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# Augmented reality (AR)



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Augmented reality (AR)

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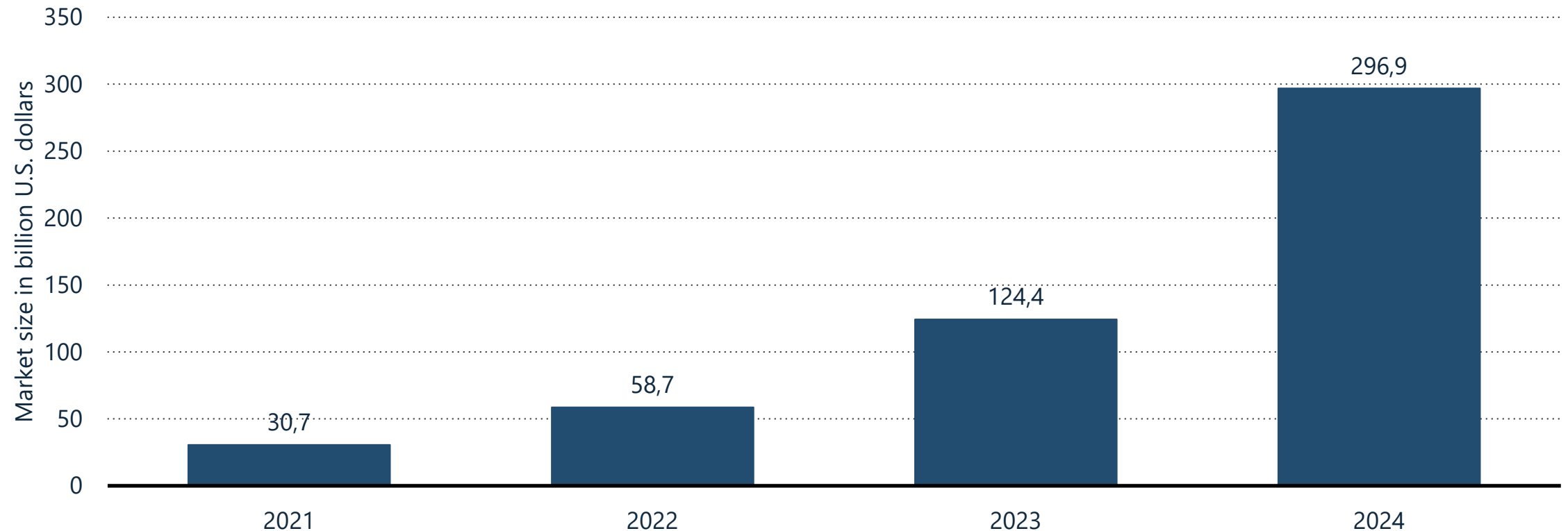


Augmented reality (AR)

# Overview

# Augmented (AR), virtual reality (VR), and mixed reality (MR) market size worldwide from 2021 to 2024 (in billion U.S. dollars)

Augmented (AR), virtual reality (VR), and mixed reality (MR) market size 2021-2024



**Note(s):** Worldwide; 2021

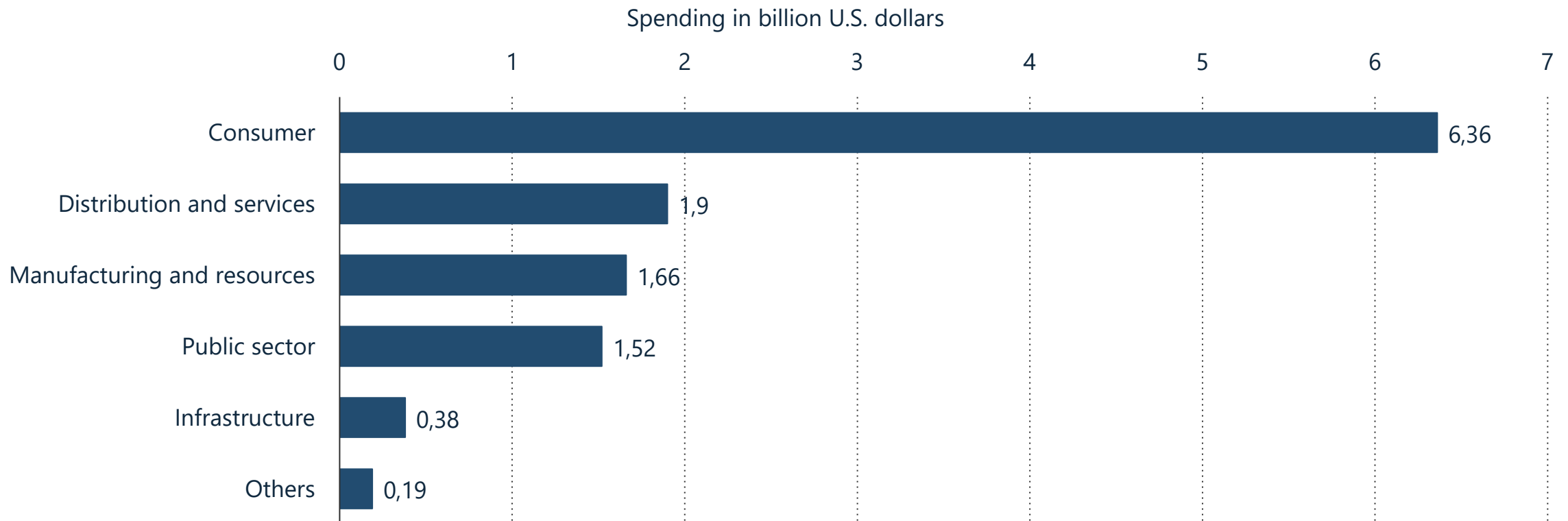
Further information regarding this statistic can be found on [page 31](#).

**Source(s):** BCG; Mordor Intelligence



# Augmented and virtual reality (AR/VR) forecast spending worldwide in 2020 (in billion U.S. dollars), by segment

Global AR/VR forecast spending by segment 2020



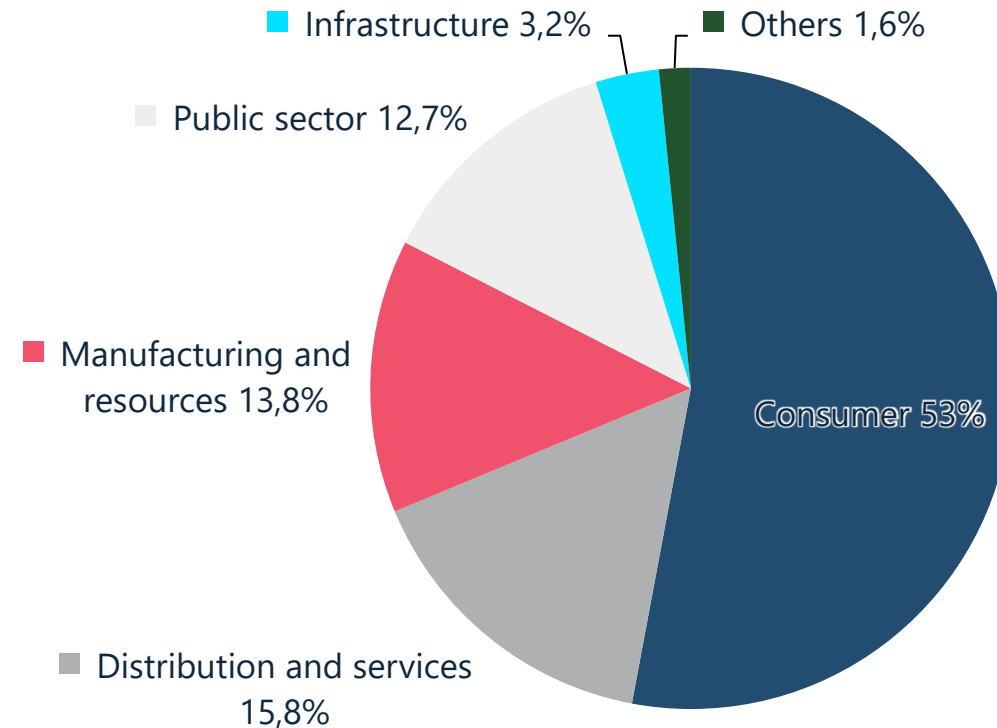
**Note(s):** Worldwide; 2020

Further information regarding this statistic can be found on [page 32](#).

**Source(s):** IDC

# Forecast share of augmented and virtual reality (AR/VR) spending worldwide in 2020, by segment

Share of global AR/VR spending by segment 2020



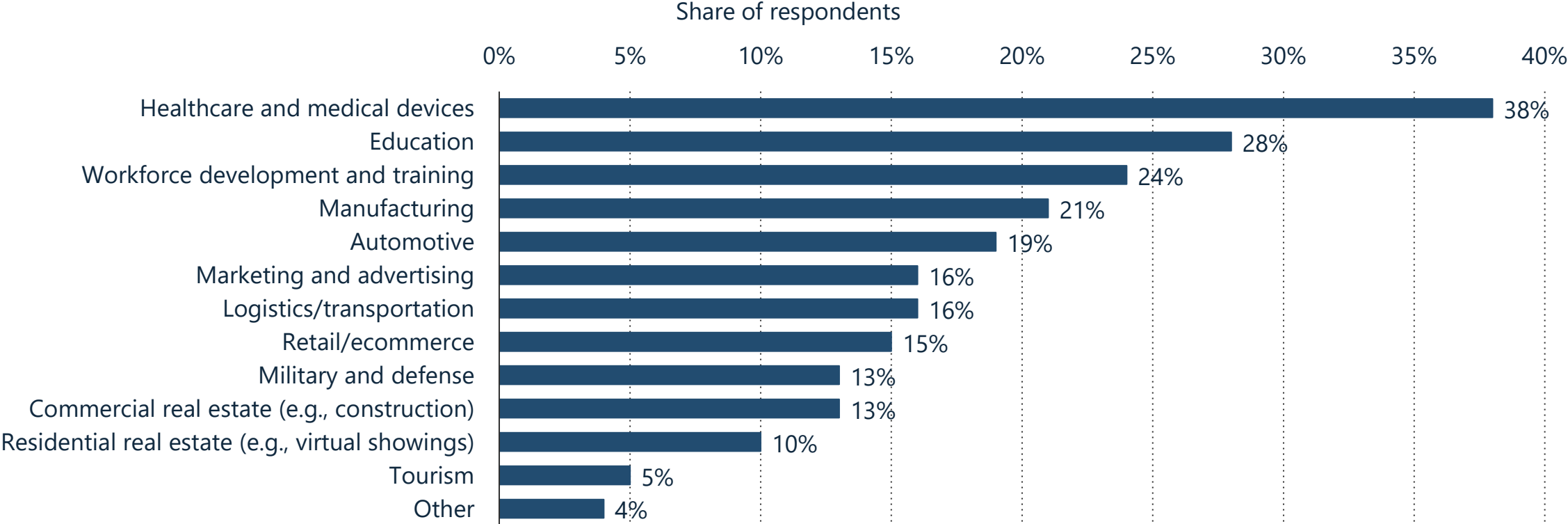
**Note(s):** Worldwide; 2020

Further information regarding this statistic can be found on [page 33](#).

