation and bury ourselves deep in financial modeling. This takes the insights and observations we accumulate throughout the year and synthesizes them into hard numbers for the current and future spatial computing industry (methodology details <u>here</u>).

In covering spatial computing for six years, our sector knowledge base and perspective continue to expand. That occurs on several levels, including insight and access to insider information, all of which informs our forecast models and inputs. Further reinforcing that knowledge position, the daily rigors of editorial production at our sister publication *AR Insider* emboldens our market insights.

Beyond knowledge position and market-sizing process, the focus of these forecasts likewise continues to evolve. Our first market forecast five years ago examined AR, VR and all their revenue subsegments. Last year, we began to produce separate forecasts for AR and VR. Though they share technical underpinnings, their nuanced market dynamics deserve deeper and focused treatment.

We continue to double down on that segmentation by focusing this report on *mobile AR* specifically. Given its leading revenue position among AR segments, and its hardware installed base, it compels its own focused analysis. This allows us to go deeper on key revenue sources like consumer, corporate & industrial, advertising and commerce. We'll do the same later this year for head-worn AR.

So what did we find out? Our outlook continues to be best characterized as *cautiously optimistic*, especially when compared to several large research firms that turn attention to AR occasionally to publish eyepopping revenue estimates in the hundreds of billions of dollars. By comparison, we're comfortably and confidently in the tens-of-billions range for aggregate mobile AR spend in outer years of this financial outlook.

The burning questions: How is mobile AR pacing? Which subsectors are most opportune? And how is AR primed for the post-Covid era? We answer these questions through numbers & narrative in this slide-based report. The goal, as always, is to empower you with a knowledge position.



What's Included in Mobile AR Revenues?

This report devises revenue estimates and forecasting for mobile AR and its subcategories. These include consumer spending (e.g., in-app-purchases); and enterprise spending (e.g., industrial visualization, advertising & commerce enablement). Key inclusions and exclusions exist throughout these categories.

For example, we track the transaction value of physical goods that are visualized and purchased through AR interfaces, such as cosmetics and shoes. However, we do not include these transactions as *AR revenue*. Software that enables such AR commerce is conversely counted as *AR revenue*. See more examples below.

Throughout this report, all revenue figures correlate to the full-year (end-of-year) total of the identified year.

Included

Consumer AR Digital Goods: e.g., in-app purchases Corporate & Industrial AR: e.g., software for mobile ARassisted assembly, maintenance and tech support Content & Ad Creation software: e.g., developer platforms Paid Ad Placement: e.g., Snapchat paid lens campaigns AR Enablement: e.g., Product visualization software, AR compression & streaming tech, 3D asset creation software.

Not Included

Physical Goods: transaction value of goods bought through AR interfaces (e.g., footwear, furniture).* Smartphone Sales: e.g., iPhone to run ARkit apps Network Data: e.g., Telco-delivered data usage for AR Professional Services: e.g., Enterprise AR consulting App & Advertising Creation Overhead: e.g., Developer salaries, agency fees



*We track these revenues (see breakdown later in this report) but do not count them towards aggregate AR spending..

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Key Takeaways



Key Takeaways Global Mobile AR Revenue

Global mobile AR revenue will grow from an estimated U.S. \$6.87 billion in 2020 to U.S. \$26.05 billion in 2025, a 30.5 percent compound annual growth rate. This sum consists of mobile AR consumer and enterprise spending and their revenue subsegments. Enterprise productivity is the leading revenue category in 2021 (\$3.12 billion), followed by AR ad placement (\$1.98 billion), and consumer in-app purchases (\$1.89 billion). Paid ad placement will be the leading mobile AR revenue category by 2025. Some of these subcategories worth noting include enterprise AR productivity, media & content creation, and commerce enablement, which collectively represent AR as a Service (ARaaS). These platforms enable companies to build AR for internal productivity (B2B), or for consumer-facing experiences (B2B2C). These "picks & shovels" will represent a large opportunity to meet the demand for democratized AR creation and accelerated time to market. As is the case across the global economy, mobile AR subsectors have been impacted unevenly in the Covid era. Given that software and digital products fared well in global lockdowns, the impact on mobile AR has been mostly positive. For example, quarantine-friendly consumer AR like product visualization has trended up in 2020; and social distancing compels enterprise remote-AR support. These factors will cause near-term adoption inflections while exposing the technology, which in turn supports its longer-term sustained adoption.



Key Takeaways Mobile AR Devices

The large installed base of smartphones lays the groundwork for mobile AR's opportunity. More specifically, AR-enabled mobile devices continue to grow in number as the smartphone replacement cycle phases them into the mobile base. This total has traditionally been cited as one monolithic figure (e.g., "one billion"). This framing is no longer relevant because the landscape of AR-enabled devices is increasingly fragmented by several platforms. The greatest AR compatibility is currently estimated for web AR (3.06 billion units), followed by Facebook's Spark AR (1.6 billion) and Apple's ARkit (1.3 billion). TikTok is the latest entrant with promising reach but underdeveloped AR. But more important than compatible AR mobile devices is the quantity of *active users*. Adding up each platform's users is misleading due to multi-platform users, so we've de-duplicated that total to calculate global AR active users. That de-duplicated sum is estimated to be 802 million by the end of 2021, growing to 1.67 billion by year-end 2025. Visual search leads today in active use, given that we cluster Google Lens, Pinterest Lens and Snap Scan under this heading. This is followed by Snapchat and Facebook lenses. Facebook's growth is owed to its use across properties including News Feed, Messenger, and Instagram. The latter will grow rapidly. Snapchat has the highest ratio of AR users per compatible device. Web AR has the lowest ratio, but the greatest growth potential due to broader compatibility.



Key Takeaways Consumer Spending

Consumer mobile AR spending includes any mobile AR software and experiences that consumers pay for (excluding mobile devices themselves). Consumer Mobile AR spending is subdivided by digital and physical goods. Digital goods involve software to obtain or enhance a digital experience, including inapp purchases (e.g., Pokémon Go) and premium apps. These were estimated at U.S. \$1.38 billion in 2020, growing to U.S. \$4.64 billion in 2025, a 27.5 percent compound annual growth rate. This is led by Niantic and in-app purchases (IAP) – a payment model that benefits from comfort and acclimation from its prevalence in mobile gaming. Mobile AR IAP spending will be driven by Pokémon Go's continued success post-pandemic, and the proliferation of Niantic's Lightship Platform that brings IAP-producing geolocated AR gaming to other titles. Meanwhile, physical goods include consumer product purchases that are informed or influenced through AR product visualization. These will grow from an estimated U.S. \$7.7 billion in 2020 to U.S. \$57.8 billion by 2025. These values are calculated for perspective but don't count towards AR revenue, as they don't represent the sale of AR itself. Instead, we count spending on enablement software that powers AR-guided commerce experiences. In terms of formats, AR-influenced physical-goods spending is driven by social lenses, visual search, and web AR. Visual search's growth will be driven by its high-intent use case (just like web search) to actively seek product information.



