Smart Home Report 2021

Statista Digital Market Outlook – Market Report

November 2021

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The market outlook presents up-to-date figures and an in-depth analysis of the Smart Home market

Introduction

Smart home and the Internet of Things (IoT) are irrevocably intertwined, with IoT being one of the most disruptive trends at the moment, affecting a large number of traditional industries. The rising number of connected devices and sensors can be controlled via smart algorithms such as machine learning tools and together form the IoT. The use of the IoT in the context of private households defines a smart home. The possibilities to automate processes in a domestic context are almost unlimited. In Statista's Digital Market Outlook we divide the Smart Home market into the segments Smart Appliances, Security, Control and Connectivity, Home Entertainment, Energy Management, and Comfort and Lighting.

With this report we provide a comprehensive overview of the current Smart Home market as well as a prognosis of developments with detailed information. Besides all relevant market figures like total and average revenues and the number of smart homes for the years 2019 to 2026, we analyze current trends and give important background information on key players, start-ups and other deep-dive topics.

This Smart Home report presents a major change from our previous reports, employing a brand-new methodology and the latest comprehensive data from our Global Consumer Survey. At the same time, the general trend remains the same: steady international growth and consolidation in the adoption of Smart Home technology.

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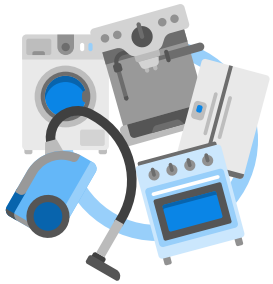
The Smart Home market is divided into 6 segments primarily based on use cases

Overview: segments

Control and Connectivity

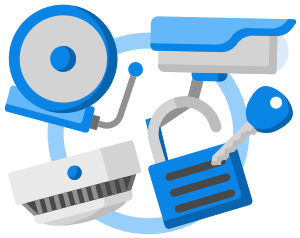
- Gateways/hubs that are capable of controlling devices of all segments
- Smart speakers with a primary focus on control, and digital assistants
- Control buttons and smart plugs/sockets

Smart Appliances



- Large appliances such as fridges, washing machines, dish washers, ovens
- Small appliances such as coffee machines, vacuum and mowing robots, microwaves

Security

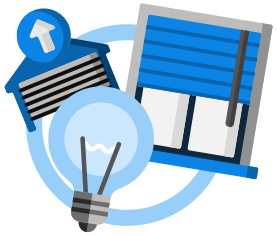


- Digitally connected and controlled devices for burglar prevention and other security issues
- Motion sensors, door locks, security cameras, Hazard prevention devices like water or smoke sensors

Home Entertainment

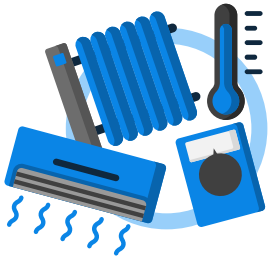
- Connected and controlled devices for entertainment purposes
- Multiroom entertainment systems with entertainment focus
- Entertainment remotes

Comfort and Lighting



- Digitally connected and controlled devices for living atmosphere improvement
- Smart lighting/bulbs
- Window/door sensors, shading devices, garage door controls

Energy Management



- Digitally connected and controlled devices for energy conservation
- Included products: Thermostats, Radiator controls, Temperature/ wind/ humidity sensors, Air condition controls

Sources: Statista Digital Market Outlook 2020

The U.S. is the largest global Smart Home market with revenues of US$23.3 billion in 2020

Overview: summary and key takeaways

Summary

The Internet of Things (IoT) is one of the hot topics when it comes to digitization and disruptive changes to traditional industries. The globally rising number of connected sensors leads to more and more data. With the use of smart algorithms such as machine learning tools, these data can be used to control actuators. These sensors and actuators are what we generally call IoT. Applying the IoT in the context of a private household is what is commonly known as a smart home. The possibilities to automate processes in the domestic context are almost countless.

The biggest Smart Home market in 2020 is the U.S. with revenues of US$23.3 billion. Although the prospects are positive, growth rates are expected to be significantly lower than in China, with 14.0% compared to 20.2% annually. This will lead to revenues of US$51.2 billion by 2026.

The European market is worth US$20.1 billion in 2020, with Smart Appliances as the biggest segment with US$6.7 billion. Sales are expected to grow at a CAGR[1] of 17.8% up to 2026 and result in revenues of US$53.9 billion.

In the Chinese market, revenues of US$15.0 billion have been generated in 2020. Smart Appliances account for the biggest share of these revenues with US$7.6 billion. Judging from the high CAGR[1] of 20.2%, the whole market is expected to exceed revenues of US$45.3 billion by 2026.