**Source(s):** IDC

# Sectors expected to witness the most disruption by immersive technologies over the next 12 months according to XR/AR/VR/MR industry experts in the United States in 2020

Sectors expected to be most disrupted by XR/AR/VR/MR as per U.S. XR experts 2020



**Note(s):** Worldwide, United States; January to February, 2020; 191 respondents; XR/AR/VR/MR industry experts (94 percent based in the U.S.)  
Further information regarding this statistic can be found on [page 34](#).  
**Source(s):** Perkins Coie; XRA; Boost VC

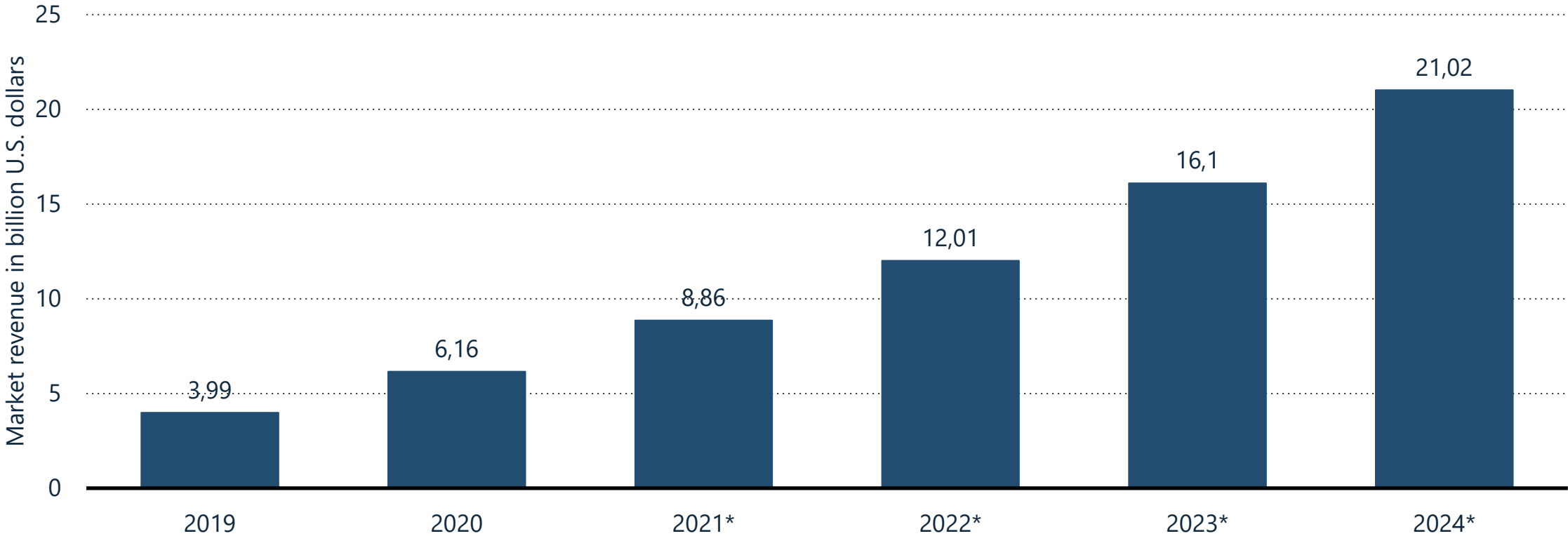


Augmented reality (AR)

# Mobile AR overview

# Mobile augmented reality (AR) market revenue worldwide from 2019 to 2024 (in billion U.S. dollars)

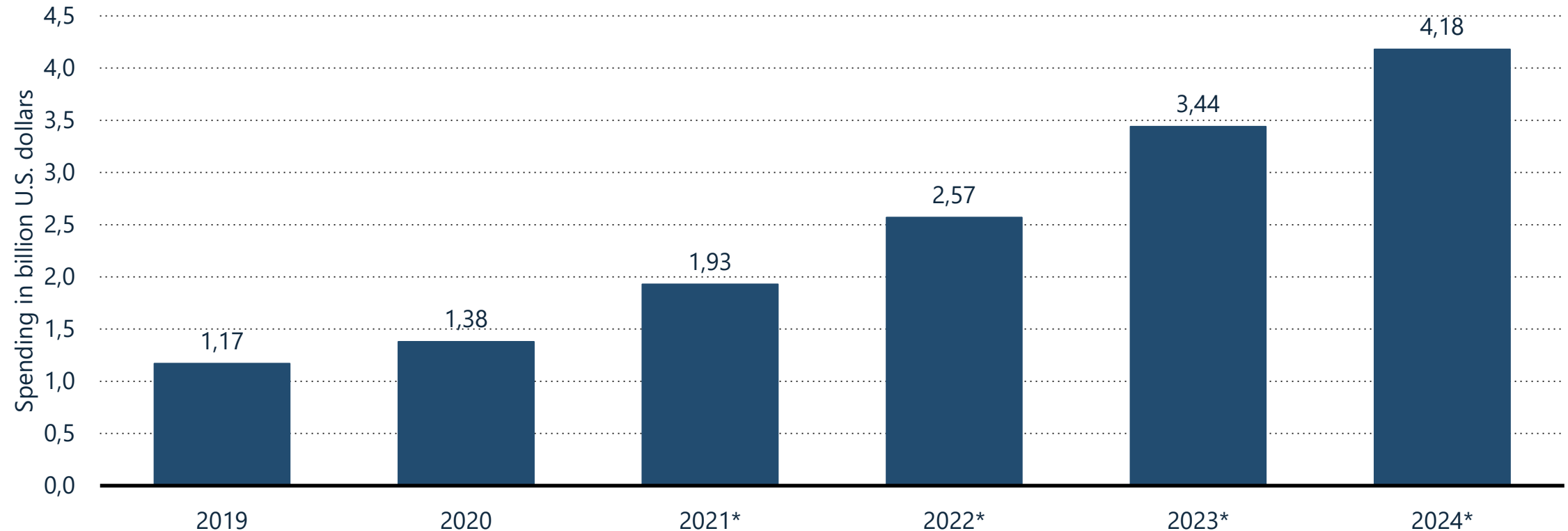
Mobile AR market revenue worldwide 2019-2024



**Note(s):** Worldwide; 2019 to 2020  
Further information regarding this statistic can be found on [page 35](#).  
**Source(s):** ARtillery Intelligence

# Consumer mobile augmented reality (AR) experiences spending worldwide from 2019 to 2024 (in billion U.S. dollars)

Consumer mobile AR experiences spending worldwide 2019-2024



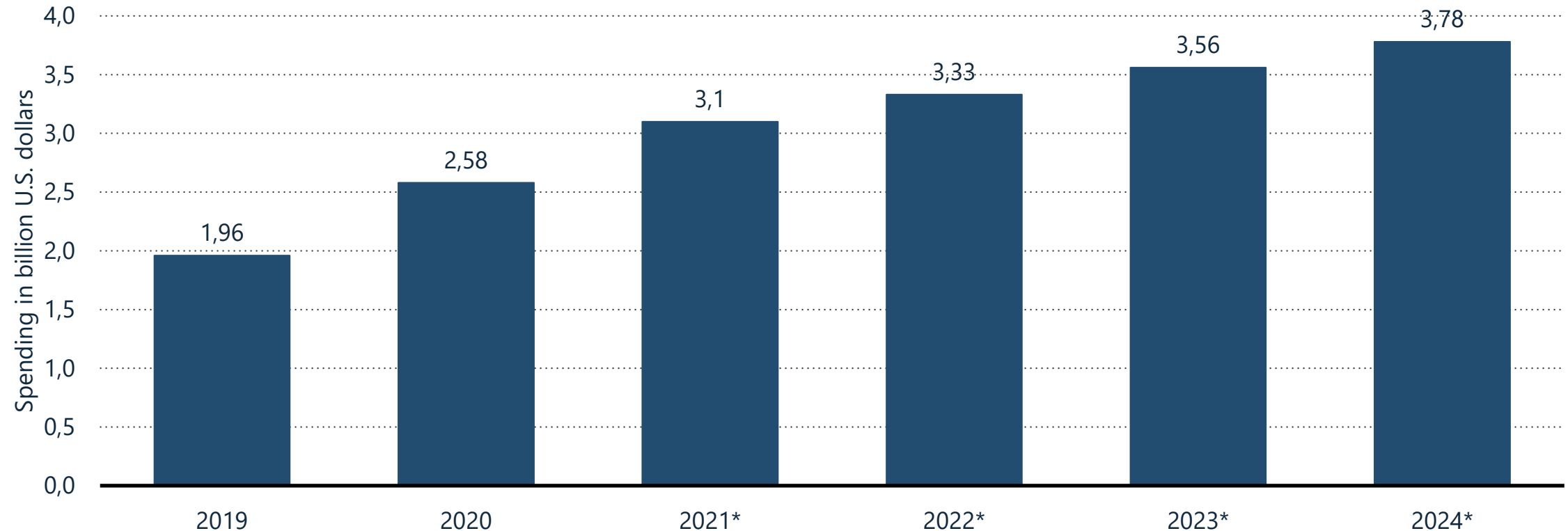
**Note(s):** Worldwide; 2019 to 2020

Further information regarding this statistic can be found on [page 36](#).

**Source(s):** ARtillery Intelligence; AR Insider

# Corporate and industrial mobile augmented reality (AR) software spending worldwide from 2019 to 2024 (in billion U.S. dollars)

Enterprise mobile AR spending worldwide 2019-2024



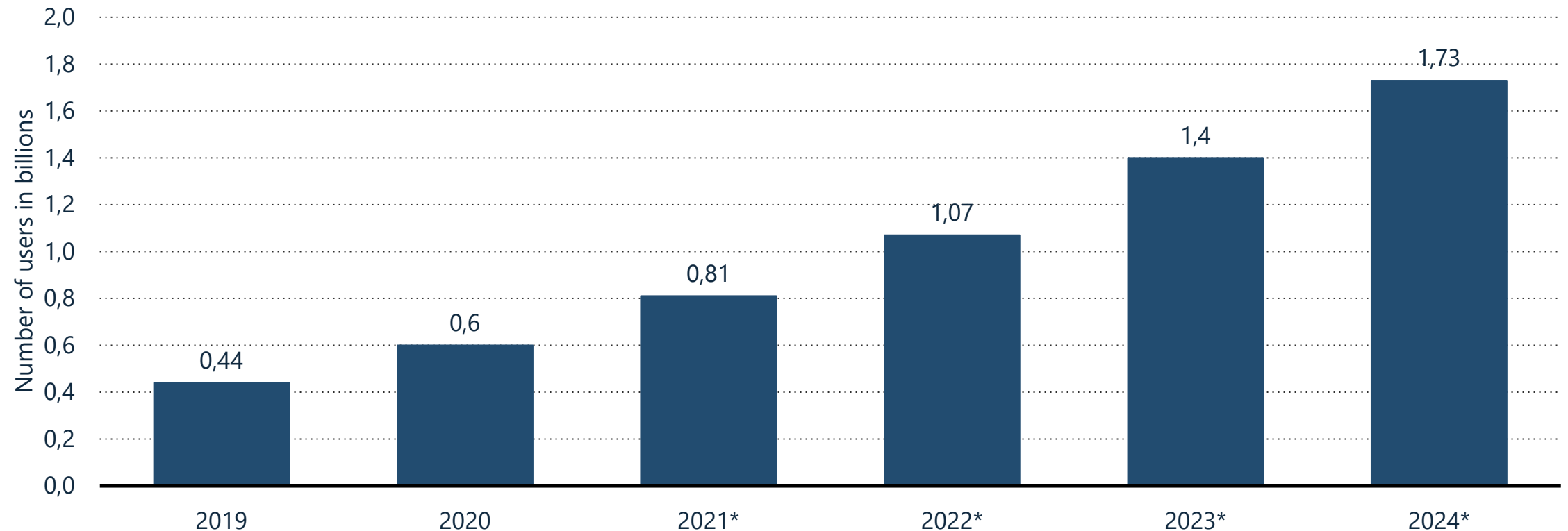
**Note(s):** Worldwide; 2019 to 2020

Further information regarding this statistic can be found on [page 37](#).