Key Takeaways Enterprise Spending: Corporate & Industrial Productivity

Mobile AR enterprise productivity is defined by software that enterprises deploy to gain operational efficiencies and effectiveness. This includes visualization software that provides line-of-sight or liveguided support for assembly, maintenance or tech support. It also includes software that helps enterprises (or software vendors that serve them) author AR experiences that fit the above description. Spending will grow from an estimated U.S. \$2.51 billion in 2020 to U.S. \$5.99 billion in 2025, a 19 percent compound annual growth rate. Growth slows in later years as the field transitions to head-worn AR (note: these values and others in this report apply only to smartphone-based AR). Enterprise mobile AR's growth potential stems from its broad applicability. It can include everything from assembly to heavy-equipment maintenance to IT support. These functions cut across several industries and verticals, causing a sizeable addressable market. Growth so far has been slowed by typical adoption barriers and organizational inertia, but case studies continue to validate strong ROI, indicating that cultural resistance will eventually give way. Meanwhile, another adoption accelerant looms: Like many areas of mobile AR, Covid-era constraints have compelled enterprise AR productivity, as remote AR support aligns with social distancing. This will boost short-term traction, while exposing the technology and accelerating its longer-term sustained adoption into a "hybrid" era of work in some verticals.



Key Takeaways Enterprise Spending: AR Media & Marketing Enablement

Mobile AR media & marketing enablement will grow from an estimated U.S. \$1.24 billion in 2020 to U.S. \$5.84 billion in 2025, a 36.4 percent compound annual growth rate. This includes software that enables enterprises or developers to create consumer-facing AR experiences such as games, apps, ads, and entertainment. Buyers of this technology (software license or SaaS) include enterprise end users (B2B) or companies that develop AR for *their* customers and constituents (B2B2C). The latter will be an opportune AR subsector, as it represents the proverbial "picks and shovels" that democratize advanced AR experience creation. These functions will grow in demand as AR itself does, as they can lower barriers to creation and accelerate time to market. This category includes a broad range of functions including creation platforms such as Unity, as well as compression and distribution software such as Mawari and VNTANA. As for vertical areas of spending, it's fairly even across media, ad creation* and gaming. Ad creation leads these categories slightly, due to brand marketer AR adoption, and a strong business case with demonstrable ROI. Spending on mobile AR media & marketing enablement is also driven by, and correlated to, the growing addressable market of AR developers and creatives, which will reach an estimated 4.16 million by 2025. AR creatives include a large global base of creative pros that could convert to AR, given low-friction tools such as Adobe Aero and Snap's Lens Studio.



*Spending on AR ad *creation* software is separate from – but related to – spending on AR ad *placement* (see next slide)

Key Takeaways Enterprise Spending: Mobile AR Ad Placement

Mobile AR ad placement will grow from an estimated U.S. \$1.36 billion in 2020 to U.S. \$6.68 billion in 2025, a 37.4 percent compound annual growth rate. This includes AR lens or visual search paid media placement and excludes other campaign costs such as ad creation software*, agency fees or selfdistributed lens marketing (e.g., brand apps). Growth is driven by advertiser interest in immersive product demonstrations. This not only resonates with advertisers' creative sensibilities but shows a strong business case through high performing ads.** In terms of formats, AR lenses lead today, including selfie filters from Snapchat, Instagram and others. Among social AR lens players today, Snapchat has the revenue lead due to greater levels of lens engagement and monetization per user. Snapchat. Facebook will catch up and surpass Snapchat by 2025 given a multi-app play that includes Instagram. TikTok is the wild card, with rapidly growing usage but underdeveloped AR. Visual search will gain ground in later years, driven by a utilitarian and frequent use case that's naturally monetizable (like web search). Mobile AR advertising has experienced mixed results from Covid-era dynamics: AR lenses are trending up but advertising is a famously recession-prone spending category. Mobile AR advertising will ultimately benefit as economic downturns cause advertisers to rethink and redeploy budget to more effective and cost-efficient formats, thus exposing AR ad placement to a larger demand base.



*Spending on AR ad *placement* is separate from – but related to – spending on AR ad *creation software* (see previous slide) **See ARtillery Intelligence report: AR Advertising Deep Dive, Part II: Case Studies.

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Revenue Overview



Mobile AR Revenue Overview

Global mobile AR revenue will grow from U.S. \$6.87 billion in 2020 to U.S. \$26.05 billion in 2025, a 30.5 percent compound annual growth rate (CAGR).

This sum consists of mobile AR consumer and enterprise spending.
 Consumer spending includes digital goods, consisting primarily of in-app purchases and premium app purchases.
 Enterprise spending includes mobile AR software that businesses and developers pay for, including AR-guided enterprise productivity, AR ad placement, AR media & content production, and commerce enablement.

Enterprise productivity is the leading AR revenue category in 2021 (\$3.12B), followed by ad placement (\$1.98B) and consumer in-app purchases (\$1.89B).
 Ad placement will be the leading mobile AR revenue category by 2025.
 Enterprise productivity spend will slow as it transitions to AR headsets.



Mobile AR Revenue Overview (cont'd)

Enterprise AR productivity, media & content creation, and commerce enablement collectively represent AR as a Service (ARaaS).
 These platforms enable companies to build AR for internal productivity (B2B) or for consumer-facing experiences (B2B2C).
 These "picks & shovels" will represent a large opportunity to meet the demand for democratized AR creation and accelerated time to market.

As is the case across the global economy, mobile AR subsectors have been impacted unevenly in the Covid era.
 Given that software and digital products fared well in global lockdowns, the impact on mobile AR has and will continue to be mostly positive.
 For example, quarantine-friendly AR like product visualization inflected in 2020; and social distancing compels enterprise remote-AR support.







* Includes transaction value of digital goods (e.g., Pokémon Go in-app-purchases), not physical goods purchased using AR visualization **Includes software that enables AR-influenced physical-goods purchases, not the transaction value of goods themselves.

U.S. \$Millions Consumer & Enterprise Mobile AR Revenue Estimates, by Source

	Enterprise Productivity	Paid Ad Placement	Media & Marketing Enablement	Consumer Digital Spending*	Commerce Enablement**	Total
2020	\$2,511	\$1,362	\$1,235	\$1,378	\$387	\$6,873
2021	\$3,117	\$1,978	\$1,897	\$1,928	\$607	\$9,528
2022	\$3,771	\$2,862	\$2,758	\$2,570	\$890	\$12,851
2023	\$4,582	\$3,917	\$3,527	\$3,440	\$1,370	\$16,835
2024	\$5,356	\$5,218	\$4,557	\$4,198	\$1,999	\$21,329
2025	\$5,993	\$6,681	\$5,842	\$4,640	\$2,891	\$26,048



* Includes transaction value of digital goods (e.g., Pokémon Go in-app-purchases), not physical goods purchased using AR visualization **Includes software that enables AR-influenced physical-goods purchases, not the transaction value of goods themselves.

The Spatial Spectrum How Does Mobile AR Stack Up to Other XR Sectors?