Key takeaways

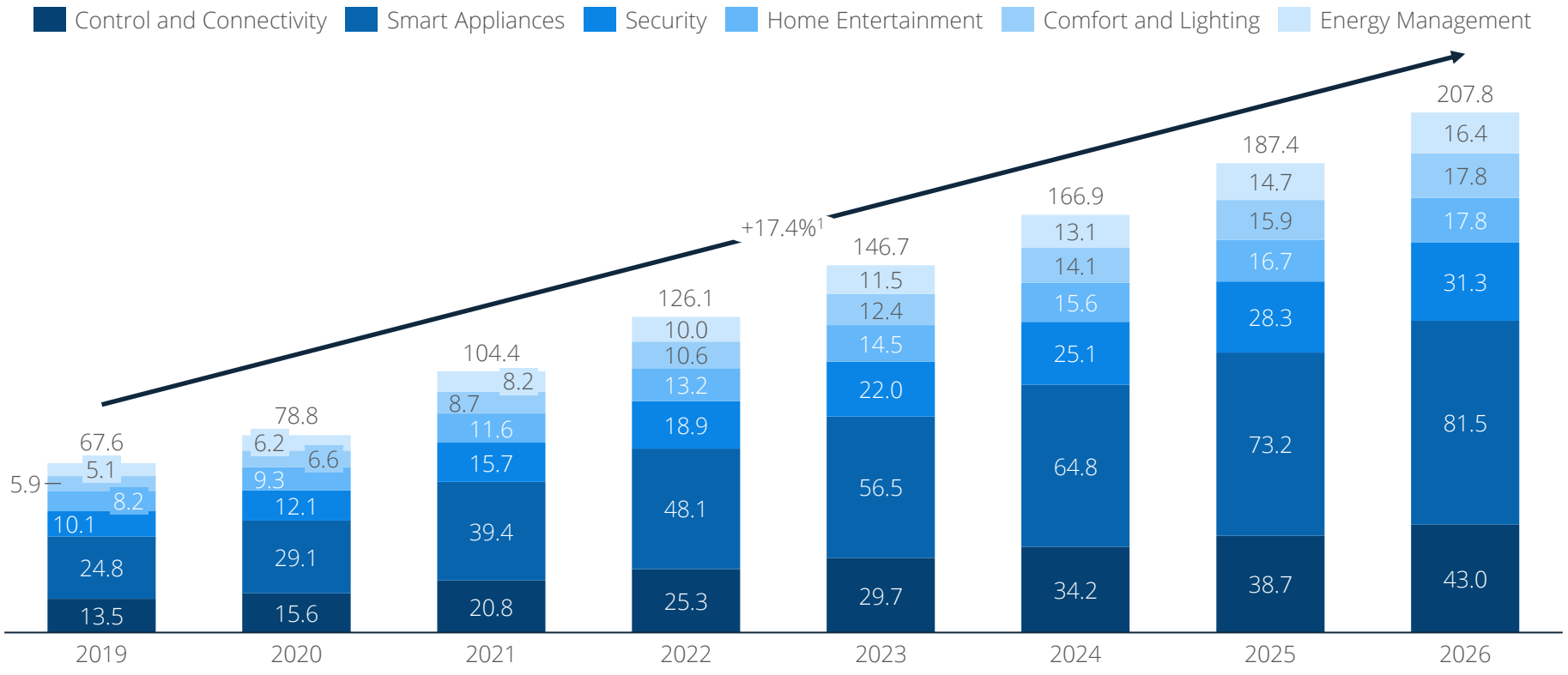
- **Control and Connectivity**
  - Foundational segment for setting up the home network with revenues of US$15.6bn in 2020 and US$43.0bn by 2026
- **Smart Appliances**
  - The largest Smart Home segment in 2020, with revenues of US$29.1bn, a CAGR[1] of 18.7% and revenues of US$81.5bn by 2026
- **Security**
  - Security is one of the most relevant topics for customers, generating US$12.1bn in 2020 and US$31.3bn by 2026
- **Home Entertainment**
  - Classic market entry segment with revenues of US$9.3bn in 2020 and, following a CAGR[1] of 11.5%, US$17.8bn by 2026
- **Comfort and Lighting**
  - Easy-to-install market entry segment with revenues of about US$6.6bn in 2020 and a CAGR[1] of 17.8% leading to US$17.8bn by 2026
- **Energy Management**
  - Includes products for energy preservation and thus cost savings, generating US$6.2bn in 2020 and US$16.4bn by 2026

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

The global Smart Home market is worth US$78.8 billion in 2020 and is expected to grow even bigger

Estimated market development: revenues (1/2)

Global revenue forecast in billion US$

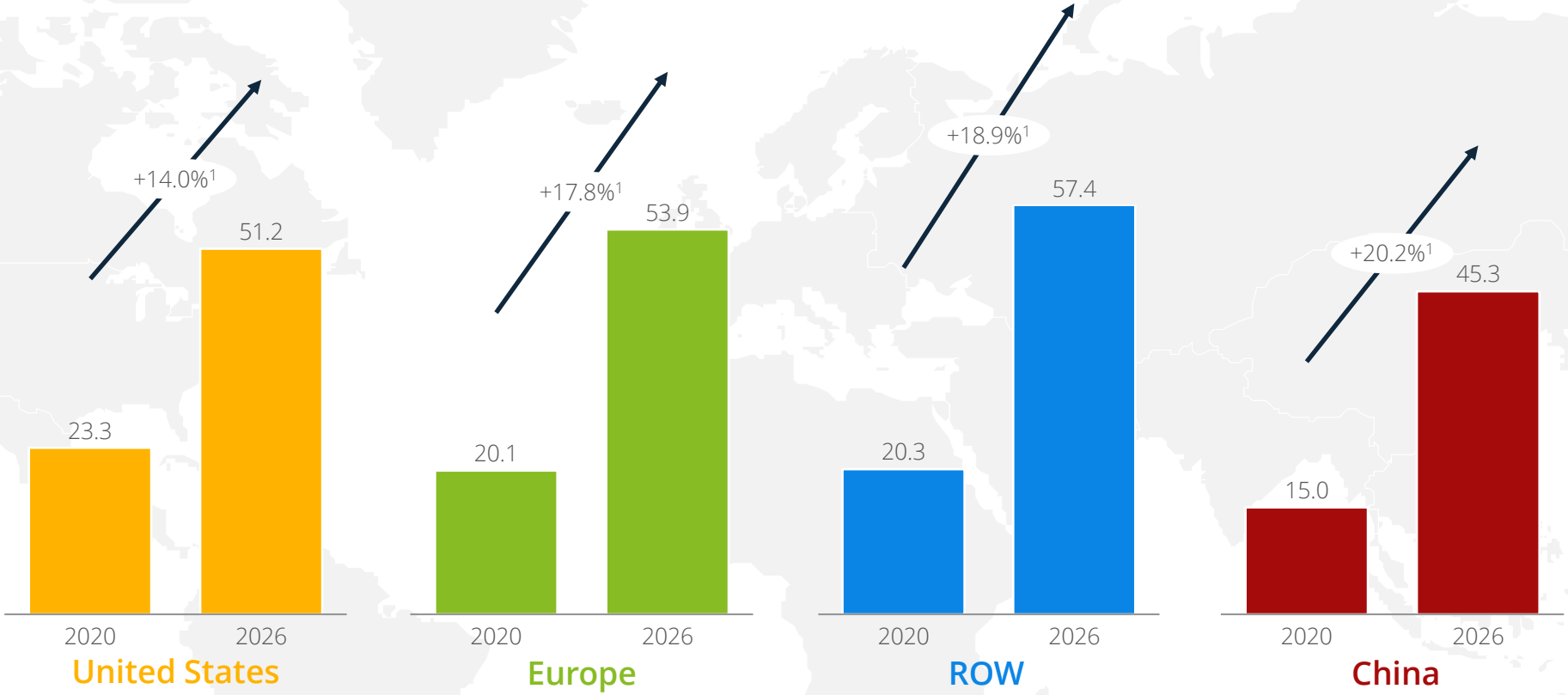


1:CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Out of the major regions, the U.S. was the biggest market in 2020, but will be overtaken by 2026

Estimated market development: revenues (2/2)