**Source(s):** ARtillery Intelligence; AR Insider

# Number of mobile augmented reality (AR) active users worldwide from 2019 to 2024 (in billions)

Global mobile augmented reality (AR) users 2019-2024



**Note(s):** Worldwide; 2019 to 2020

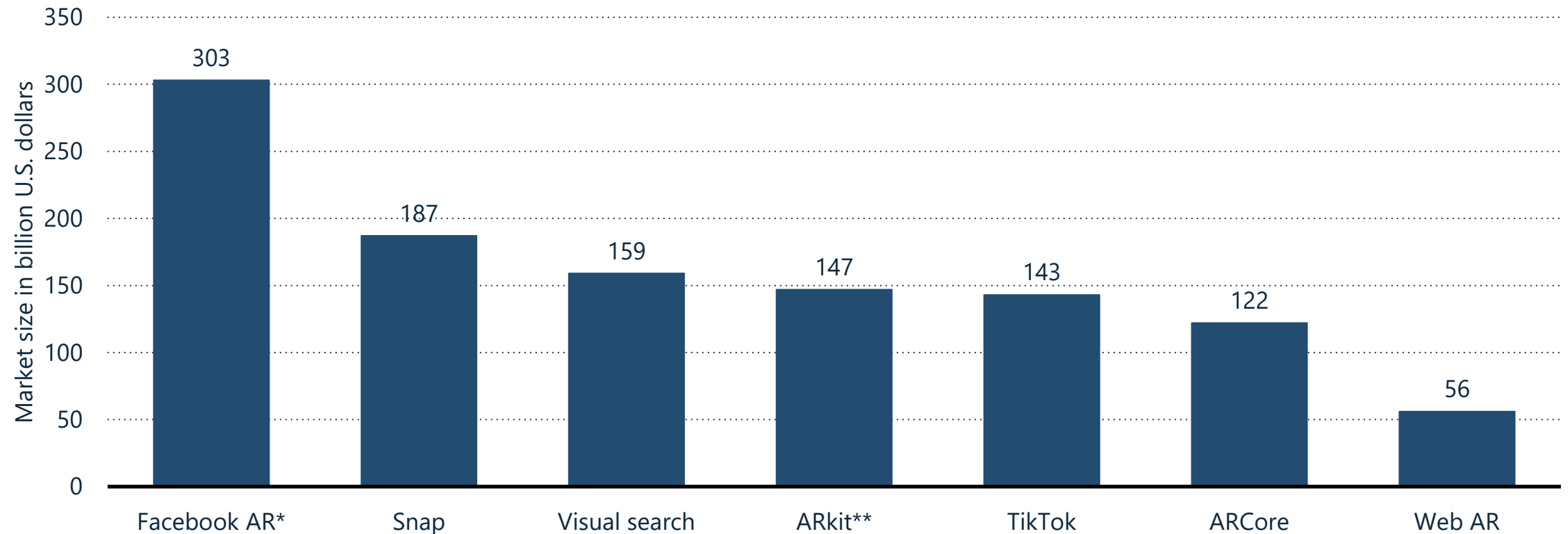
Further information regarding this statistic can be found on [page 38](#).

**Source(s):** ARtillery Intelligence; AR Insider



# Mobile augmented reality (AR) active users worldwide in 2020, by platform

Mobile AR active users worldwide 2020, by platform



**Note(s):** Worldwide; 2020

Further information regarding this statistic can be found on [page 39](#).

**Source(s):** ARtillery Intelligence; AR Insider

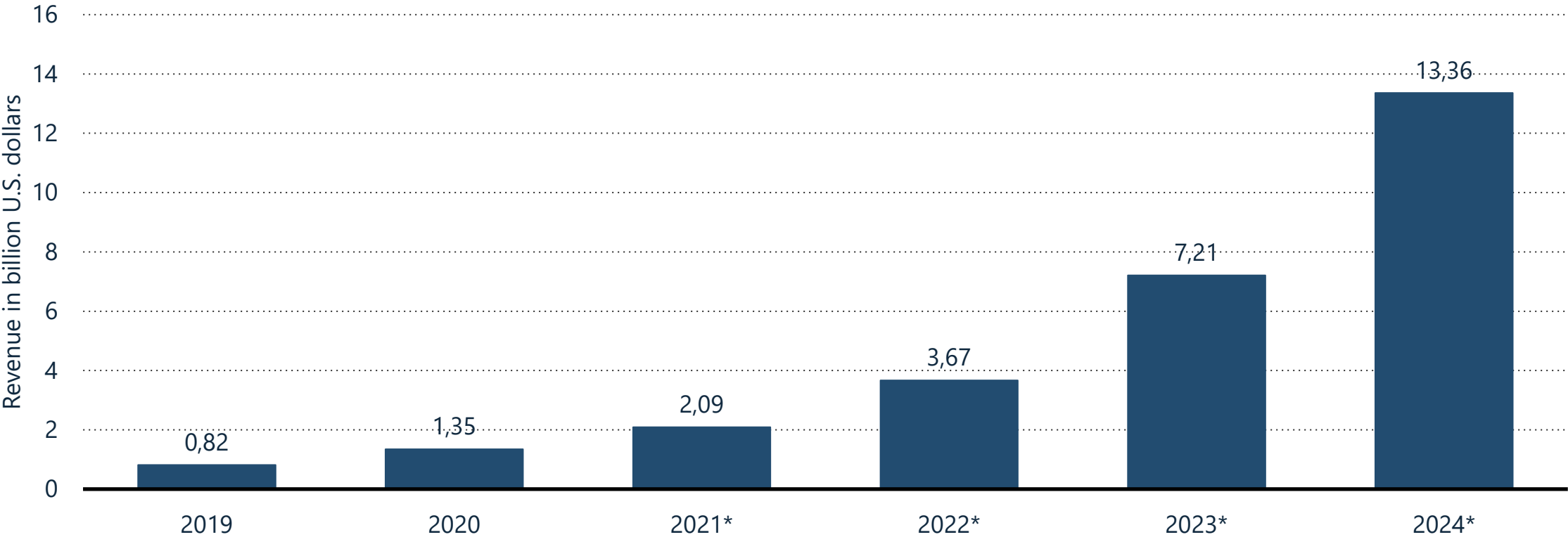


Augmented reality (AR)

## Segments: Devices

# Consumer and enterprise augmented reality (AR) glasses hardware and software revenue worldwide from 2019 to 2024 (in billion U.S. dollars)

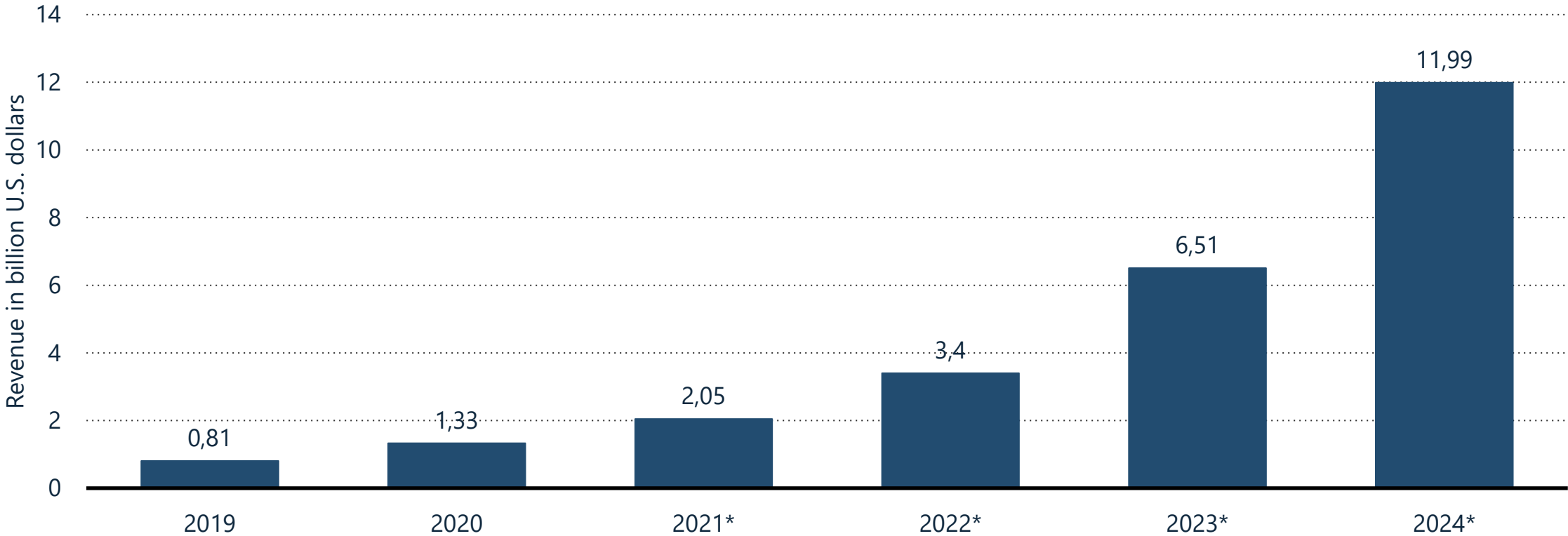
Consumer and enterprise AR glasses revenue worldwide 2019-2024



**Note(s):** Worldwide; 2019 to 2020  
Further information regarding this statistic can be found on [page 40](#).  
**Source(s):** ARtillery Intelligence

# Enterprise augmented reality (AR) glasses hardware and software revenue worldwide from 2019 to 2024 (in billion U.S. dollars)

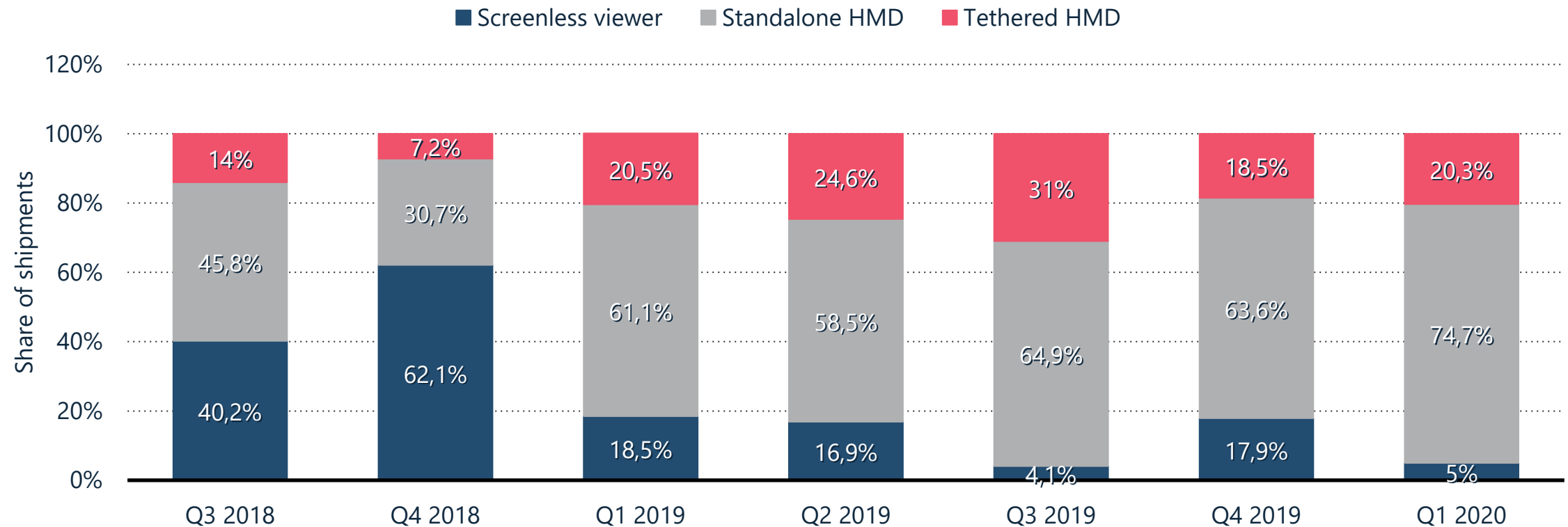
Enterprise AR glasses spending worldwide 2019-2024



**Note(s):** Worldwide; 2019 to 2020  
Further information regarding this statistic can be found on [page 41](#).  
**Source(s):** ARtillery Intelligence

# Distribution of augmented reality (AR) headset shipments worldwide from 3rd quarter 2018 to 1st quarter 2020, by category

Global augmented reality (AR) headset shipments from Q3 2018 - Q1 2020, by category