*See ARtillery Intelligence's separate dedicated forecasts for VR and head-worn AR, respectively.

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Mobile AR Devices



Mobile AR Device Outlook

A large installed base of global smartphones lays the groundwork for mobile AR's opportunity.

More specifically, AR-enabled mobile devices continue to grow in number as the smartphone replacement cycle phases them into the mobile base.

This universe of AR-ready mobile devices has traditionally been cited as one monolithic figure (e.g., "one billion"), referring to ARkit and ARCore.
 This framing is no longer relevant nor sufficient because the landscape of AR-enabled devices is increasingly fragmented by several platforms.

The greatest AR compatibility is currently held by Web AR (3.06 billion units), followed by Facebook's Spark AR (1.6 billion) and Apple's ARkit (1.3 billion).
 TikTok is the latest entrant with promising reach but underdeveloped AR.



Mobile AR Device Outlook (contd')

More important than compatible AR mobile devices is active users.
 Adding up each platform's users is misleading due to multi-platform users, so we've de-duplicated that total to calculate global AR active users.
 That de-duplicated sum is estimated to be 802 million by the end of 2021, growing to 1.67 billion by year-end 2025.*

Visual search collectively has the most active users, followed by Snapchat.
 Visual search's lead is due to our aggregation of several platforms including Google Lens, Pinterest Lens and Snap Scan.
 Facebook's growth is likewise owed to AR use across properties, including News Feed, Messenger and Instagram. The latter could grow rapidly.

Snapchat has the highest ratio of AR users within the platform's reach.
Early-stage web AR has the lowest ratio, but greatest growth potential.





Mobile AR Global Penetration 2021 AR-Compatible Devices & Active Users, Across Platforms* Millions of Units



Google, Pinterest & Snap (de-duped) * Includes Instagram & Messenger



- ARkit (Devices)**
- Total AR Active (de-duped)
- ARkit (Active)**

TikTok (Devices)
TikTok (Devices)
Visual Search (Active)***

- TikTok AR (Active)
- Facebook AR (Devices
 ARCore (Devices)
 Snap Lenses (Active)
 ARCore (Active)*
- Visual Search (Devices)
 Snap Lenses (Devices)
 Facebook AR (Active)****
 Web AR (Active)

Mobile AR Global Penetration AR-Compatible Devices Across Platforms*

Millions of Units

	Smartphones (of any type)	Web AR (Devices)	Facebook AR (Devices)	Visual Search (Devices)	ARkit (Devices)**	TikTok (Devices)	ARCore (Devices)	Snap Lenses (Devices)
2020	3,460	3,036	1,587	1,571	1,185	950	633	490
2021	3,489	3,062	1,625	1,609	1,250	1,050	891	515
2022	3,519	3,099	1,634	1,618	1,311	1,150	1,148	535
2023	3,545	3,132	1,660	1,643	1,356	1,225	1,533	550
2024	3,567	3,161	1,670	1,653	1,383	1,300	1,920	560
2025	3,585	3,186	1,710	1,693	1,406	1,350	2,052	570



*Excludes platforms endemic to China. **Includes iPad

Mobile AR Global Penetration AR-Active Users Across Platforms*

Millions of Units

	Total AR Active (de-duped)	Visual Search (Active)***	Snap Lenses (Active)	Facebook AR (Active)****	ARkit (Active)**	TikTok AR (Active)	ARCore (Active)*	Web AR (Active)
2020	629	293	294	182	147	143	122	56
2021	802	403	309	233	192	179	182	93
2022	990	497	321	288	238	219	257	149
2023	1,236	652	330	347	285	257	371	229
2024	1,462	835	336	404	309	299	484	284
2025	1,668	1,045	342	463	331	338	536	350



*Excludes platforms endemic to China.

**Includes iPad

***Google, Pinterest & Snap (de-duped)

**** Includes Instagram & Messenger



*Includes iPad

telligence

**Growth slows in later years as platform coverage reaches the upper limit of global smartphones

Mobile AR Global Penetration ARkit* & ARCore Estimated Penetration by Region**

Millions of Units

	Asia	North America	Europe	South America	MEA	Total
2020	818	454	418	73	55	1,818
2021	963	556	471	86	64	2,140
2022	1,106	615	565	98	74	2,459
2023	1,300	722	665	116	87	2,889
2024	1,486	826	760	132	99	3,303
2025	1,556	865	795	138	104	3,458



*Includes iPad

**Growth slows in later years as platform coverage reaches the upper limit of global smartphones



ARtillery Intelligence

*Excludes platforms endemic to China.

Mobile AR Estimated Active Users by Region*

Millions of Units

	Asia	North America	Europe	South America	MEA	Total
2020	283	157	145	25	19	629
2021	361	201	184	32	24	802
2022	446	248	228	40	30	990
2023	556	309	284	49	37	1,236
2024	658	365	336	58	44	1,462
2025	750	417	384	67	50	1,668



*Excludes platforms endemic to China.

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Consumer Spending



Consumer Mobile AR Spending

Consumer mobile spending includes any mobile AR software and experiences that consumers pay for (excluding mobile devices themselves).

Consumer Mobile AR spending is subdivided by digital and physical goods.
 Digital goods include software to obtain or enhance a digital experience, including in-app purchases (e.g., Pokémon Go) and premium apps.
 Physical goods include consumer product purchases that are informed and influenced through AR (3D product visualization).

Both are evaluated in this section but only digital goods count as AR revenue.
 AR-assisted physical goods purchases inflate AR's value if one were to count a product's transaction value (e.g., couches, cars) as AR revenue.
 We instead attribute AR's proportionate role in the value chain by estimating spending levels on AR commerce-enablement software.



Consumer Spending Digital Goods

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Mobile AR: Consumer Digital Goods

Mobile AR digital goods include software purchases to obtain or enhance an AR experience – consisting of in-app purchases (IAP) and premium apps.
 Revenue will grow from \$1.38 billion in 2020 to \$4.64 billion by 2025.

IAP has a commanding share of this total with \$1.36 billion in 2020.
 IAP's dominance is due to low friction, as well as consumer acclimation and comfort from the model's prevalence in mobile gaming.
 AR is also too early and unproven to get consumers to pay upfront for premium apps. IAP eases them in with less upfront commitment/cost.*

Within IAP, the vast majority of revenue is attributed to Pokémon Go, which has derived an estimated \$5.1 billion in lifetime revenue from IAP.
 Pokémon Go was resilient during Covid lockdowns, while Niantic's Lightship Platform will extend the IAP revenue opportunity to other titles.



*This is validated in ARtillery Intelligence's consumer survey report: AR Usage & Consumer Attitudes, Wave IV



*Includes native app downloads on iOS and Android.