Total Smart Home revenue forecast in billion US$

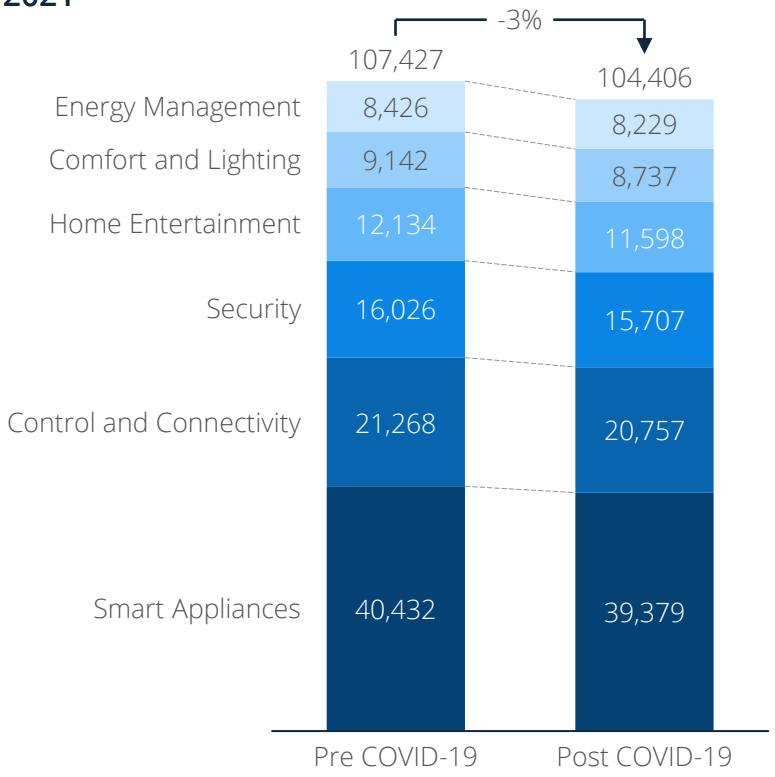


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

The global Smart Home market will fall 3% short of revenue expectations in 2021

COVID-19 impact[1]: Smart Home forecast (1/2)

Global Smart Home revenue forecast in million US$ in 2021



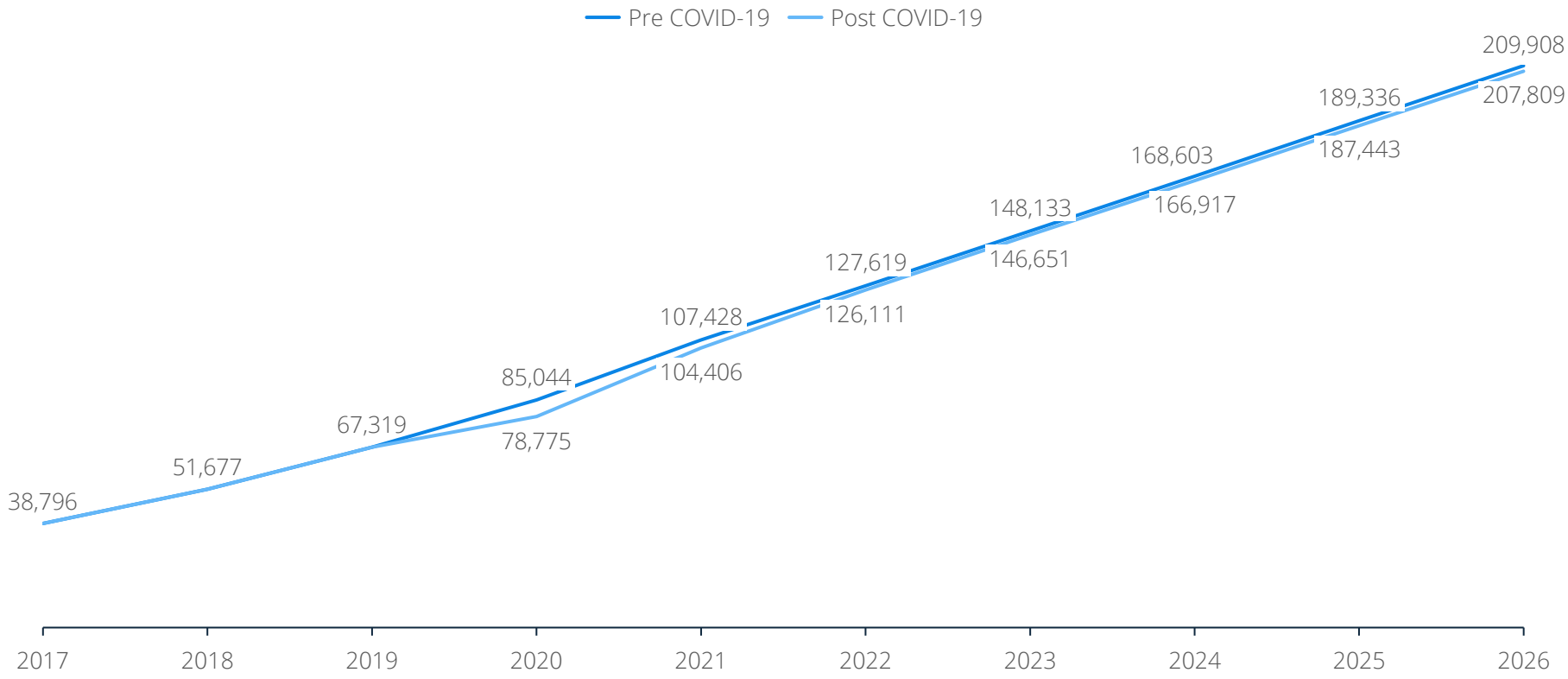
- In general, consumer electronics were affected by COVID-19 as stores were closed and supply chains adversely impacted.
- The global smart home market will drop 3% from the originally forecasted US$105 billion to US$102 billion.
- The market is strongly connected to consumer spending for appliances and services connected to the household and will therefore likely drop due to reduced spending in these areas.
- More necessary everyday objects or security devices will not be affected as severely as devices with pure entertainment focus.
- Despite the diversity of the smart home ecosystems, supply chain challenges combined with installation and service delays slowed down adoption of smart home technology.

1: COVID-19 impact on Smart Home revenue is constantly followed and will be updated regularly; thus, forecast subject to change
Sources: Statista Digital Market Outlook 2020

Reduced spending for Smart Home products noticeably affected 2020

COVID-19 impact[1]: Smart Home forecast (2/2)