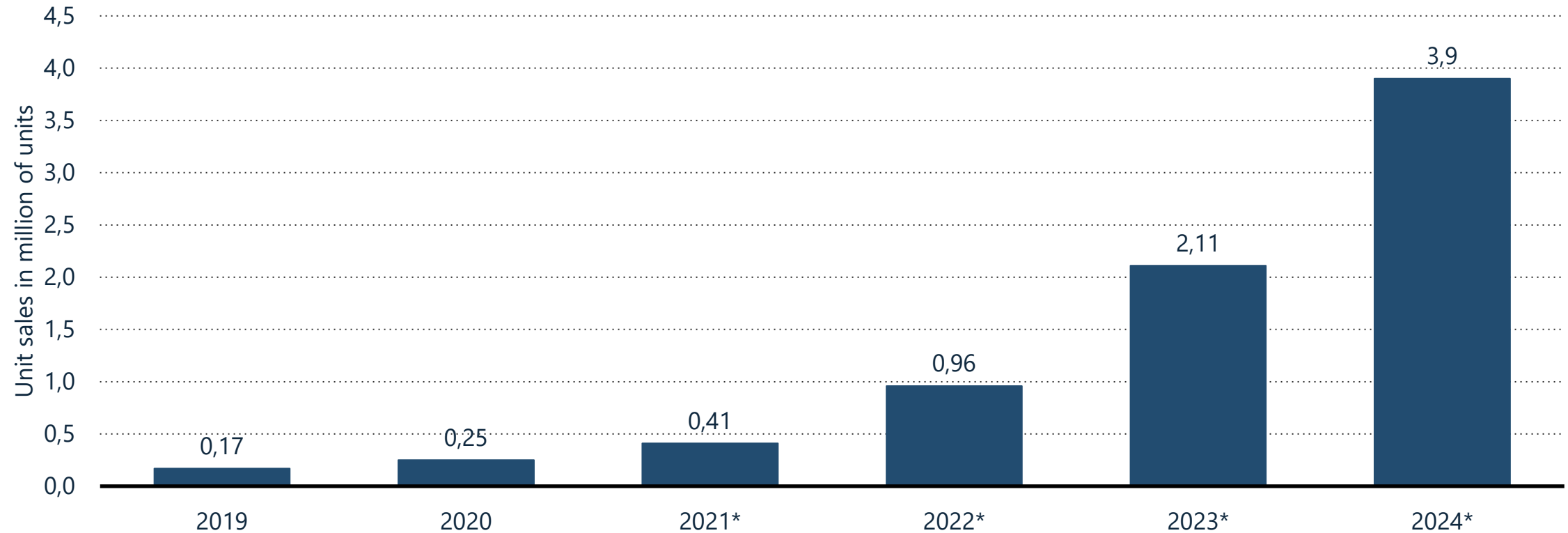
**Note(s):** Worldwide; Q3 2018 to Q2 2020

Further information regarding this statistic can be found on [page 42](#).

**Source(s):** IDC

# Augmented reality (AR) glasses unit sales worldwide from 2019 to 2024 (in million units)

AR glasses unit sales worldwide 2019-2024



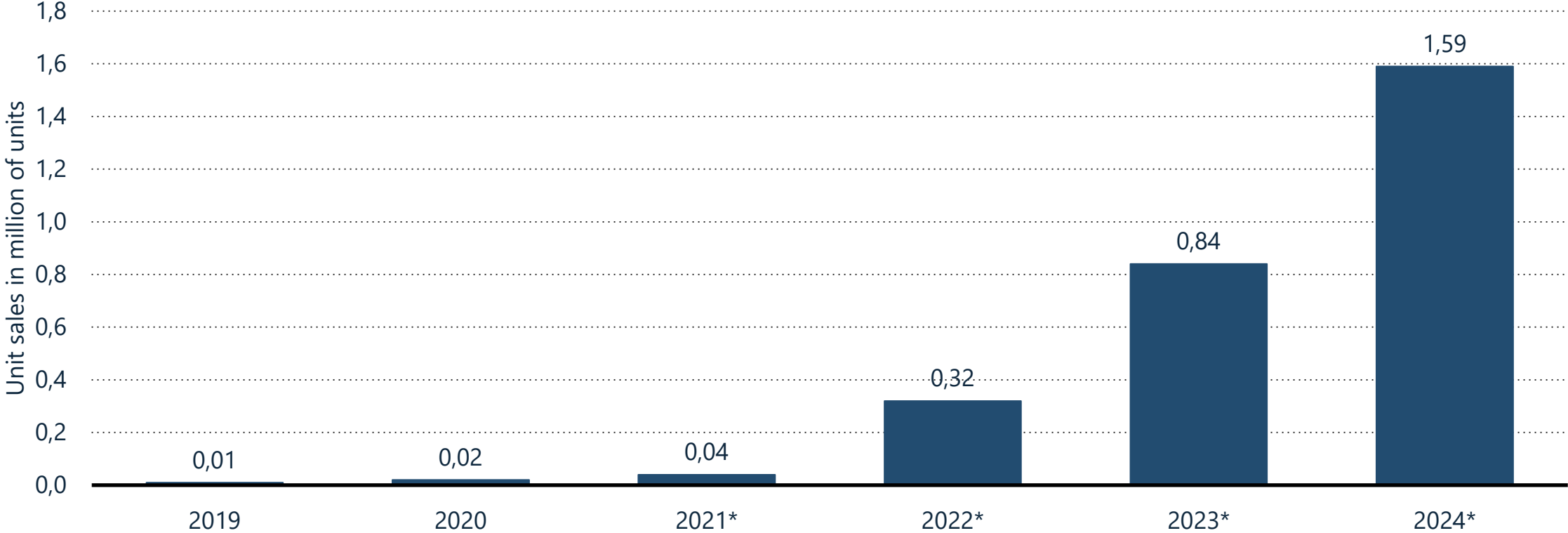
**Note(s):** Worldwide; 2019 to 2020

Further information regarding this statistic can be found on [page 43](#).

**Source(s):** ARtillery Intelligence; AR Insider

# Consumer augmented reality (AR) glasses unit sales worldwide from 2019 to 2024 (in million units)

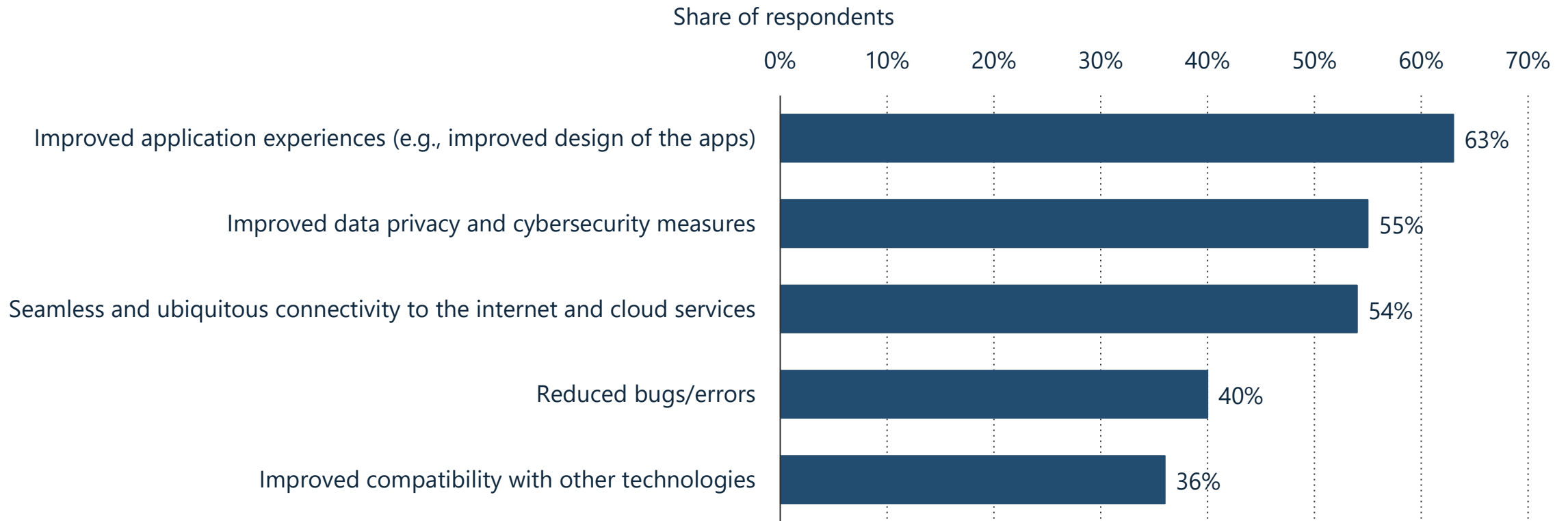
Consumer AR glasses unit sales worldwide 2019-2024



**Note(s):** Worldwide; 2019 to 2020  
Further information regarding this statistic can be found on [page 44](#).  
**Source(s):** ARtillery Intelligence

# Leading improvements and solutions to immersive technology software that will have the greatest impact with consumers in the next two years according to XR/AR/VR/MR industry experts in the United States in 2020

Top XR/AR/VR/MR software improvements in next two years as per U.S. XR experts 2020



**Note(s):** Worldwide, United States; January to February, 2020; 191 respondents; XR/AR/VR/MR industry experts (94 percent based in the U.S.)

Further information regarding this statistic can be found on [page 45](#).

**Source(s):** Perkins Coie; XRA; Boost VC



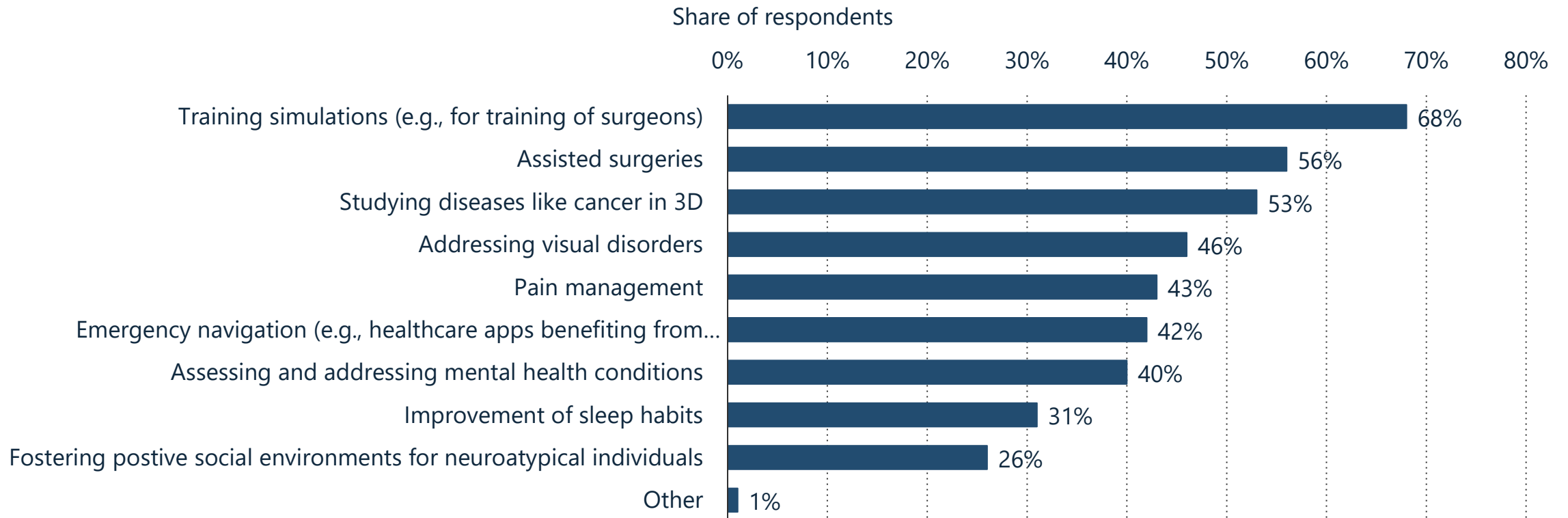


Augmented reality (AR)

# Consumption

# Leading applications of immersive technologies in the healthcare sector in the next two years according to XR/AR/VR/MR industry experts in the United States in 2020

Top XR/AR/VR/MR applications in the healthcare sector as per U.S. XR experts 2020