Consumer Mobile AR App Download* Estimates, by Category

Millions of Units

	Social	Games	Shopping & Commerce	Utilities	Educational	Other	Total
2020	410	319	91	46	27	18	910
2021	563	438	125	63	38	25	1,252
2022	796	619	177	88	53	35	1,769
2023	1,045	813	232	116	70	46	2,322
2024	1,449	1,127	322	161	97	64	3,220
2025	1,875	1,458	417	208	125	83	4,166



Consumer Spending Estimates on Mobile AR Digital Goods*





* Includes transaction value of digital goods (e.g., Pokémon Go in-app-purchases), not physical goods purchased using AR visualization (see next section).
Pokémon Go Revenue Estimated Worldwide Player Spending*

U.S. \$Millions





*Source: Sensor Tower estimates and ARtillery Intelligence calculations

**Extrapolated full-year total based on ARtillery Intelligence run-rate calculation

Consumer Mobile AR Spending Estimates on Digital Goods, by Region*

U.S. \$Millions





*Includes transaction value of digital goods (e.g., Pokémon Go in-app-purchases), not physical goods purchased using AR visualization (see next section). *Excludes platforms endemic to China.

Consumer Mobile AR Spending Estimates on Digital Goods, by Region*

U.S. \$Millions

	Asia	North America	Europe	South America	MEA	Total
2020	\$620	\$345	\$317	\$55	\$41	\$1,378
2021	\$868	\$482	\$443	\$77	\$58	\$1,928
2022	\$1,156	\$642	\$591	\$103	\$77	\$2,570
2023	\$1,548	\$860	\$791	\$138	\$103	\$3,440
2024	\$1,889	\$1,050	\$966	\$168	\$126	\$4,198
2025	\$2,088	\$1,160	\$1,067	\$186	\$139	\$4,640



*Includes transaction value of digital goods (e.g., Pokémon Go in-app-purchases), not physical goods purchased using AR visualization (see next section). *Excludes platforms endemic to China.

Consumer Spending Physical Goods

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Mobile AR: Consumer Physical Goods

AR-assisted purchases of physical goods will grow from \$7.7 billion in 2020 to \$57.8 billion in 2025 – one of the fastest growing segments in this forecast.
 Steep growth is due to its small starting base and rapid expansion that's driven by cultural acclimation to AR visualization in the shopping flow.
 To reiterate, these revenues are tracked here for perspective, but aren't counted towards AR revenue totals (see inclusions & exclusions).

AR-assisted physical goods purchases include both eCommerce and physical retail purchases.
 AR eCommerce ends in an online order for shipped merchandise.
 AR retail commerce happens through retailers' in-store AR activations.
 Offline spending normally outnumbers eCommerce 9-1. But this is flipped in AR, where product visualization adds more value to remote purchases.



Mobile AR: Consumer Physical Goods

Among mobile AR platforms, social lenses drive the most commerce today, followed by visual search and AR visualization apps.
 Web AR will grow over time due to lower friction to launch AR experiences; and the ability to run campaigns through web-compatible channels.
 Among product categories, cosmetics leads AR commerce followed by clothing, jewelry & watches, furniture and home appliances.

AR-assisted commerce was accelerated by Covid-era lockdowns, when product visualization brought in-person benefits to eCommerce transactions.
 This factor resonated with shelter-in-place consumers, as well as brands and retailers motivated to reconcile physical-retail revenue declines.
 This forced adoption in the Covid era has exposed the technology which will drive its sustained adoption post-pandemic.



AR-Influenced Commerce Estimated Spending on Physical Goods, Influenced by Mobile AR* U.S. \$Millions

\$70,000	AR-influenced transaction acclimation to AR visual	on volume starts with a sr lization in the shopping flo	mall base and expands qui w (retail & e-commerce).	ickly due to cultural		
\$60,000 - \$50.000 -	These figures represen purchases. They do no experiences (see next s	it transaction value of mol t include AR-enabling tecl slide).	bile AR-influenced product n to create shopping			\$57 830
\$40,000 -	These figures aren't co they're <i>AR-influenced</i> p purchase of <i>AR itself</i>	unted towards AR revenu physical goods purchases	e totals, as not the			401,000
\$30,000 -					\$39,980	
\$20,000 -				\$27,402		
\$10,000 -	\$7,732	\$12,144	\$17,798			
\$0 -	2020	2021	2022	2023	2024	2025



*Includes smartphone and tablet-based AR product visualization that results in the purchase of physical goods. *Includes transaction value of goods purchased, not AR technology to enable shopping experiences. *These figures are not counted towards "AR Revenue" as they don't represent the sale of AR itself.

AR COMMERCE Revenue U.S. \$Millions Mobile AR-Influenced Consumer Spending* & Enabling Tech Revenue





*Includes smartphone and tablet-based AR product visualization that results in the purchase of physical goods. *Does not include AR digital goods (e.g., Pokémon Go in-app-purchases), which are examined in the previous section.





*Includes smartphone and tablet-based AR product visualization that results in the purchase of physical goods. *Includes transaction value of goods purchased, not AR technology to develop shopping experiences. *These figures are not counted towards "AR Revenue" as they don't represent the sale of AR itself.

AR-Influenced Commerce Estimated Spending on Physical Goods, Influenced by Mobile AR*

U.S. \$Millions

	Social Lenses	Visual Search	Web AR	AR Visualization Apps	In-Game	Total
2020	\$5,341	\$1,389	\$402	\$549	\$50	\$7,732
2021	\$7,615	\$2,698	\$769	\$989	\$73	\$12,144
2022	\$9,650	\$4,974	\$1,400	\$1,667	\$107	\$17,798
2023	\$13,198	\$8,835	\$2,458	\$2,759	\$152	\$27,402
2024	\$17,535	\$14,674	\$3,445	\$4,115	\$211	\$39,980
2025	\$22,434	\$22,383	\$7,354	\$5,375	\$284	\$57,830



*Includes smartphone and tablet-based AR product visualization that results in the purchase of physical goods. *Includes transaction value of goods purchased, not AR technology to develop shopping experiences. *These figures are not counted towards "AR Revenue" as they don't represent the sale of AR itself.

AR-Influenced Commerce, by Vertical*

Simplified View: Detail provided in subsequent slide tables

2021 U.S. \$Millions

*Includes smartphone and tablet-based AR product visualization that results in the purchase of physical goods.

*Includes transaction value of goods purchased, not AR technology to develop shopping experiences.