Global Smart Home revenue forecast in million US$

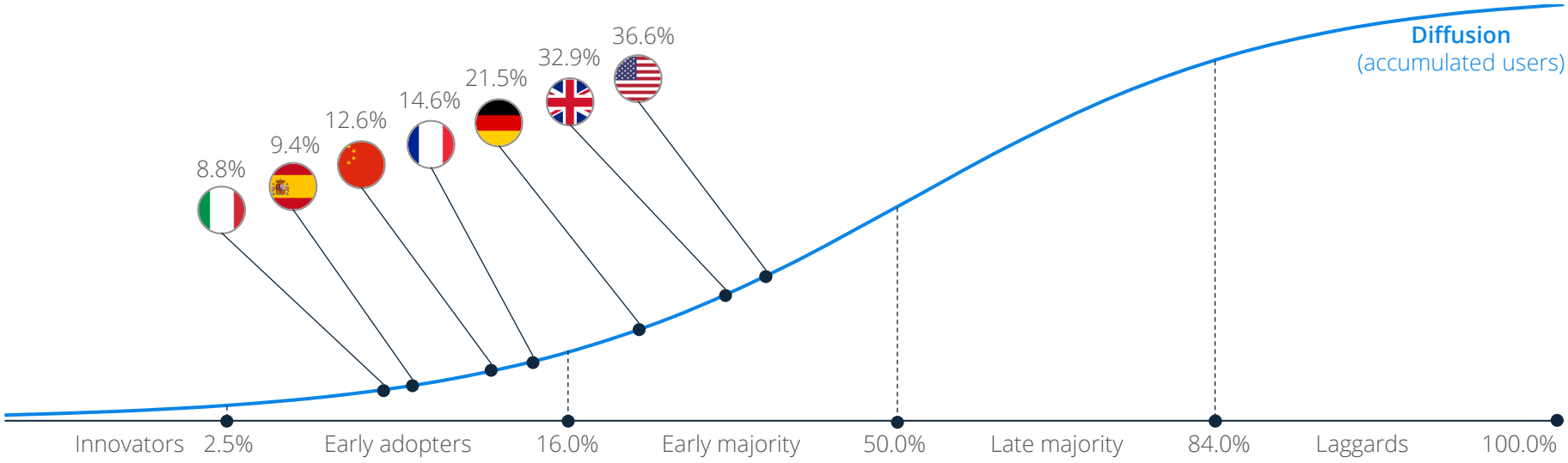


1: COVID-19 impact on Smart Home revenue is constantly followed and will be updated regularly; thus, forecast subject to change as conditions are changing rapidly (May 2020)
Sources: Statista Digital Market Outlook 2020

The market is moving past the early-adopter stage in some countries towards acceptance and demand

Innovation diffusion

Innovation diffusion curve for 2020



The diffusion of innovations graph shows successive groups of consumers adopting devices from the Smart Home market (the graph above shows the household penetration rate of selected countries). Innovations in general are not adopted by all individuals at the same time. Instead, they tend to adopt in a time sequence, and can be classified into adopter categories based on how long it takes until they begin using the service. Diffusion is considered to be the rate at which innovations spread among users (an adoption rate of 100% is theoretically possible but not realistic). Considering the moderate penetration, replacement cycles and that more and more devices will be connected, adoption will steadily grow in the next years.

Sources: Statista Digital Market Outlook 2020

The Smart Home market comprises both start-ups and established companies

Key player landscape

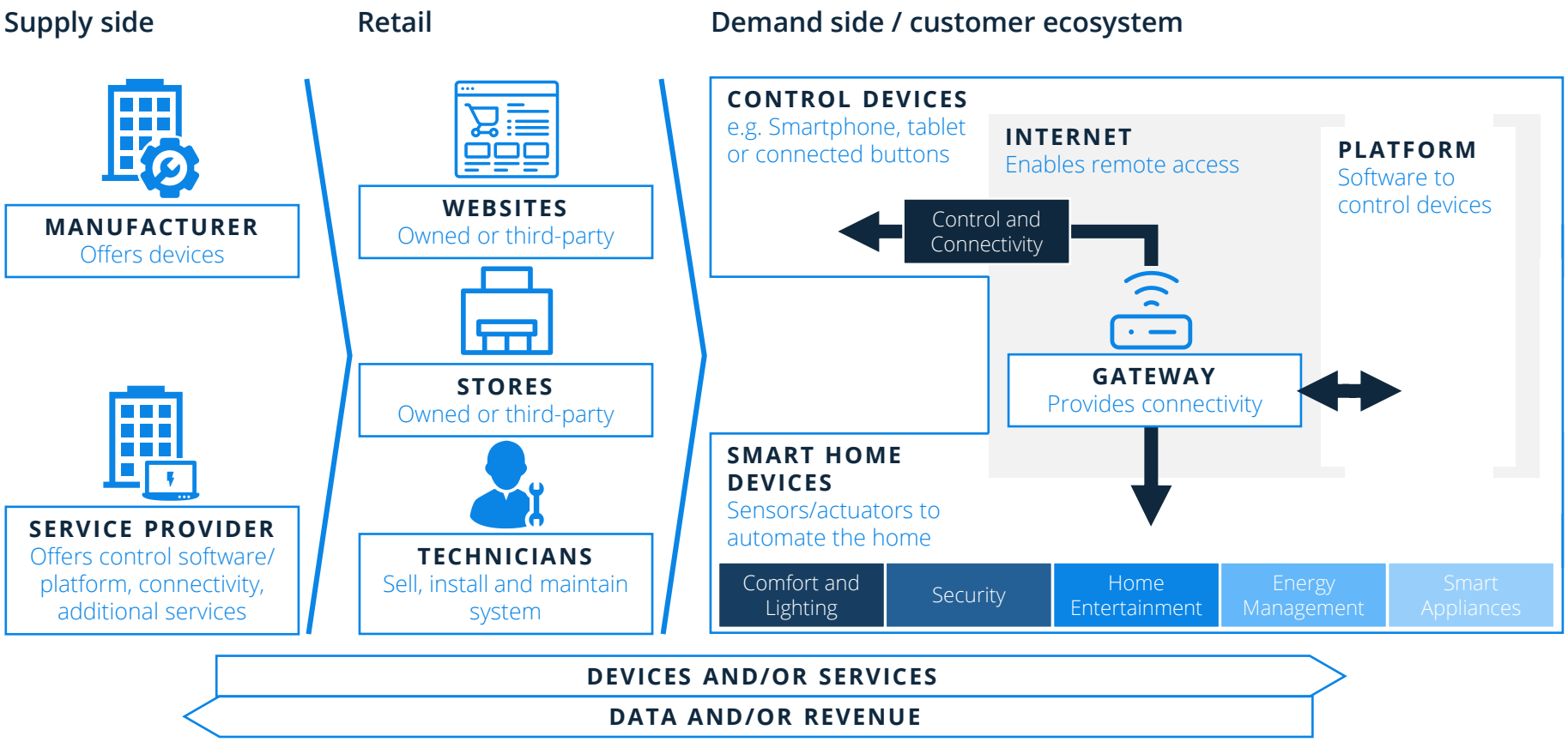
Representative Smart Home key players by type and segment[1]