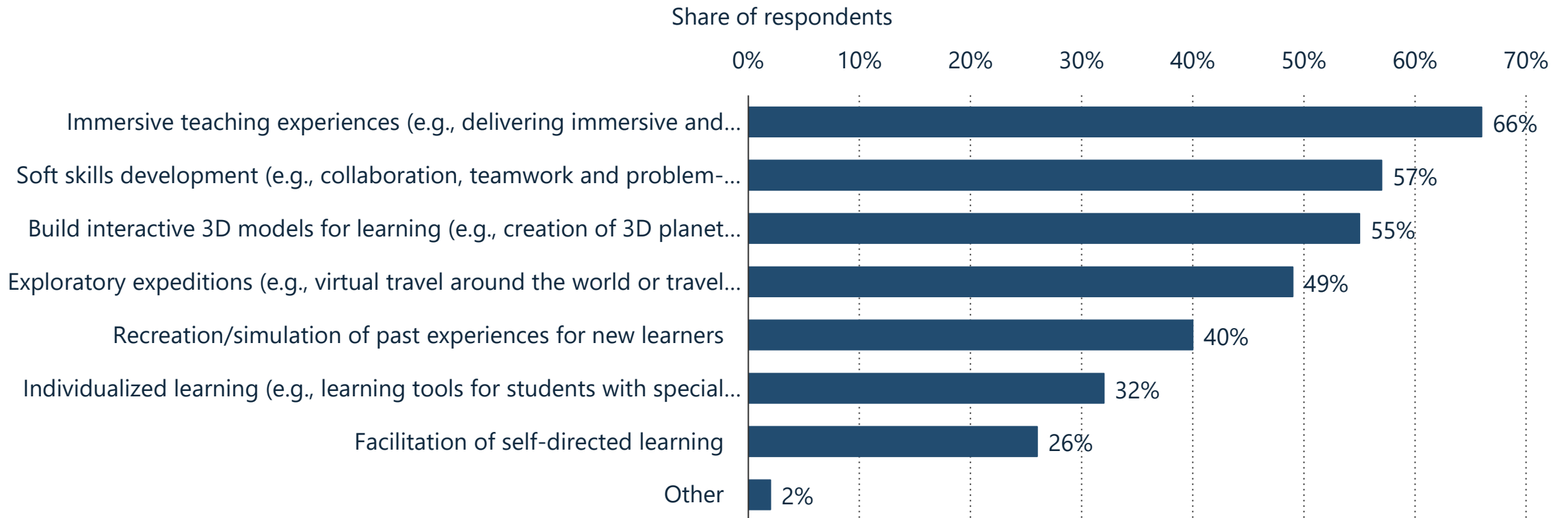
**Note(s):** Worldwide; January to February, 2020; 191 respondents; XR/AR/VR/MR industry experts (94 percent based in the U.S.)

Further information regarding this statistic can be found on [page 46](#).

**Source(s):** Perkins Coie; XRA; Boost VC

# Leading applications of immersive technologies in the education sector in the next two years according to XR/AR/VR/MR industry experts in the United States in 2020

Top XR/AR/VR/MR applications in the education sector as per U.S. XR experts 2020



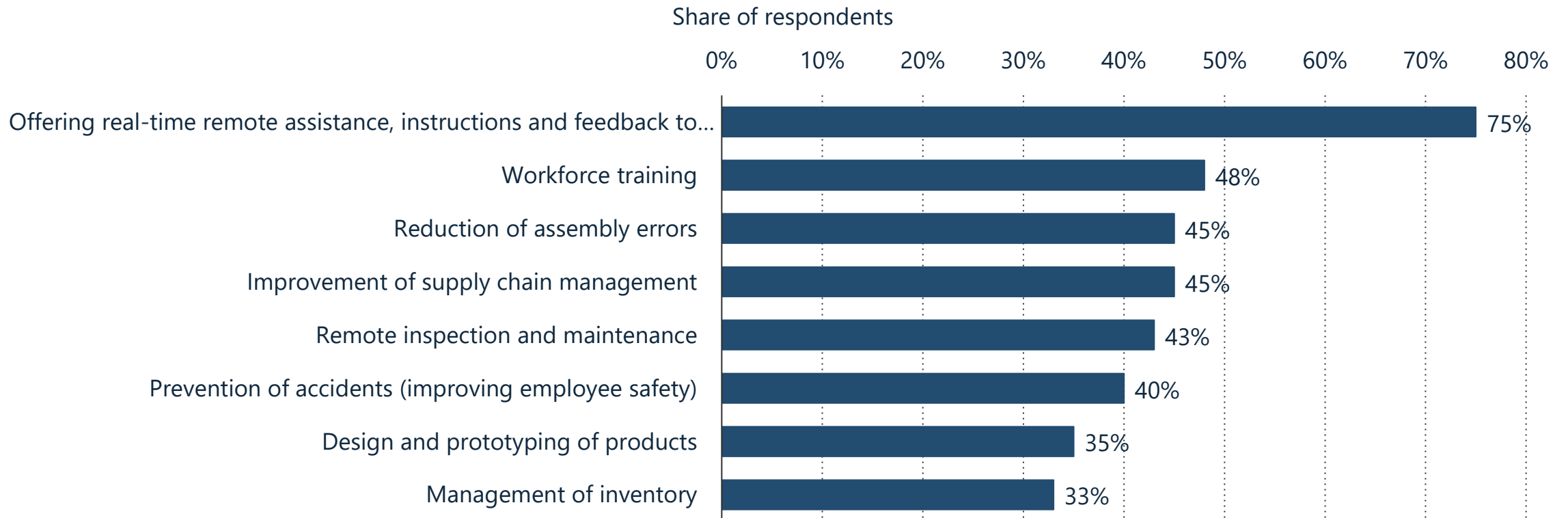
**Note(s):** Worldwide; January to February, 2020; 191 respondents; XR/AR/VR/MR industry experts (94 percent based in the U.S.)

Further information regarding this statistic can be found on [page 47](#).

**Source(s):** Perkins Coie; XRA; Boost VC

# Leading applications of immersive technologies in the manufacturing sector in the next two years according to XR/AR/VR/MR industry experts in the United States in 2020

Top XR/AR/VR/MR applications in the manufacturing sector as per U.S. XR experts 2020



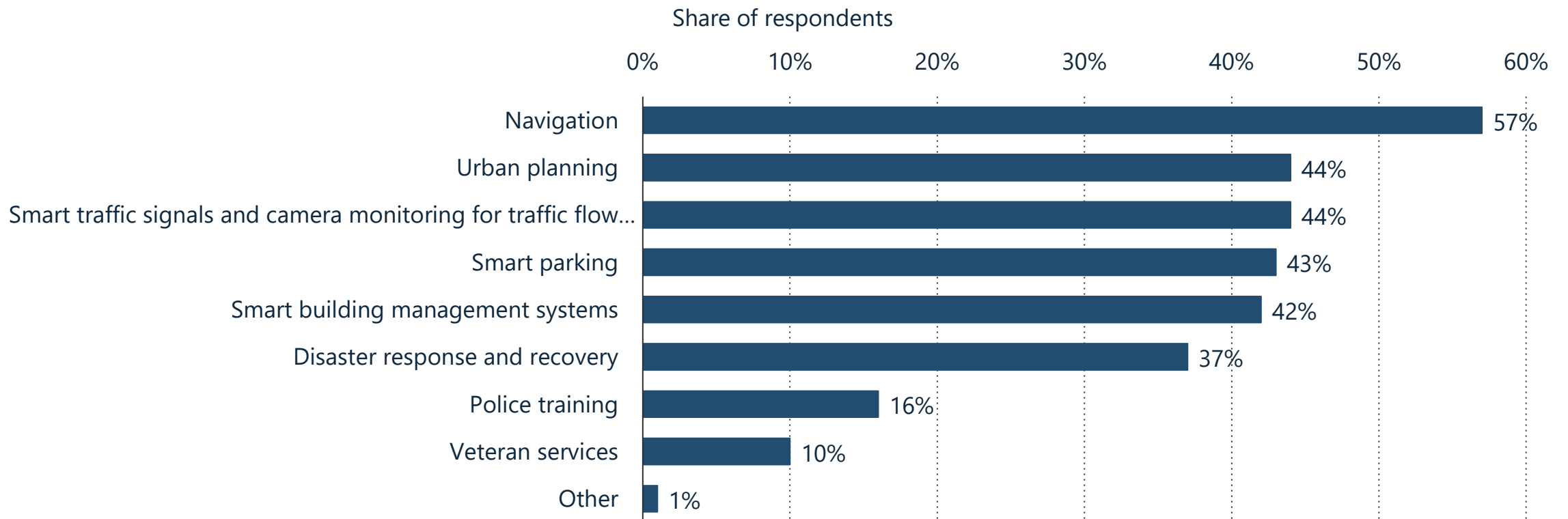
**Note(s):** Worldwide; January to February, 2020; 191 respondents; XR/AR/VR/MR industry experts (94 percent based in the U.S.)

Further information regarding this statistic can be found on [page 48](#).

**Source(s):** Perkins Coie; XRA; Boost VC

# Leading applications of immersive technologies in smart cities according to XR/AR/VR/MR industry experts in the United States in 2020

Top XR/AR/VR/MR applications in smart cities as per U.S. XR experts 2020



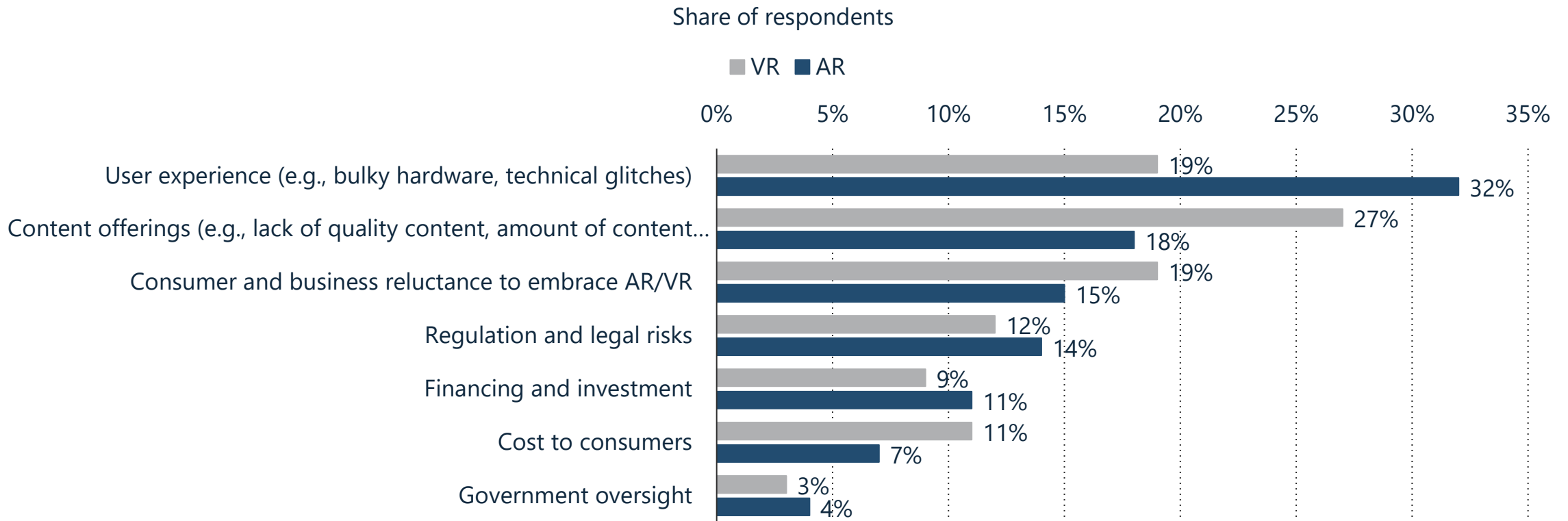
**Note(s):** Worldwide, United States; January to February, 2020; 191 respondents; XR/AR/VR/MR industry experts (94 percent based in the U.S.)

Further information regarding this statistic can be found on [page 49](#).