* These figures are not counted towards "AR Revenue" as they don't represent the sale of AR itself





Cosmetics & Personal Care
Clothing (sans Footwear & Jewelry)
Jewelry & Watches
Bags & Accessories
Footwear
Furniture & Home Goods
Home Appliances
Consumer Electronics
Cars & Auto Supplies
Computers & Telecom
Travel & Event Bookings
Food (Grocery & Restaurant)

- Toys & Hobbies
- Sports, Fitness & Outdoor
- Industrial Appliances/equipment
- Consumer Packaged Goods
- Books & Media
- Flowers & Gifts
- DIY, Garden & Pets
- Office Supplies & Stationary
- Other

AR-Influenced Commerce, by Vertical*

U.S. \$Millions

	Cosmetics & Personal Care	Clothing (sans Footwear)	Jewelry & Watches	Bags & Accessories	Footwear	Furniture & Home Goods	Home Appliances	Consumer Electronics	Cars & Auto Supplies	Computers & Telecom	Travel & Events	Food, Restaurant & Grocerv	Toys & Hobbies	Sports, Fitness & Outdoor	Industrial equipment	Consumer Packaged Goods	Books & Media	Flowers & Gifts	Home Improvement & Garden	Office & Stationary	Other	Total
2020	\$928	\$773	\$626	\$619	\$611	\$549	\$541	\$534	\$309	\$309	\$240	\$232	\$224	\$170	\$155	\$147	\$139	\$77	\$46	\$39	\$464	\$7,732
2021	\$1,457	\$1,214	\$984	\$971	\$959	\$862	\$850	\$838	\$486	\$486	\$376	\$364	\$352	\$267	\$243	\$231	\$219	\$121	\$73	\$61	\$729	\$12,144
2022	\$2,136	\$1,780	\$1,442	\$1,424	\$1,406	\$1,264	\$1,246	\$1,228	\$712	\$712	\$552	\$534	\$516	\$392	\$356	\$338	\$320	\$178	\$107	\$89	\$1,068	\$17,798
2023	\$3,288	\$2,740	\$2,220	\$2,192	\$2,165	\$1,946	\$1,918	\$1,891	\$1,096	\$1,096	\$849	\$822	\$795	\$603	\$548	\$521	\$493	\$274	\$164	\$137	\$1,644	\$27,402
2024	\$4,798	\$3,998	\$3,238	\$3,198	\$3,158	\$2,839	\$2,799	\$2,759	\$1,599	\$1,599	\$1,239	\$1,199	\$1,159	\$880	\$800	\$760	\$720	\$400	\$240	\$200	\$2,399	\$39,980
2025	\$6,940	\$5,783	\$4,684	\$4,626	\$4,569	\$4,106	\$4,048	\$3,990	\$2,313	\$2,313	\$1,793	\$1,735	\$1,677	\$1,272	\$1,157	\$1,099	\$1,041	\$578	\$347	\$289	\$3,470	\$57,830



*Includes smartphone and tablet-based AR product visualization that results in the purchase of physical goods. *Includes transaction value of goods purchased, not AR technology to develop shopping experiences. *These figures are not counted towards "AR Revenue" as they don't represent the sale of AR itself.

Brand & Retailer Adoption Drivers Factors Influencing Vertical-Specific AR Advertising & Commerce

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Product is Conducive to Visualization

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ntelligence

- Food, Restaurant & Grocery
- Sports, Fitness
 & Outdoor
- Flowers & Gifts
 - Office & Stationary

- Home
 Improvement &
- Garden
- Cars & Auto Supplies
- Cupplics
- Travel & Events
- Consumer Packaged Goods
 - Computers & Telecom

Jewelry & Watches

Furniture &

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Home Goods

Bags &

Accessories

- Home Appliances
- Industrial Equipment
- Toys & Hobbies Media & Entertainment
 - Consumer
 Electronics

- Cosmetics &
 Personal Care
 - Clothing & Footwear

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Spending Power & Adoption Drive

Intro & Exec Summary

> Revenue Overview

Mobile AR Devices

Consumer Spending

Corporate & Industrial Productivity

Media & Marketing Enablement

Ad Placement

Commerce Enablement

Resources & Reference

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Enterprise Spending



Mobile AR Enterprise Revenue

- Spending will grow from \$5.5 billion in 2020 to \$21.4 billion in 2025.
 This includes any enterprise-purchased AR software for internal use (B2B) or to develop AR for customers and constituents (B2B2C).
 This deviates from common connotations with "enterprise AR" which often only consider and include *industrial* AR use cases.
 We track such industrial use, including productivity and visualization software; but apply "enterprise AR" to *all* organizational AR purchases.
 This is congruent with broader definitions of "enterprise software."
- Categories include corporate & industrial productivity, AR media & content creation platforms, commerce enablement software and AR ad placement.*
 Productivity software currently leads the way, followed by ad placement.
 Ad placement will pull into the lead in later years, as it continues to attract brand advertisers through high-performing immersive ad formats.**



*Spending on AR ad *placement* is separate from – but related to – spending on AR ad *creation software*. **See ARtillery Intelligence report: AR Advertising Deep Dive, Part I: The Landscape.





*Includes enabling tech for AR-influenced eCommerce, not transaction value of goods purchased (see previous section). **Includes software for AR experience & ad creation, not consulting fees nor other overhead (e.g., developer salaries). ***Includes only the paid media component of AR-based ad campaigns, not other marketing costs nor agency fees.

Mobile AR Estimated Revenues, by Source*

U.S. \$Millions

	Enterprise Productivity	AR Ad Placement***	AR Media & Marketing Enablement**	AR Commerce Enablement*	AR Infrastructure & Distribution	Total
2020	\$2,511	\$1,362	\$652	\$387	\$583	\$5,495
2021	\$3,117	\$1,978	\$1,140	\$607	\$757	\$7,600
2022	\$3,771	\$2,862	\$1,807	\$890	\$951	\$10,281
2023	\$4,582	\$3,917	\$2,324	\$1,370	\$1,203	\$13,395
2024	\$5,356	\$5,218	\$3,124	\$1,999	\$1,433	\$17,131
2025	\$5,993	\$6,681	\$4,247	\$2,891	\$1,595	\$21,408



*Includes enabling tech for AR-influenced eCommerce, not transaction value of goods purchased (see previous section). **Includes software for AR experience & ad creation, not consulting fees nor other overhead (e.g., developer salaries). ***Includes only the paid media component of AR-based ad campaigns, not other marketing costs nor agency fees.

Enterprise Spending Corporate & Industrial Productivity

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Enterprise Mobile AR Productivity

- Spending will grow from \$2.51 billion in 2020 to \$5.99 billion in 2025.
 This growth slows in later years as the field transitions to head-worn AR.
- This category consists of software that enterprises deploy to improve productivity and operational efficiencies.
 This includes visualization software that brings line of sight or live guided support to functions such as assembly, maintenance and IT support.
 It also includes software that helps enterprises (or software vendors that serve them) *author* AR experiences that fit the above descriptions.
- Like many areas of mobile AR, Covid-era constraints compelled enterprise AR productivity, as remote AR support aligns with social distancing.
 This boosts short-term traction, while exposing the technology and accelerating its longer-term sustained adoption.



Estimated Spending on Enterprise Mobile AR Productivity*





*Includes smartphone and tablet-based AR software spend, including SaaS/licenses to deploy enterprise AR. *Includes enterprise AR creation, development and authoring software, but not consulting fees, salaries or other overhead. *Includes AR visualization software for industrial and corporate use cases (see next slide for breakdown).

Estimated Spending on Mobile AR Productivity*, by Vertical

2021

*Includes smartphone and tablet-based AR software spend, including SaaS/licenses to deploy enterprise AR.

*Includes enterprise AR creation, development and authoring software, but not consulting fees, salaries or other overhead.