	Control and Connectivity	Comfort and Lighting	Security	Home Entertainment	Energy Management	Smart Appliances
Dedicated segment companies	Control4, FIBARO Home intelligence, INSTEON, LOXONE, GIRA, eQ-3	LEDVANCE, LIFX, BeON home, moodnode, COMFY LIGHT	ALARM.COM, CHUANGO, canary, ADT Security, LUPUS ELECTRONICS, ring, august, vivint.SmartHome	SONOS, PURE, Roku, BLUESOUND, D. DEFINITIVE TECHNOLOGY	tado°, ecobee, climote, nest, netatmo	ECOVACS ROBOTICS, iRobot, neato robotics
Players entering the market from foreign industries	HomeKit, T··· Magenta SmartHome, AVM, Baidu 百度, amazon echo, mi, belkin, NETGEAR	link, somfy, hue PHILIPS, LEEDARSON, SAMSUNG SmartThings	AT&T, ASSA ABLOY, SCHLAGE, Gigaset	B&O BANG & OLUFSEN, tv, logitech, BOSE, DENON	hive, Danfoss, innogy, BOSCH, Honeywell, Schneider Electric	B/S/H/, Haier, LG, Whirlpool CORPORATION

1: Key player overview does not represent the entire market landscape
Sources: Statista Digital Market Outlook, as of April 2021

A smart home ecosystem consists of many intersections and entry points

Smart Home ecosystem



Sources: Statista Digital Market Outlook 2020

Trend leaders and drivers are seen very differently by industry experts

Expert voices in the market

Who would you recognize as a smart home market leader?

- Platform providers: Apple, Google, Amazon
- The future will belong to manufacturers: Philips Hue, Belkin, Homatic
- There is high potential for telcos and utility companies
- There are no leaders as product quality still is too bad

Which are the most relevant segments for the customer?

- Security is and will remain the most relevant segment
- Energy, comfort, entertainment and security are the most important
- I don't see security as too important, because most customers can't install it on their own
- People want to protect their homes
- The biggest driver will be comfort: quick ACs, heating, and automation/ AI

How would you describe the current market development?

- The development is slowed down since technical difficulties scare mass market customers
- We reached the point in adoption where quality is finally improving
- As tech-interested consumers grow older privacy concerns shrink
- Too many proprietary communication standards still repel customers

Will the future smart home be controlled by voice or touch?

- In the household it will be touch – it's more comfortable!
- Rather touch as people don't want to lead soliloquies
- Neither nor – a real smart home is fully automated
- None exclusively – it depends on the use case!

Sources: Statista Smart Home Expert interviews, September – November 2017, focus on Europe

There are still substantial market entry barriers for mass market consumers

Selected key success factors

Brand awareness

Brand awareness is the most important aspect of all marketing campaigns. The smart home industry needs strong brands that unite different elements. Brand awareness for smart speakers, for example is already high but more specialized products often lack awareness.

Mass consumer sales channels

As the market is developing more and more into a general IoT, an early integration of products in mass consumer sales channels is important besides listings on eCommerce platforms. Also a go-to-market strategy can deliver unique value propositions and break down purchase barriers with trained staff at the point of sale.

Compelling cross-segment propositions and broader ecosystems

Customers want products without limitation to e.g. energy management or security needs but potentially for all the demands they might have. This means that companies need to either implement functions that they previously considered out of their segment, or at least provide the possibility to easily connect other products to the ecosystem. Multifunctional devices should focus on consumer needs and not on integrating as many functions as possible.

DIY installation

The need for professional installation is always a cost driver and time consuming, therefore also a possible purchase barrier for customers.

Simple customer journey

Mapping the customer experience and optimizing all touchpoints is important for every complex product. After-sales service and easy-to-handle service enquiries are often neglected.

Support for industry standards

Missing interoperability is one of the main purchase barriers (slide 14)

Voice control

Voice control has disrupted the whole digital economy. There is no doubt that it will stimulate growth in the market. However, not all use cases will include voice control, touch will remain an important way of device access. Nevertheless, extensive voice integration is an important step in nearly all use cases in the smart home environment.

AI, machine learning and more analytics

The progress in AI is unstoppable and will make smart homes autonomous in the future. The question will be how much use cases should be user or AI driven.

Data security and privacy concerns

Due to comprehensive networking and individual adaptation to user behavior, personal data protection and technical data security are particularly important topics. Data traffic must be protected against unauthorized viewing and access.

Sources: Statista Digital Market Outlook 2020

Missing interoperability is still one of the main barriers for consumers adopting smart home devices

Home automation protocols

Smart home protocols and interoperability

Smart home devices communicate via wireless networks on bandwidths that are often not compatible with each other. Companies use various communication protocols while each protocol has its own appeal for different technologies. Devices that use other protocols are generally controlled via separate apps or control units. Many companies use proprietary communication standards in order to build market entry barriers for potential competitors and to prevent customers from switching to existing competitors.

Some companies also tried to standardize protocols and there is an increasing amount of software solutions which support multiple communication standards, but till now, there is no uniform standard. Last year's launch of Bluetooth LE mesh was another step towards addressing the challenge of interoperability. Nevertheless, consumers still have to check which devices are compatible with one another.

Communication protocols are only one part of automation capabilities. If consumers want to use cloud-based voice services and personal assistants, they also have to check their compatibility. Not all devices can be controlled via Amazon Alexa or Google assistant.

Selected protocols for smart home solutions

Bluetooth

Short-range wireless protocol (around 10m) with adaptive frequency detecting existing signals

Wireless local area networking based on IEEE 802.11 standards

Open decentralized protocol for building automation, operating on more than one physical layer (e.g. infrared, ethernet etc.)

Wireless protocol used by Nest, Samsung, QUALCOMM or OSRAM; Devices can communicate even when the network goes down

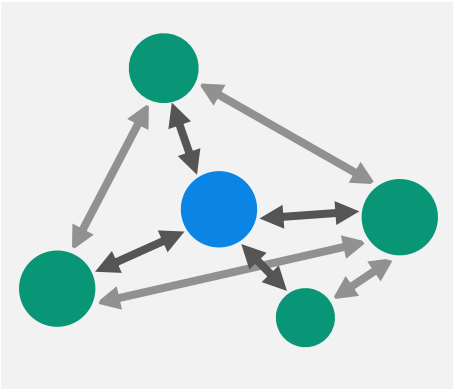
Wireless protocol which operates in a mesh network, using a device to relay a signal to other devices, strengthening and expanding the signal

Open source mesh network protocol owned by Sigma Systems which is slower than Zigbee but requires less energy

Sources: Statista Digital Market Outlook 2020

Integration is the key to success in the smart home business

Trend analysis (1/3)



Cross-segment integration

While many companies used to see the single smart home segments as clearly distinguishable in the past, we have been observing a shift in this understanding for some time. Customers do not want products whose functions are limited to single purposes such as energy management or security needs, but prefer devices that meet all the potential needs and demands they might have.

This means that players in the market need to either implement functions that they previously considered out of their segment, or at least provide the possibility to easily connect other products to the platform/ ecosystem.