**Source(s):** Perkins Coie; XRA; Boost VC

# Leading obstacles to mass adoption of augmented reality (AR) and virtual reality (VR) technologies according to XR/AR/VR/MR industry experts in the United States in 2020

Obstacles to mass adoption of AR/VR technologies as per U.S. XR experts 2020



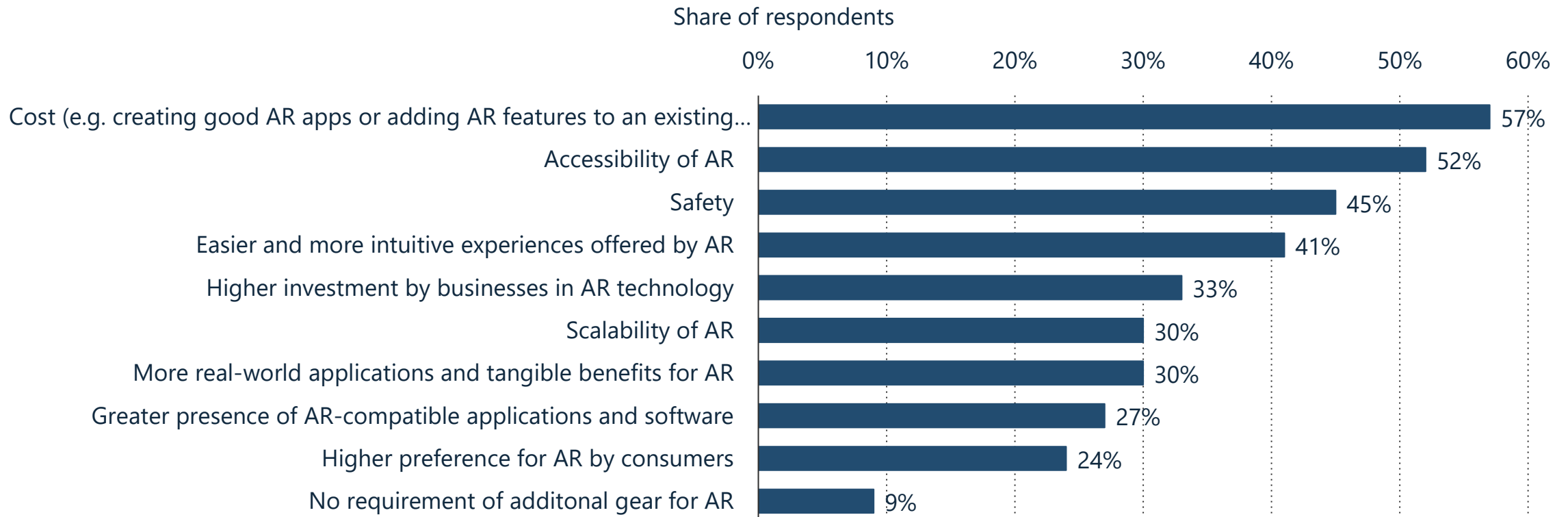
**Note(s):** Worldwide, United States; January to February 2020; 191 respondents; XR/AR/VR/MR industry experts (94 percent based in the U.S.)

Further information regarding this statistic can be found on [page 50](#).

**Source(s):** Perkins Coie; XRA; Boost VC

# Factors most responsible for augmented reality (AR) market surpassing the virtual reality (VR) market according to XR/AR/VR/MR industry experts in the United States in 2020

Factors responsible for AR market surpassing VR market as per U.S. XR experts 2020



**Note(s):** Worldwide, United States; January to February, 2020; 191 respondents; XR/AR/VR/MR industry experts (94 percent based in the U.S.)

Further information regarding this statistic can be found on [page 51](#).

**Source(s):** Perkins Coie; XRA; Boost VC



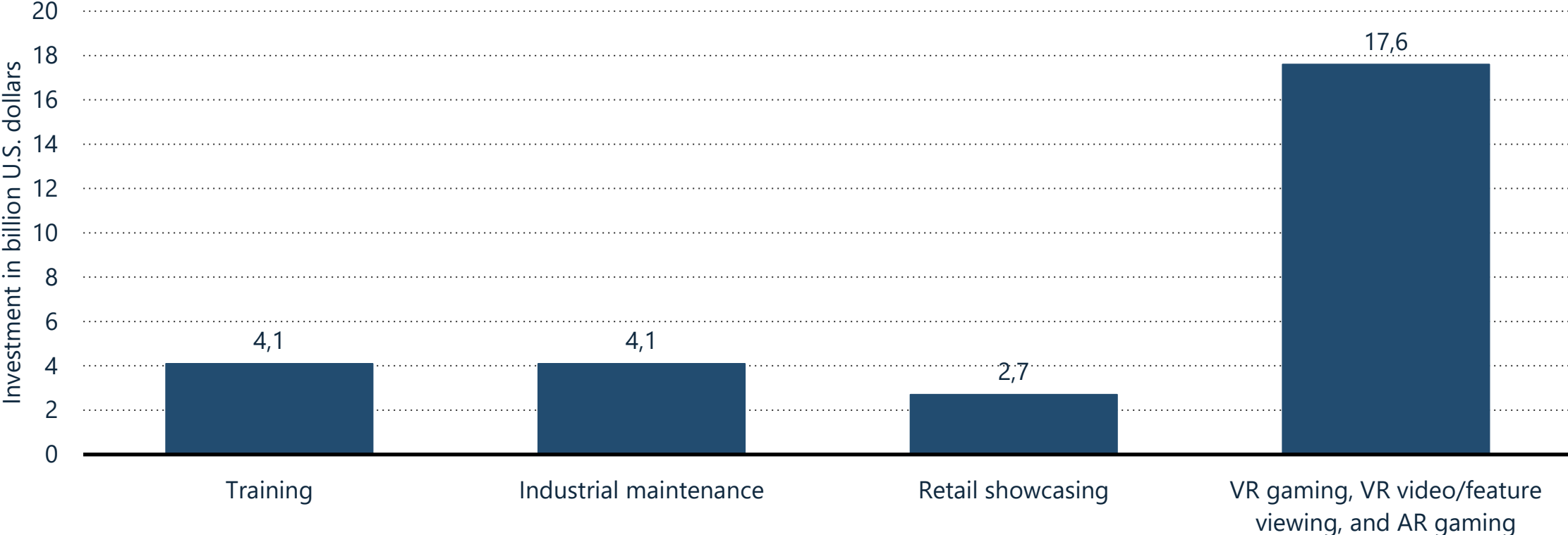
Augmented reality (AR)

# Outlook



# Investment in augmented and virtual reality (AR/VR) technology worldwide in 2024, by use case (in billion U.S. dollars)

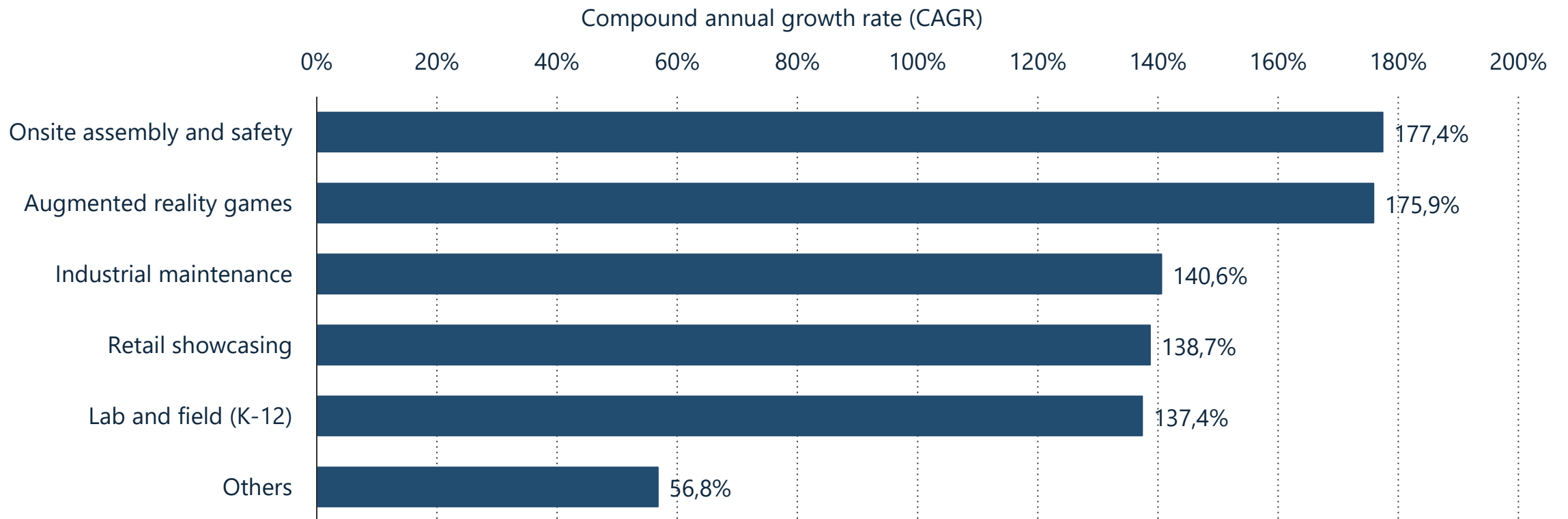
Investment in AR/VR technology worldwide in 2024, by use case



**Note(s):** Worldwide; 2020  
Further information regarding this statistic can be found on [page 52](#).  
**Source(s):** IDC

# Compound annual growth rate (CAGR) of augmented and virtual reality (AR/VR) use case spending worldwide from 2018 to 2023

AR/VR use case spending CAGR worldwide 2018-2023



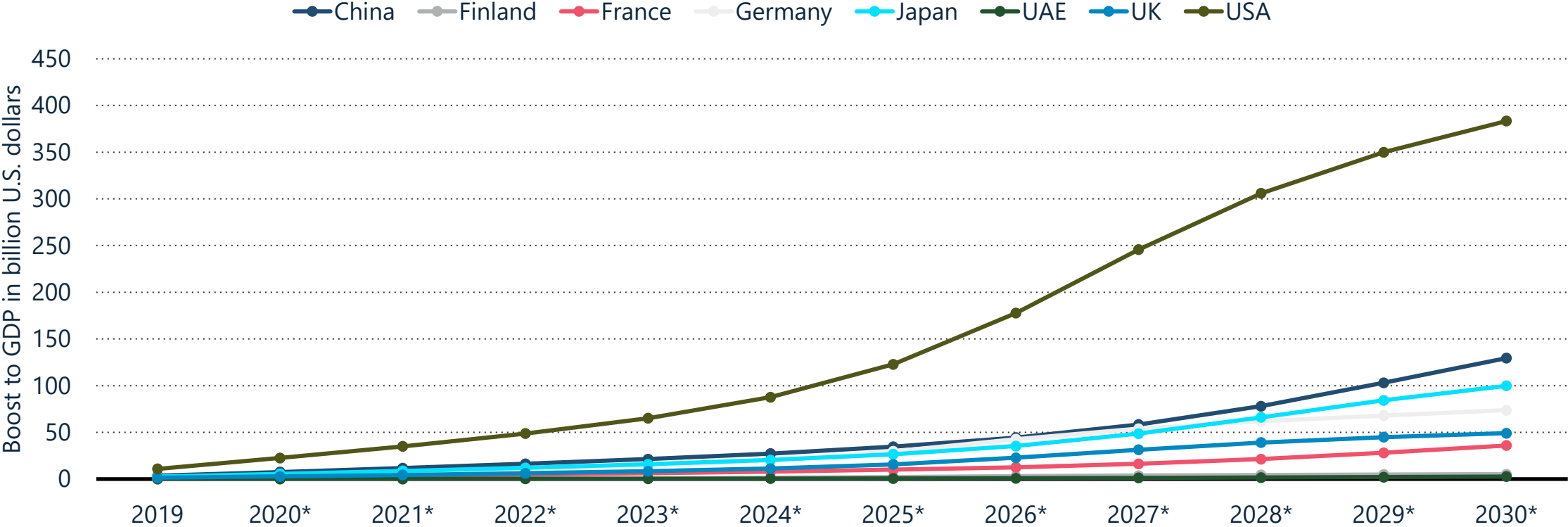
**Note(s):** Worldwide; 2018 to 2019

Further information regarding this statistic can be found on [page 53](#).