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■ Real Estate ■ Finance Education Other Corporate/Commercial Transportation Healthcare Telecom Other Industrial AEC Government/Military Aviation & Aerospace Oil, Gas & Utilities

Automotive

Estimated Spending on Mobile AR Productivity*, by Vertical

	Real Estate	Finance	Education	Other Corporate/ Commercial	Transportation	Healthcare	Telecom	Other Industrial	AEC	Government/ Military	Aviation & Aerospace	Oil, Gas & Utilities	Automotive	Total
2020	\$38	\$50	\$75	\$138	\$151	\$176	\$201	\$213	\$226	\$264	\$314	\$326	\$339	\$2,511
2021	\$47	\$62	\$94	\$171	\$187	\$218	\$249	\$265	\$281	\$327	\$390	\$405	\$421	\$3,117
2022	\$57	\$75	\$113	\$207	\$226	\$264	\$302	\$321	\$339	\$396	\$471	\$490	\$509	\$3,771
2023	\$69	\$92	\$137	\$252	\$275	\$321	\$367	\$389	\$412	\$481	\$573	\$596	\$619	\$4,582
2024	\$80	\$107	\$161	\$295	\$321	\$375	\$428	\$455	\$482	\$562	\$669	\$696	\$723	\$5,356
2025	\$90	\$120	\$180	\$330	\$360	\$420	\$479	\$509	\$539	\$629	\$749	\$779	\$809	\$5,993



*Includes smartphone and tablet-based AR software spend, including SaaS/licenses to deploy enterprise AR.

*Includes enterprise AR creation, development and authoring software, but not consulting fees, salaries or other overhead.

Estimated Spending on Mobile AR Productivity*, by Use Case

2021

*Includes smartphone and tablet-based AR software spend, including SaaS/licenses to deploy enterprise AR.

*Includes enterprise AR creation, development and authoring software, but not consulting fees, salaries or other overhead.

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Academic Instruction & Education Industrial Assembly Data Visualizaiton Advanced Imaging (Including Surgical) Other Corporate & Commercial Enterprise Training & Knowledge Transfer Other Industrial Spatial Planning & Architecture Corporate & Industrial Sales Product Design & Collaboration Warehousing & Logistics Maintenance & Repair Tactical & Combat Field Services & Tech Support

Estimated Spending on Mobile AR Productivity*, by Use Case

	Academic Instruction & Education	Industrial Assembly	Data Visualization	Advanced Imaging (Including Surgical)	Other Corporate & Commercial	Enterprise Training & Knowledge Transfer	Other Industrial	Spatial Planning & Architecture	Corporate & Industrial Sales	Product Design & Collaboration	Warehousing & Logistics	Maintenance & Repair	Tactical & Combat	Field services & Tech Support	Total
2020	\$50	\$94	\$100	\$126	\$138	\$151	\$176	\$201	\$213	\$226	\$239	\$245	\$251	\$301	\$2,511
2021	\$62	\$117	\$125	\$156	\$171	\$187	\$218	\$249	\$265	\$281	\$296	\$304	\$312	\$374	\$3,117
2022	\$75	\$141	\$151	\$189	\$207	\$226	\$264	\$302	\$321	\$339	\$358	\$368	\$377	\$453	\$3,771
2023	\$92	\$172	\$183	\$229	\$252	\$275	\$321	\$367	\$389	\$412	\$435	\$447	\$458	\$550	\$4,582
2024	\$107	\$201	\$214	\$268	\$295	\$321	\$375	\$428	\$455	\$482	\$509	\$522	\$536	\$643	\$5,356
2025	\$120	\$225	\$240	\$300	\$330	\$360	\$420	\$479	\$509	\$539	\$569	\$584	\$599	\$719	\$5,993



*Includes smartphone and tablet-based AR software spend, including SaaS/licenses to deploy enterprise AR.

*Includes enterprise AR creation, development and authoring software, but not consulting fees, salaries or other overhead. © ARtillery Intelligence, 2021

Enterprise Spending Media & Marketing Enablement

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Media & Marketing Enablement

Mobile AR media & marketing enablement will grow from \$1.24 billion in 2020 to \$5.84 billion in 2025, a 36.4 percent compound annual growth rate (CAGR).
 This includes software that enables enterprises to create consumer-based AR experiences such as games, apps, ads* & entertainment.
 This category also includes infrastructure and distribution technologies such as compression and streaming for graphically-intense AR.

 There are fairly-even spending levels across media, marketing and gaming.
 Marketing & ad creation lead, due to brand-advertiser AR adoption (explored later), given a strong business case and demonstrable ROI.
 AR media & marketing is also correlated to the addressable market of AR developers and creatives, which will reach 4.16 million by 2025.
 Potential AR creatives include a large global base of creative professionals that could convert to AR, given low-friction tools such as Adobe Aero.



*Spending on AR ad *creation* software is separate from – but related to – spending on AR ad *placement* (see next section)

Nobile AR Media Creation Estimated spending on AR Creation & Development Software*





* Includes all formats & distribution channels including apps and web AR.

* Includes software only (doesn't include AR creation overhead such as developer salaries or agency fees).

** Spending on AR ad creation software is separate from – but related to – spending on AR ad placement (see next section). © ARtillery Intelligence, 2021

AR Developers & Creatives Estimated Universe of AR Creators Millions of Individuals





*Includes professional and amateur creatives, such as creative agency pros and community lens creators.

AR Developers & Creatives Addressable Market of AR Creators, Relative to Total Universe

Millions of Individuals



Mobile AR Infrastructure Estimated Spending on Mobile AR Distribution Technologies*





*Includes revenue estimates for Mobile AR-deployed technology only (head-worn AR measured separately).

Enterprise Spending Ad Placement

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Mobile AR Ad Placement

Mobile AR ad placement* will grow from \$1.36 billion in 2020 to \$6.68 billion in 2025, a 37.4 percent compound annual growth rate (CAGR).
 This includes paid AR lenses and visual search ad placement, such as sponsored lens options offered by Snapchat and Facebook.
 It does not include ad creation*, agency fees, other marketing expenses nor self-distributed brand apps and experiences (e.g., IKEA Place app).

Growth is driven by advertiser interest in immersive product demonstrations.
 This not only resonates with advertisers' creative sensibilities, but it's showing a strong business case through high-performing ads.**
 AR lenses lead all ad formats today in both engagement and revenue, including selfie filters from Snapchat, Facebook and others.
 Despite pandemic-driven retractions, AR advertising's growth in 2020 was boosted by the introduction of Instagram and TikTok's AR ad programs.



Mobile AR Ad Placement

Among Social AR lens players today, Snapchat has the revenue lead.
 This comes despite Facebook's greater global scale, and results from higher levels of lens engagement (and monetization) per Snapchat user.
 Snapchat will maintain this lead in the near term, however Facebook will surpass it by 2025, given multiple AR-enabled apps including Instagram.
 Visual search will gain ground in later years, driven by a utilitarian and frequent use case that's naturally monetizable (like web search).*
 TikTok is the wild card, with rapidly growing usage but underdeveloped AR.