Smart assistants

Next to the smartphone, which already serves as a quite comfortable controlling device for smart home products, we see many users controlling devices with smart assistants such as Siri, Alexa or Cortana. With Amazon's introduction of its Echo assistant, the speaking devices became part of the smart home. Google followed with its Google Home device, DingDong by LingLong was introduced and Apple's HomePod as well as Baidu's Raven followed in 2019, also Samsung announced its Galaxy Home speaker.

On the one hand, those assistants offer another possibility to control peripheral devices; on the other hand, they offer a higher level of AI learning to the Smart Home: Smart Home devices (e.g. a thermostat) learn certain patterns in an isolated way, but Smart Assistants could take these to the next level by synchronizing and optimizing cross-device communication and thus orchestrating functionalities and automating obnoxious procedures in a household.

Sources: Statista Digital Market Outlook 2020

Moving past the early adopter stage, the market still shows a diverse key player landscape

Trend analysis (2/3)

Multiple key player landscape

IoT initiatives by Google, Apple, Amazon or Alibaba have already changed the smart home landscape noticeably, providing opportunities for all kinds of companies, but they have also forced market consolidation. The big tech players are rapidly expanding their product portfolios in the smart home field with huge investments, e.g. Amazon acquired Ring in 2019 for US$1 billion or Google which already acquired Nest for US$3.2 billion back in 2014. Nevertheless, several market segments still have no clear market leader. We believe that the smart home industry will emerge as a robust environment with multiple key players with strong brands in every segment. Manufacturers, telcos, energy suppliers, medium-sized companies or start-ups still have chances in the future, where practically every product in the average home will be connected in an economical way with the internet.

Data sharing and security concerns

The connection of every device, more sophisticated AI-driven services and the gathering of a gigantic amount of data will bring along a big challenge for data transfer solutions. Sharing the data of homeowners with businesses will probably foster growth of new individualized technologies and services in the market. Data that are shared with smart devices will therefore be of great interest to companies.

Considering the handling of all these data, security concerns will become even more relevant. Consumers are already worried about data security breaches in the context of smart homes and providers have to respond to these concerns. Due to the fact that there are currently no minimum requirements, there is no standard for implementing cybersecurity into smart devices. All relevant providers should approach these issues from a cost and value perspective. As the IoT market evolves and more consumers are willing to convert to connected homes, market demand for cybersecurity features will definitely increase.

Sources: Statista Digital Market Outlook 2020

Other markets will integrate into the smart home business

Trend analysis (3/3)

Usage-based insurances

The two main areas where smart or usage-based insurances record the greatest advancements are connected cars and smart homes. The idea is simple: people who live carefully should pay less for their insurance than people who are more likely to be in the need for an insurance payment. A few years ago, such usage-based approaches were not possible, but with the introduction of a variety of sensors, they are today. With those sensors it is possible to identify what kind of behavior is potentially dangerous, and the frequency with which consumers behave in a risky way can be recorded as well.

This way insurances can become more accurate. Obviously both sides benefit: Consumers can benefit from lower fees and insurances from fewer claims. The only problematic aspect that remains is data security.

Cross-market integration

As mentioned previously, consumers rather want smart home devices which potentially connect to other areas. This applies to the segments on the one hand, but also different areas in life in general. Considering, for example, the entertainment segment, customers want the same availability of streaming services in all situations (household, car, phone). Thus, it is necessary for companies in the smart home market to ensure compatibility with cross-industry services such as media streaming.

Next to the insurance business (see above), eCommerce is worthy of being integrated, as the recent trend of dash buttons shows. These one-click purchases are likely to become automated even further as customers are likely to want certain things like toilet paper or laundry detergents reordered on a regular basis. These are only a few examples of possible ways in which smart homes will be integrated in a broader context.

Sources: Statista Digital Market Outlook 2020

A sufficient digital infrastructure is the necessary basis for developing digital markets

Key market indicators: digital infrastructure overview

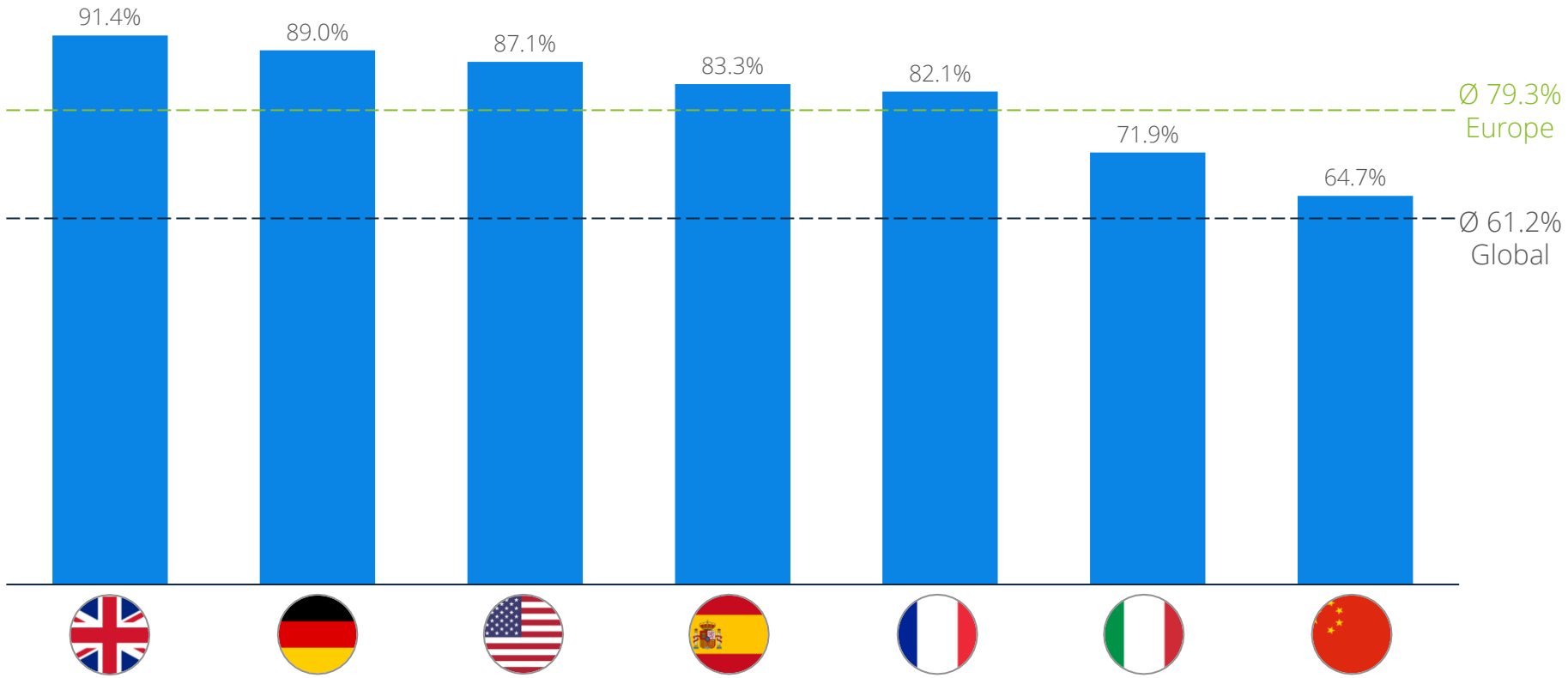
	Global Ø 2020	
INTERNET PENETRATION	61.2%	Percentage of total population using the internet on a monthly basis. In recent years, all sorts of connected devices have gained popularity because of the increasing internet penetration across all countries.
BROADBAND SUBSCRIPTION	15.8 per 100 capita	Access to broadband internet is crucial for establishing digital services. Only an always-on mentality and a high amount of data traffic leads to consumers integrating digital services in their everyday lives.
CONNECTION SPEED	20.3 kbit/s	Average internet connection speed in kbit/s. With rising connection speed, more sophisticated services and functions like voice control or video chat become available.
SMARTPHONE PENETRATION	89.5%	Percentage of total population using a smartphone on a monthly basis. Lots of connected smart home devices can be controlled with the smartphone and with increasing penetration more people are able to benefit from this interconnectivity.