**Source(s):** IDC

# Boost to gross domestic product (GDP) from augmented reality (AR) worldwide from 2019 to 2030, by country (in billion U.S. dollars)

Boost to GDP from augmented reality (AR) worldwide 2019-2030, by country



**Note(s):** Worldwide; 2019  
 Further information regarding this statistic can be found on [page 54](#).  
**Source(s):** PwC



Augmented reality (AR)

## References

# Augmented (AR), virtual reality (VR), and mixed reality (MR) market size worldwide from 2021 to 2024 (in billion U.S. dollars)

## Augmented (AR), virtual reality (VR), and mixed reality (MR) market size 2021-2024

### Source and methodology information

Source(s)	BCG; Mordor Intelligence
Conducted by	BCG; Mordor Intelligence
Survey period	2021
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	BCG
Publication date	February 2021
Original source	bcg.com
Notes:	<i>n.a.</i>

### Description

The global augmented reality (AR), virtual reality (VR), and mixed reality (MR) market is forecast to reach 30.7 billion U.S. dollars in 2021, rising to close to 300 billion U.S. dollars by 2024. What is AR/VR? AR/VR technology makes use of sensory devices to either virtually modify a user's environment or completely immerse them in a simulated environment. Virtual reality devices typically consist of specially designed headsets that offer complete visual immersion into a simulated environment, while augmented reality relies on headsets that add virtual elements to a user's actual environment. In 2020, sales of AR/VR headsets are projected to reach 5.5 million units. When it comes to VR/AR device sales by vendor, Sony's PlayStation VR and Facebook's Oculus VR headsets are the major VR headset products being sold on the market now. VR and gaming One major use of VR headsets is for gaming, as such devices allow gamers to have a full-immersive experience in the gaming world, be it a fantasy land or the driver's seat of a racing car. There are different VR gaming headsets including headsets for PC, console and premium mobile devices, as well as standalone devices. In 2019, of the overall VR gaming device shipments, 2.8 million units of standalone VR gaming headsets were shipped worldwide. VR headsets are becoming increasingly popular among gamers, and are considered by 37 percent of surveyed global game developers to be an important platform for future growth.

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# Augmented and virtual reality (AR/VR) forecast spending worldwide in 2020 (in billion U.S. dollars), by segment

## Global AR/VR forecast spending by segment 2020

### Source and methodology information

Source(s)	IDC
Conducted by	IDC
Survey period	2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	IDC
Publication date	November 2020
Original source	idc.com
Notes:	<i>Figures based on market share and 2020 spending figures provided by the source.</i>

### Description

In 2020, consumer spending on augmented and virtual reality (AR/VR) technology is expected to reach around 6.36 billion U.S. dollars, whilst the distribution and services sector is forecast to spend nearly two billion U.S. dollars. Total AR/VR spending worldwide is projected to amount to 12 billion U.S. dollars in 2020, although this is set to rise considerably through to 2024, reaching 72.8 billion U.S. dollars. AR consumption AR technology is being used across numerous industries such as healthcare, public safety, gas and oil, tourism and marketing. As the technology improves further, there is no doubt that the use cases of AR will widen and develop as businesses and consumers alike realize the full potential, with the technology expected to become as prominent as mobile devices are in today's market. VR consumption VR gaming and VR video make up the largest consumer use cases for VR technology, with 20.8 billion U.S. dollars expected to be spent in 2023 on these areas alone. However, experts have suggested that the benefits of VR will have an impact upon industry too, with improvements to efficiency a real possibility. As a result, by 2023 it is expected that industrial usage will be three times larger than that of consumers .

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# Forecast share of augmented and virtual reality (AR/VR) spending worldwide in 2020, by segment

## Share of global AR/VR spending by segment 2020

### Source and methodology information

Source(s)	IDC
Conducted by	IDC
Survey period	2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	IDC
Publication date	November 2020
Original source	idc.com
Notes:	<i>n.a.</i>

### Description

In 2020, consumer spending on augmented and virtual reality (AR/VR) is expected to account for 53 percent of global AR/VR spending that year. Total AR/VR spending worldwide is projected to amount to 12 billion U.S. dollars in 2020, rising to 72.8 billion U.S. dollars by 2024.

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# Sectors expected to witness the most disruption by immersive technologies over the next 12 months according to XR/AR/VR/MR industry experts in the United States in 2020

## Sectors expected to be most disrupted by XR/AR/VR/MR as per U.S. XR experts 2020

### Source and methodology information

Source(s)	Perkins Coie; XRA; Boost VC
Conducted by	Perkins Coie; XRA; Boost VC
Survey period	January to February, 2020
Region(s)	Worldwide, United States
Number of respondents	191
Age group	<i>n.a.</i>
Special characteristics	XR/AR/VR/MR industry experts (94 percent based in the U.S.)
Published by	Perkins Coie
Publication date	March 2020
Original source	2020 Augmented and Virtual Reality Survey Report, page 17
Notes:	<i>Question: In which sectors do you expect to see the most disruption by immersivetechologies in the next 12 months? (outside of the gaming andentertainment space)</i>

### Description

The healthcare and medical devices sector was forecast to witness the most disruption by immersive technologies over the next 12 months according to XR industry experts, with this sector highlighted by 38 percent of respondents.

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# Mobile augmented reality (AR) market revenue worldwide from 2019 to 2024 (in billion U.S. dollars)

## Mobile AR market revenue worldwide 2019-2024

### Source and methodology information

Source(s)	ARTillery Intelligence
Conducted by	ARTillery Intelligence
Survey period	2019 to 2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	ARTillery Intelligence
Publication date	July 2020
Original source	artilry.co
Notes:	<i>* Forecast. Mobile AR revenue includes mobile AR consumer and enterprise spending and their revenue subsegments.</i>

### Description

In 2020, the mobile augmented reality (AR) market was worth 6.16 billion U.S. dollars. It is forecasted to rise to 8.86 billion U.S. dollars in 2021, before jumping to over 21 billion U.S. dollars by 2024.

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# Consumer mobile augmented reality (AR) experiences spending worldwide from 2019 to 2024 (in billion U.S. dollars)

## Consumer mobile AR experiences spending worldwide 2019-2024

### Source and methodology information

Source(s)	ARTillery Intelligence; AR Insider
Conducted by	ARTillery Intelligence
Survey period	2019 to 2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	AR Insider
Publication date	December 2020
Original source	arinsider.co
Notes:	* <i>Forecast.</i>

### Description

In 2020, consumer mobile augmented reality (AR) experiences spending amounted to 1.38 billion U.S. dollars. Consumer mobile AR spending is forecast to rise to 1.93 billion U.S. dollars in 2021, before climbing to 4.18 billion U.S. dollars by 2024.

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# Corporate and industrial mobile augmented reality (AR) software spending worldwide from 2019 to 2024 (in billion U.S. dollars)

## Enterprise mobile AR spending worldwide 2019-2024

### Source and methodology information

Source(s)	ARTillery Intelligence; AR Insider
Conducted by	ARTillery Intelligence
Survey period	2019 to 2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	AR Insider
Publication date	February 2021
Original source	arinsider.co
Notes:	<i>* Forecast. Enterprise mobile AR spending includes smartphone and tablet-based AR software spend; AR creation, development, and authorizing software; and AR visualization software for customer support, corporate use cases, and IT service management.</i>

### Description

In 2020, corporate and industrial mobile augmented reality (AR) software spending amounted to 2.58 billion U.S. dollars. Enterprise mobile AR spending is forecast to rise to 3.1 billion U.S. dollars in 2021, before climbing to 3.78 billion U.S. dollars by 2024.

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# Number of mobile augmented reality (AR) active users worldwide from 2019 to 2024 (in billions)

## Global mobile augmented reality (AR) users 2019-2024

### Source and methodology information

Source(s)	ARtillery Intelligence; AR Insider
Conducted by	ARtillery Intelligence
Survey period	2019 to 2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	AR Insider
Publication date	February 2021
Original source	arinsider.co
Notes:	<i>* Forecast. The figure represents AR active devices. This has been de-duplicated to factor in platform overlap.</i>

### Description

As per recent data, by 2023 there will be an estimated 2.4 billion mobile augmented reality (AR) users worldwide, a rise of 2.2 billion from the 200 million seen in 2015. In 2021, there will be an estimated 1.96 billion mobile AR users worldwide. That same year, in the United states alone, the total number of AR users is forecast to reach 85 million . AR headsets In contrast to virtual reality (VR) , which creates an artificial environment, AR simply makes use of the existing environment by overlaying new information on top of it. In AR, the information about the surrounding real world is made available to the user for information and/or interaction through the use of headsets. By 2023, it is anticipated that global AR headset shipments will reach over 30 million units, over 12 times the number expected to be shipped in 2020. AR consumption AR technology is being used across numerous industries such as: healthcare, public safety, gas and oil, tourism, marketing etc. Everyone from tourists to soldiers to someone looking for the closest subway stop is able to benefit from this ability to place computer-generated graphics in one`s field of vision. Forecasts estimate that in 2023, spending on extended reality (XR) technology , including AR, by the manufacturing and construction industry alone will reach 35 billion U.S. dollars.

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# Mobile augmented reality (AR) active users worldwide in 2020, by platform

## Mobile AR active users worldwide 2020, by platform

### Source and methodology information

Source(s)	ARTillery Intelligence; AR Insider
Conducted by	ARTillery Intelligence
Survey period	2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	AR Insider
Publication date	March 2021
Original source	arinsider.co
Notes:	<i>* Includes Instagram and Messenger. ** Includes iPad.</i>

### Description

In 2020, Facebook AR was the biggest contributor toward the total number of mobile augmented reality (AR) users worldwide, with over 300 million active users of this platform. Other notable mobile AR platforms include Snap and TikTok.

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# Consumer and enterprise augmented reality (AR) glasses hardware and software revenue worldwide from 2019 to 2024 (in billion U.S. dollars)

## Consumer and enterprise AR glasses revenue worldwide 2019-2024

### Source and methodology information

Source(s)	ARtillery Intelligence
Conducted by	ARtillery Intelligence
Survey period	2019 to 2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	ARtillery Intelligence
Publication date	September 2020
Original source	artilry.co
Notes:	<i>* Forecast. Includes platform revenue for consumer and enterprise experience creation (bought by enterprises/developers).</i>

### Description

In 2020, consumer and enterprise augmented reality (AR) glasses hardware and software revenue amounted to 1.35 billion U.S. dollars. It is forecast that this is set to rise to 2.09 billion U.S. dollars in 2021 before climbing to 13.36 billion U.S. dollars by 2024.

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# Enterprise augmented reality (AR) glasses hardware and software revenue worldwide from 2019 to 2024 (in billion U.S. dollars)

## Enterprise AR glasses spending worldwide 2019-2024

### Source and methodology information

Source(s)	ARtillery Intelligence
Conducted by	ARtillery Intelligence
Survey period	2019 to 2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	ARtillery Intelligence
Publication date	February 2021
Original source	artilry.co
Notes:	<i>* Forecast. Includes platform revenue for consumer and enterprise experience creation (bought by enterprises/developers).</i>

### Description

In 2020, enterprise augmented reality (AR) glasses hardware and software revenue amounted to 1.33 billion U.S. dollars. It is forecast that this is set to rise to 2.05 billion U.S. dollars in 2021 before climbing to 11.99 billion U.S. dollars by 2024.

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# Distribution of augmented reality (AR) headset shipments worldwide from 3rd quarter 2018 to 1st quarter 2020, by category

## Global augmented reality (AR) headset shipments from Q3 2018 - Q1 2020, by category

### Source and methodology information

Source(s)	IDC
Conducted by	IDC
Survey period	Q3 2018 to Q2 2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	IDC
Publication date	June 2020
Original source	idc.com
Notes:	<i>n.a.</i>

### Description

According to recent data, standalone head mounted displays (HMDs) made up 74.7 percent of total augmented reality (AR) headset shipments worldwide in the first quarter of 2020, the largest proportion by category. In the fourth quarter of 2018, screenless viewers accounted for the largest share across all category types, however, standalone HMDs have maintained the largest share in all of the other quarters studied.

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# Augmented reality (AR) glasses unit sales worldwide from 2019 to 2024 (in million units)

## AR glasses unit sales worldwide 2019-2024

### Source and methodology information

Source(s)	ARtillery Intelligence; AR Insider
Conducted by	ARtillery Intelligence
Survey period	2019 to 2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	AR Insider
Publication date	March 2021
Original source	arinsider.co
Notes:	* <i>Forecast.</i>

### Description

In 2021, unit sales of augmented reality (AR) glasses among the leading brands worldwide are expected to amount to 410 thousand units, rising to 3.9 million units by 2024.