Mobile AR advertising could have mixed results from Covid-era dynamics.
 AR lenses are trending up, as they enhance social connection.
 But advertising is a famously recession-prone spending category.
 Mobile AR advertising will ultimately see a net benefit as recessions cause advertisers to rethink and redeploy budget to more performant formats.





ARtillery Intelligence *Includes estimated paid media placement only. Does not include self-distributed marketing, agency fees or creation software (see previous section). *Doesn't include platforms endemic to China.

**Includes Google Lens, Pinterest Lens and Snap Scan.

***Includes Instagram, Messenger and all Facebook properties that distribute AR lenses.

Mobile AR Estimated Ad Placement, by Source*

U.S. \$Millions

	Snapchat Lenses	Facebook Lenses***	Visual Search**	Other Lenses (gaming, email, messaging)	TikTok Lenses	Web AR	Total
2020	\$816	\$377	\$60	\$74	\$27	\$10	\$1,362
2021	\$1,027	\$616	\$182	\$101	\$36	\$17	\$1,978
2022	\$1,257	\$969	\$399	\$138	\$71	\$28	\$2,862
2023	\$1,471	\$1,368	\$757	\$177	\$98	\$46	\$3,917
2024	\$1,695	\$1,804	\$1,307	\$220	\$133	\$60	\$5,218
2025	\$1,937	\$2,327	\$1,897	\$270	\$172	\$77	\$6,681



*Includes estimated paid media placement only. Does not include self-distributed marketing, agency fees or creation software (see previous section). *Doesn't include platforms endemic to China.

**Includes Google Lens, Pinterest Lens and Snap Scan.

***Includes Instagram, Messenger and all Facebook properties that distribute AR lenses.

Social Mobile AR Ad Revenue How Do Social Lens Platforms* Stack Up?

\$2,500 Simplified View: Detail provided in subsequent slide tables





*Includes estimated paid media placement only. Does not include self-distributed marketing, agency fees or creation software (see previous section). *Doesn't include platforms endemic to China.
Social Mobile AR Ad Revenue How Do Social Lens Platforms* Stack Up?

U.S. \$Millions

	Snapchat	Facebook News Feed	Instagram	Others	Facebook Messenger	TikTok			
2020	\$816	\$240	\$91	\$64	\$46	\$27			
2021	\$1,027	\$374	\$171	\$88	\$71	\$36			
2022	\$1,257	\$534	\$334	\$121	\$101	\$71			
2023	\$1,471	\$710	\$526	\$155	\$131	\$98			
2024	\$1,695	\$899	\$739	\$191	\$165	\$133			
2025	\$1,937	\$1,102	\$1,022	\$234	\$203	\$172			



*Includes estimated paid media placement only. Does not include self-distributed marketing, agency fees or creation software (see previous section). *Doesn't include platforms endemic to China.





*Includes estimated paid media placement only. Does not include self-distributed marketing, agency fees or creation software (see previous section). *Doesn't include platforms endemic to China.

Visual Search Estimated Ad Placement*, by Source

U.S. \$Millions

	Google	Pinterest	Snap Scan	Other	Total		
2020	\$28.2	\$18.7	\$11.3	\$1.6	\$59.7		
2021	\$91.1	\$50.9	\$35.4	\$4.2	\$182		
2022	\$207	\$103	\$80.5	\$8.6	\$399		
2023	\$405	\$180	\$157	\$15.0	\$757		
2024	\$716	\$289	\$278	\$24.1	\$1,307		
2025	\$1,055	\$400	\$410	\$32.8	\$1,897		



*Includes estimated paid media placement only. Does not include self-distributed marketing, agency fees or creation software (see previous section). *Doesn't include platforms endemic to China.

U.S. \$Millions

Mobile AR Estimated Ad Placement*, by Vertical

Simplified View: Detail provided in subsequent slide tables

2021

*Includes estimated paid media placement only. Does not include self-distributed marketing, agency fees or creation software (see previous section).

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Cosmetics & Personal Care ■ Clothing (sans Footwear & Jewelry) Media & Entertainment ■ Jewelry & Watches Bags & Accessories ■ Footwear Furniture & Home Goods Home Appliances Consumer Electronics Cars & Auto Supplies Computers & Telecom Travel & Events Food (Grocery & Restaurant) Toys & Hobbies Sports, Fitness & Outdoor Industrial Appliances/Equipment Consumer Packaged Goods ■ Flowers & Gifts ■ DIY, Garden & Pets Office Supplies & Stationary ■ Other © ARtillery Intelligence, 2021

Mobile AR Estimated Ad Placement, by Vertical*

U.S. \$Millions

	Cosmetics & Personal Care	Clothing (sans Footwear)	Media & Entertainment	Jewelry & Watches	Bags & Accessories	Footwear	Furniture & Home Goods	Home Appliances	Consumer Electronics	Cars & Auto Supplies	Computers & Telecom	Travel & Events	Food. Restaurant & Grocerv	Toys & Hobbies	Sports, Fitness & Outdoor	Industrial Equipment	Consumer Packaged Goods	Flowers & Gifts	Home Improvement & Garden	Office & Stationary	Other	Total
2020	\$163.5	\$136.2	\$122.6	\$96.7	\$95.4	\$94.0	\$83.1	\$81.7	\$80.4	\$61.3	\$45.0	\$42.2	\$40.9	\$39.5	\$30.0	\$27.2	\$25.9	\$13.6	\$8.2	\$6.8	\$68.1	\$1,362
2021	\$237.4	\$197.8	\$178.1	\$140.5	\$138.5	\$136.5	\$120.7	\$118.7	\$116.7	\$89.0	\$65.3	\$61.3	\$59.4	\$57.4	\$43.5	\$39.6	\$37.6	\$19.8	\$11.9	\$9.9	\$98.9	\$1,978
2022	\$343.4	\$286.2	\$257.6	\$203.2	\$200.3	\$197.5	\$174.6	\$171.7	\$168.8	\$128.8	\$94.4	\$88.7	\$85.9	\$83.0	\$63.0	\$57.2	\$54.4	\$28.6	\$17.2	\$14.3	\$143.1	\$2,862
2023	\$470.0	\$391.7	\$352.5	\$278.1	\$274.2	\$270.2	\$238.9	\$235.0	\$231.1	\$176.2	\$129.2	\$121.4	\$117.5	\$113.6	\$86.2	\$78.3	\$74.4	\$39.2	\$23.5	\$19.6	\$195.8	\$3,917
2024	\$626.2	\$521.8	\$469.7	\$370.5	\$365.3	\$360.1	\$318.3	\$313.1	\$307.9	\$234.8	\$172.2	\$161.8	\$156.6	\$151.3	\$114.8	\$104.4	\$99.2	\$52.2	\$31.3	\$26.1	\$260.9	\$5,218
2025	\$801.7	\$668.1	\$601.3	\$474.4	\$467.7	\$461.0	\$407.5	\$400.9	\$394.2	\$300.7	\$220.5	\$207.1	\$200.4	\$193.8	\$147.0	\$133.6	\$126.9	\$66.8	\$40.1	\$33.4	\$334.1	\$6,681



*Includes estimated paid media placement only. Does not include self-distributed marketing, agency fees or creation software (see previous section). *Doesn't include platforms endemic to China.