Sources: Statista Digital Market Outlook 2020

Internet penetration is especially high in some European countries, China is lagging behind

Key market indicators: internet penetration

Internet penetration in 2020

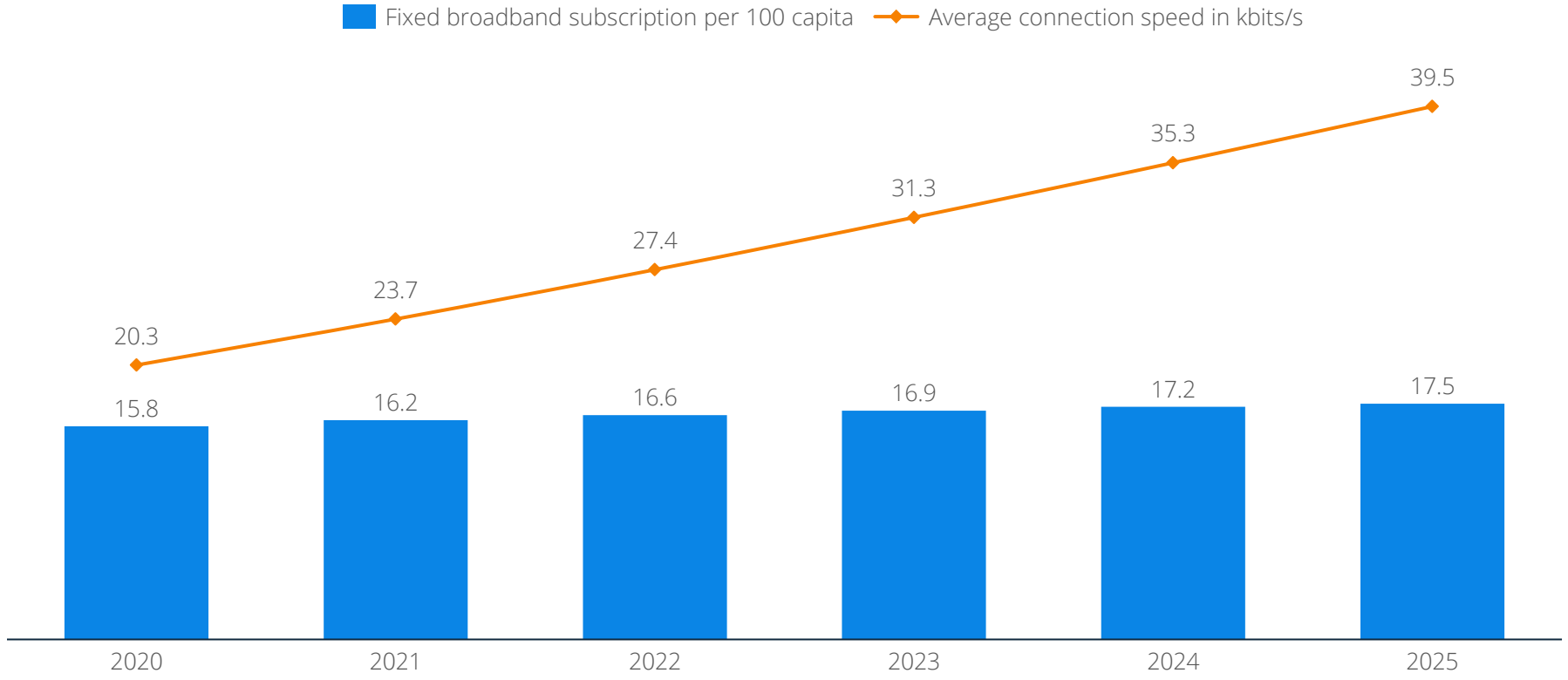


Sources: Statista Digital Market Outlook 2020

From a global perspective, broadband subscriptions and connection speed are continuously rising

Key market indicators: fixed broadband subscriptions and average connection speed