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# Consumer augmented reality (AR) glasses unit sales worldwide from 2019 to 2024 (in million units)

## Consumer AR glasses unit sales worldwide 2019-2024

### Source and methodology information

Source(s)	ARtillery Intelligence
Conducted by	ARtillery Intelligence
Survey period	2019 to 2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	ARtillery Intelligence
Publication date	January 2021
Original source	artilry.co
Notes:	<i>* Forecast. Includes vendors with hardware in-market at time of release, as well as anticipated market entrants such as Apple.</i>

### Description

In 2020, unit sales of consumer augmented reality (AR) glasses among the leading brands worldwide reached 20 thousand units. It is forecast to double in 2021 to 40 thousand units, before rising considerably to 1.59 million units by 2024.

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# Leading improvements and solutions to immersive technology software that will have the greatest impact with consumers in the next two years according to XR/AR/VR/MR industry experts in the United States in 2020

## Top XR/AR/VR/MR software improvements in next two years as per U.S. XR experts 2020

### Source and methodology information

Source(s)	Perkins Coie; XRA; Boost VC
Conducted by	Perkins Coie; XRA; Boost VC
Survey period	January to February, 2020
Region(s)	Worldwide, United States
Number of respondents	191
Age group	<i>n.a.</i>
Special characteristics	XR/AR/VR/MR industry experts (94 percent based in the U.S.)
Published by	Perkins Coie
Publication date	March 2020
Original source	2020 Augmented and Virtual Reality Survey Report, page 28
Notes:	<i>Question: What are the top improvements/solutions across immersive technology software that will make the greatest impact with consumers in the next two years?</i>

### Description

Improved application experiences, as well as data privacy and cybersecurity measures, are what many XR industry experts expect from immersive technology software over the next two years. These solutions were highlighted by 63 percent and 55 percent of respondents, respectively, in a 2020 survey.

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# Leading applications of immersive technologies in the healthcare sector in the next two years according to XR/AR/VR/MR industry experts in the United States in 2020

## Top XR/AR/VR/MR applications in the healthcare sector as per U.S. XR experts 2020

### Source and methodology information

Source(s)	Perkins Coie; XRA; Boost VC
Conducted by	Perkins Coie; XRA; Boost VC
Survey period	January to February, 2020
Region(s)	Worldwide
Number of respondents	191
Age group	<i>n.a.</i>
Special characteristics	XR/AR/VR/MR industry experts (94 percent based in the U.S.)
Published by	XRA
Publication date	March 2020
Original source	2020 Augmented and Virtual Reality Survey Report, page 18
Notes:	<i>n.a.</i>

### Description

Training simulations are expected to be a major application of immersive technologies in the healthcare sector within the next two years according to 68 percent of XR industry experts who responded to the 2020 survey.

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# Leading applications of immersive technologies in the education sector in the next two years according to XR/AR/VR/MR industry experts in the United States in 2020

## Top XR/AR/VR/MR applications in the education sector as per U.S. XR experts 2020

### Source and methodology information

Source(s)	Perkins Coie; XRA; Boost VC
Conducted by	Perkins Coie; XRA; Boost VC
Survey period	January to February, 2020
Region(s)	Worldwide
Number of respondents	191
Age group	<i>n.a.</i>
Special characteristics	XR/AR/VR/MR industry experts (94 percent based in the U.S.)
Published by	XRA
Publication date	March 2020
Original source	2020 Augmented and Virtual Reality Survey Report, page 19
Notes:	<i>Question: In the education sector, which of the following new applications/solutions can we expect immersive technologies to offer in the next two years?</i>

### Description

Immersive teaching experiences are expected to be a major application of immersive technologies in the education sector within the next two years according to 66 percent of XR industry experts who responded to the 2020 survey.

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# Leading applications of immersive technologies in the manufacturing sector in the next two years according to XR/AR/VR/MR industry experts in the United States in 2020

## Top XR/AR/VR/MR applications in the manufacturing sector as per U.S. XR experts 2020

### Source and methodology information

Source(s)	Perkins Coie; XRA; Boost VC
Conducted by	Perkins Coie; XRA; Boost VC
Survey period	January to February, 2020
Region(s)	Worldwide
Number of respondents	191
Age group	<i>n.a.</i>
Special characteristics	XR/AR/VR/MR industry experts (94 percent based in the U.S.)
Published by	XRA
Publication date	March 2020
Original source	2020 Augmented and Virtual Reality Survey Report, page 18
Notes:	<i>Question: In the healthcare sector, which of the following new applications/solutions can we expect immersive technologies to offer in the next two years?</i>

### Description

Real-time remote assistance, as well as instructions and feedback to employees, is expected to be a major application of immersive technologies in the manufacturing sector within the next two years according to 75 percent of XR industry experts who responded to the 2020 survey.

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# Leading applications of immersive technologies in smart cities according to XR/AR/VR/MR industry experts in the United States in 2020

## Top XR/AR/VR/MR applications in smart cities as per U.S. XR experts 2020

### Source and methodology information

Source(s)	Perkins Coie; XRA; Boost VC
Conducted by	Perkins Coie; XRA; Boost VC
Survey period	January to February, 2020
Region(s)	Worldwide, United States
Number of respondents	191
Age group	<i>n.a.</i>
Special characteristics	XR/AR/VR/MR industry experts (94 percent based in the U.S.)
Published by	XRA
Publication date	March 2020
Original source	2020 Augmented and Virtual Reality Survey Report, page 21
Notes:	<i>Question: What are some of the top applications of immersive technologies in smartcities?</i>

### Description

Improvements in navigation solutions and urban planning are the top applications of immersive technologies in smart cities according to 57 and 44 percent, respectively, of XR industry experts from a 2020 survey.

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# Leading obstacles to mass adoption of augmented reality (AR) and virtual reality (VR) technologies according to XR/AR/VR/MR industry experts in the United States in 2020

## Obstacles to mass adoption of AR/VR technologies as per U.S. XR experts 2020

### Source and methodology information

Source(s)	Perkins Coie; XRA; Boost VC
Conducted by	Perkins Coie; XRA; Boost VC
Survey period	January to February 2020
Region(s)	Worldwide, United States
Number of respondents	191
Age group	<i>n.a.</i>
Special characteristics	XR/AR/VR/MR industry experts (94 percent based in the U.S.)
Published by	Perkins Coie; XRA; Boost VC
Publication date	March 2020
Original source	2020 Augmented and Virtual Reality Survey Report, page 22
Notes:	<i>n.a.</i>

### Description

In an early 2020 survey, 32 percent of the XR industry experts surveyed cited user experience as being one of the biggest obstacles to mass adoption of augmented reality (AR) technologies. Content offerings ran a close second place, with 18 percent highlighting this as an obstacle.

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# Factors most responsible for augmented reality (AR) market surpassing the virtual reality (VR) market according to XR/AR/VR/MR industry experts in the United States in 2020

## Factors responsible for AR market surpassing VR market as per U.S. XR experts 2020

### Source and methodology information

Source(s)	Perkins Coie; XRA; Boost VC
Conducted by	Perkins Coie; XRA; Boost VC
Survey period	January to February, 2020
Region(s)	Worldwide, United States
Number of respondents	191
Age group	<i>n.a.</i>
Special characteristics	XR/AR/VR/MR industry experts (94 percent based in the U.S.)
Published by	Perkins Coie
Publication date	March 2020
Original source	2020 Augmented and Virtual Reality Survey Report, page 14
Notes:	<i>Question: Which of the following factors are most responsible in terms of the AR market surpassing the VR market?</i>

### Description

Cost, accessibility, and safety are the top three factors most responsible for the augmented reality market surpassing the virtual reality market at some point according to a survey amongst XR industry experts.

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# Investment in augmented and virtual reality (AR/VR) technology worldwide in 2024, by use case (in billion U.S. dollars)

## Investment in AR/VR technology worldwide in 2024, by use case

### Source and methodology information

Source(s)	IDC
Conducted by	IDC
Survey period	2020
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	IDC
Publication date	November 2020
Original source	idc.com
Notes:	<i>n.a.</i>

### Description

The commercial use cases for augmented and virtual reality (AR/VR) that are expected to receive the largest investment in 2024 are training and industrial maintenance with 4.1 billion U.S. dollars forecast to be invested in both fields. VR gaming, VR video/feature viewing, and AR gaming make up the three largest consumer use cases for augmented and virtual reality (AR/VR), with 17.6 billion U.S. dollars expected to be spent in 2024. COVID-19 and VR Virtual reality (VR) is a simulated experience that can be similar to or completely different from the real world. The aim of VR is to create a sensory experience for the user sometimes including sight, touch, hearing, smell, or even taste. These effects involve the use of VR headsets, a device which does not allow light or images from the real world to interfere with the virtual one. VR headset suppliers include HTC, Oculus, PlayStation and Valve. Manufacturers have observed a surge in interest during the coronavirus (COVID-19) pandemic as mainstream users, particularly those quarantined at home, have looked for new things to do. However, supply shortages have arisen, notably for some of the most sought-after devices such as the Oculus Quest and the Valve Index. This has been compounded further by an increasingly strong demand for VR technology from businesses. AR/VR in business The use of VR in an enterprise setting can often be seen through its use within training exercises. Examples of this include scenarios where new employees are being trained on important, technical machines and equipment - taking these out of service for training purposes would be an expensive and disruptive process for a business, with VR stepping in to alleviate this issue. Augmented reality (AR) can also be used to help improve efficiencies in a company, particularly with 'see what I see' capabilities for remote assistance, as well as the overlaying of data on the physical world image. On-site assembly, safety, in addition to industrial mainten [...]

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# Compound annual growth rate (CAGR) of augmented and virtual reality (AR/VR) use case spending worldwide from 2018 to 2023

## AR/VR use case spending CAGR worldwide 2018-2023

### Source and methodology information

Source(s)	IDC
Conducted by	IDC
Survey period	2018 to 2019
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	IDC
Publication date	March 2020
Original source	idc.com
Notes:	<i>n.a.</i>

### Description

During the forecast period, AR/VR spending for onsite assembly and safety purposes is projected to grow with a compound annual growth rate (CAGR) of 177.4 percent, whilst spending on augmented reality games is set to grow at a CAGR of 175.9 percent. Extended Reality (XR) Extended reality (XR) is an emerging term for all immersive technologies, including augmented reality (AR), virtual reality (VR), and mixed reality (MR), plus those that are yet to be created. Immersive, or XR, technologies, extend the reality we experience by either merging the virtual and "real" worlds or by creating a fully immersive experience. The market for XR technology is growing, with projections for 2023 valuing it at over 18 billion U.S. dollars. VR creates an artificial environment, whereas AR makes use of the existing environment by overlaying new information on top of it. In both VR and AR, the information or imagery is made available to the user through the use of headsets. By 2023, global XR headset shipments are anticipated to reach over 68 million units, with major companies like Microsoft and Intel investing in XR technology. XR Consumption The number of mobile AR users globally is expected to reach 2.4 billion by 2023, fueled in part by a growing desire for AR technology to enhance consumer experiences in media and entertainment. Music concerts and sports events are just two examples where AR technology is being used more commonly in order to help enrich the fan experience. The consumer virtual reality market is expected to be worth over 16 billion U.S. dollars by 2023, with significant VR investment going into VR gaming, as well as industrial training and maintenance.

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# Boost to gross domestic product (GDP) from augmented reality (AR) worldwide from 2019 to 2030, by country (in billion U.S. dollars)

## Boost to GDP from augmented reality (AR) worldwide 2019-2030, by country

### Source and methodology information

Source(s)	PwC
Conducted by	PwC
Survey period	2019
Region(s)	Worldwide
Number of respondents	<i>n.a.</i>
Age group	<i>n.a.</i>
Special characteristics	<i>n.a.</i>
Published by	PwC
Publication date	November 2019
Original source	pwc.com
Notes:	* <i>Forecast.</i>

### Description

It is forecast that augmented reality (AR) will boost gross domestic product (GDP) worldwide by 1.1 trillion U.S. dollars by 2030, with the U.S. expected to receive a boost of over 380 billion U.S. dollars, while in China, the boost is set to approach 130 billion U.S. dollars.

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