Enterprise Spending Commerce Enablement

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Mobile AR Commerce Enablement

Mobile AR commerce enablement will grow from \$387 million in 2020 to \$2.89 billion in 2025, a 49.5 percent compound annual growth rate (CAGR).
 This stems from the area covered earlier in this report: AR-influenced consumer purchases for physical goods.
 The figures examined in this section are for the software that enables the product visualization and "try-ons" that drive those transactions.
 Mobile AR commerce-enablement can have endpoints in all the channels examined in this report: social lenses, native apps, web AR, ads, etc.

Mobile AR commerce-enablement is split between eCommerce and retail.
 As examined earlier, eCommerce will lead in the long term, given that AR adds more value to remote shoppers who can't see and feel products.
 Retailer and brand adoption will map to vertical-specific factors such as spending power, motivation and product-fit with remote visualization.



AR COMMERCE Revenue U.S. \$Millions Mobile AR-Influenced Consumer Spending* & Enabling Tech Revenue





*Includes smartphone and tablet-based AR product visualization that results in the purchase of physical goods. *Does not include AR digital goods (e.g., Pokémon Go in-app-purchases), which are examined in the previous section.

AR Commerce Estimated Enabling-Tech Revenue

U.S. \$Millions





Brand & Retailer Adoption Drivers Factors Influencing Vertical-Specific AR Advertising & Commerce

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Product is Conducive to Visualization

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- Food, Restaurant & Grocery
- Sports, Fitness
 & Outdoor
- Flowers & Gifts
 - Office & Stationary

- Home
 Improvement &
- Garden
- Cars & Auto Supplies
- Cupplics
- Travel & Events
- Consumer Packaged Goods
 - Computers & Telecom

Jewelry & Watches

Furniture &

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Home Goods

Bags &

Accessories

- Home Appliances
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Resources & Reference



Next Steps

In addition to standalone and self-contained orientation, this forecast lays the groundwork for continued ARtillery Intelligence narratives.

With the foundation of this data set, several subsequent reports and articles will be developed in the coming months that each drill down into the dynamics and drivers of the revenue categories quantified in this report. The story is not over...

Work also now begins on the next forecast in our coverage of the spatial computing spectrum, including head worn AR and VR. These forecasts are interlinked and strengthen each other, where the *whole is greater than the sum of its parts*.

We encourage questions and coverage suggestions here.



About ARtillery Intelligence

ARtillery Intelligence chronicles the evolution of spatial computing. Through writings and multimedia, it provides deep and analytical views into the industry's biggest players, opportunities and strategies.

Run by analysts and former journalists, coverage is grounded in a disciplined and journalistic approach. It also maintains a business angle: Though there are fun and games in spatial computing, cultural, technological and financial implications are primary.

Products include the *AR Insider* publication and the ARtillery PRO research subscription, which together engender a circular flow of knowledge. Research includes monthly narrative reports, market-sizing forecasts, consumer survey data and multi-media, all housed in a robust intelligence vault. Learn more <u>here</u>.



About Intelligence Briefings

ARtillery Intelligence Briefings are monthly installments of spatial computing data and analysis. They synthesize original data to reveal opportunities and dynamics of spatial computing sectors. In addition to data, a layer of insights is applied to translate market events and raw figures into prescriptive advice.

More information, past reports and editorial calendar can be seen <u>here</u>.

ARtillery Intelligence

About the Author

Mike Boland was one of Silicon Valley's first tech reporters of the Internet age, as a staff reporter for Forbes (print) starting in 2000. He has been an industry analyst covering mobile and social media since 2005, and is now Chief Analyst of *ARtillery Intelligence* and Editor-in-Chief of *AR Insider.*

Mike is a frequent speaker at industry conferences such as AWE, VRLA and LeadsCon. He has authored more than 150 reports and market-sizing forecasts on the tech & media landscape. He contributes regularly to news sources such as *TechCrunch*, *Business Insider* and *Huffington Post*.

A trusted source for tech journalists, his comments have appeared in A-list publications, including *The New Yorker*, *The Wall Street Journal* and *The New York Times*.

Further background, history and credentials can be read <u>here</u>.

Forecast Methodology

ARtillery Intelligence follows disciplined best practices in market sizing and forecasting, developed and reinforced through its principles' 16 years in research and intelligence in tech sectors. This includes the past 6 years covering AR & VR as a main focus.

This report focuses on AR revenue projections in various sub-sectors and product areas. ARtillery Intelligence has built financial models that are customized to the specific dynamics and unit economics of each. These include variables like unit sales, company revenues, pricing trends, market trajectory and several other micro and macro factors that ARtillery Intelligence tracks.

This approach primarily applies a *bottom-up* forecasting methodology, which is secondarily vetted against a *top-down* analysis. Together, confidence is achieved through triangulating revenues and projections in a disciplined way. For more information on what's included and not included in the forecast (a key consideration when evaluating the figures) see slide 5.

More about ARtillery Intelligence's market-sizing methodology can be seen here and more on its credentials can be seen here.

Disclosure & Ethics Policy

ARtillery has no financial stake in the companies mentioned in this report, nor was it commissioned to produce its figures. With all market sizing, ARtillery Intelligence remains independent of players and practitioners in the sectors it covers, thus mitigating bias in industry revenue calculations and projections. ARtillery Intelligence's disclosure and ethics policy can be seen in full <u>here</u>.



What's Included in Mobile AR Revenues?

This report devises revenue estimates and forecasting for mobile AR and its subcategories. These include consumer spending (e.g., in-app-purchases); and enterprise spending (e.g., industrial visualization, advertising & commerce enablement). Key inclusions and exclusions exist throughout these categories.

For example, we track the transaction value of physical goods that are visualized and purchased through AR interfaces, such as cosmetics and shoes. However, we do not include these transactions as *AR revenue*. Software that enables such AR commerce is conversely counted as *AR revenue*. See more examples below.

Throughout this report, all revenue figures correlate to the full-year (end-of-year) total of the identified year.

Included

Consumer AR Digital Goods: e.g., in-app purchases Corporate & Industrial AR: e.g., software for mobile ARassisted assembly, maintenance and tech support Content & Ad Creation software: e.g., developer platforms Paid Ad Placement: e.g., Snapchat paid lens campaigns AR Enablement: e.g., Product visualization software, AR compression & streaming tech, 3D asset creation software.

Not Included

Physical Goods: transaction value of goods bought through AR interfaces (e.g., footwear, furniture).* Smartphone Sales: e.g., iPhone to run ARkit apps Network Data: e.g., Telco-delivered data usage for AR Professional Services: e.g., Enterprise AR consulting App & Advertising Creation Overhead: e.g., Developer salaries, agency fees



*We track these revenues (see breakdown later in this report) but do not count them towards aggregate AR spending..

Video Companion (Click Here to Play)

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ARtillery Market Sizing How do we come up with our figures?

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