Global fixed broadband subscriptions and average connection speed

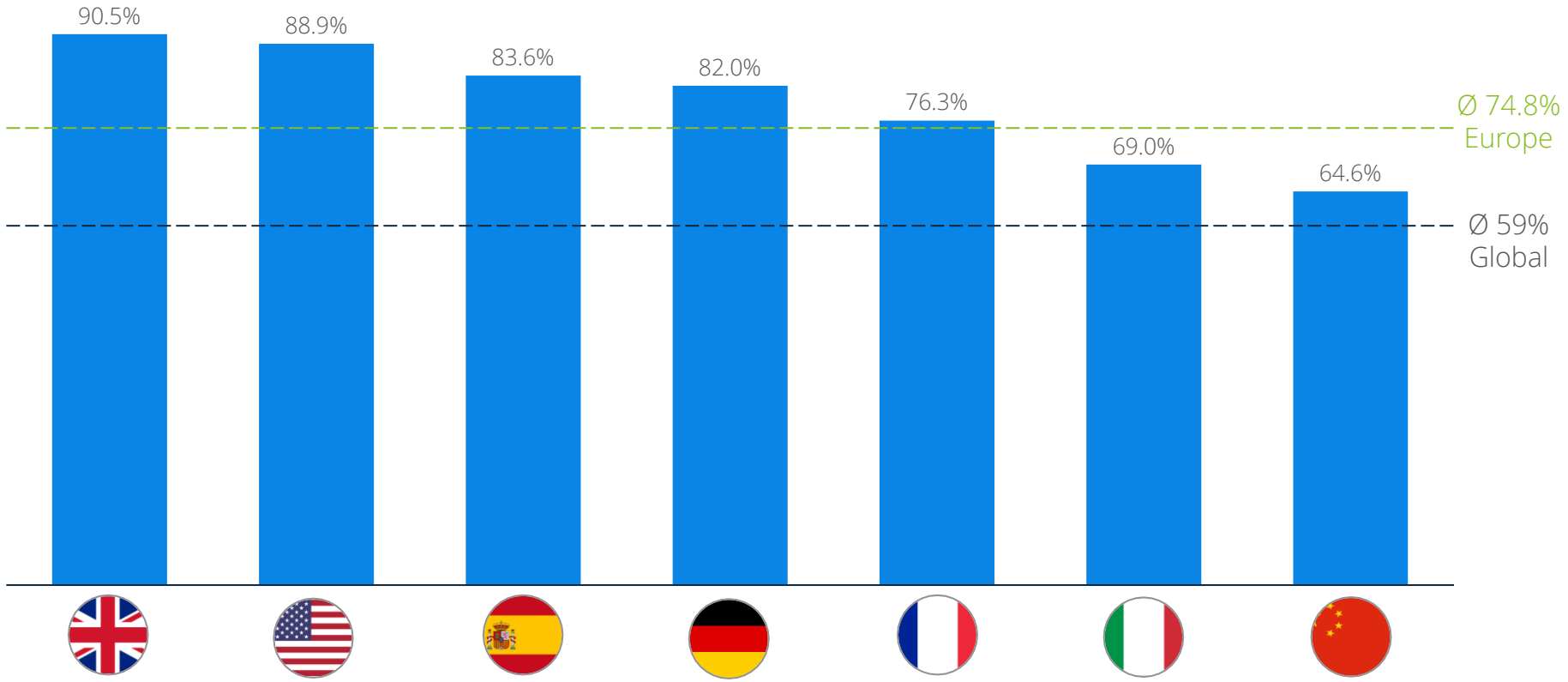


Sources: Statista Digital Market Outlook 2020

Due to the rise of smartphones, mobile access to smart home solutions has become more sought after

Key market indicators: smartphone penetration

Smartphone penetration in 2020



Sources: Statista Digital Market Outlook 2020

The rising adoption of smart home products is also influenced by various socioeconomic factors

Key market indicators: socioeconomic overview

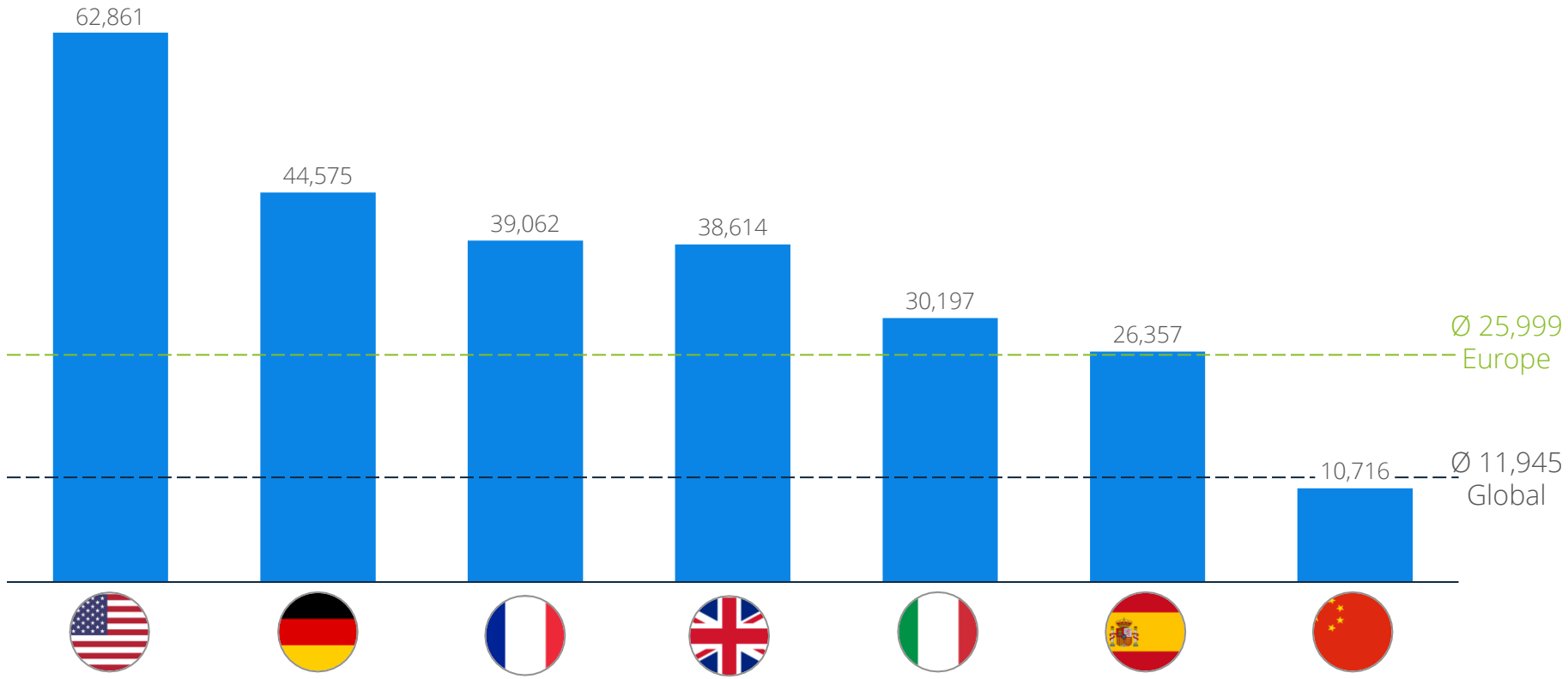
	Global Ø 2020	
GROSS DOMESTIC PRODUCT	11,945 per capita in US$	Gross domestic product of the selected region in US$ in relation to total population. The GDP is a monetary measure of the market value of all goods and services produced in one year and is commonly used to determine economic performance.
CONSUMER SPENDING	6,554 per capita in US$	Average consumer spending per capita of private households in US$. Knowing the expenditure per capita gives necessary insights into price developments and the average willingness to pay for smart home products.
POPULATION	7,469 in million	Number of individuals (all ages). The number of individuals living in a country is a key indicator for the market size. Individuals within certain age groups have a stronger preference for connectivity services.
HOUSEHOLDS	2,099.7 in million	The total number of households. The household, defined as a group of persons who make common provision of food, shelter and other essentials for living, is a fundamental socioeconomic unit (UN 2019).

Sources: Statista Digital Market Outlook 2020, UN 2019

GDP per capita is by far the highest in the U.S., followed by Germany

Key market indicators: gross domestic product

Gross domestic product per capita in 2020 in US$

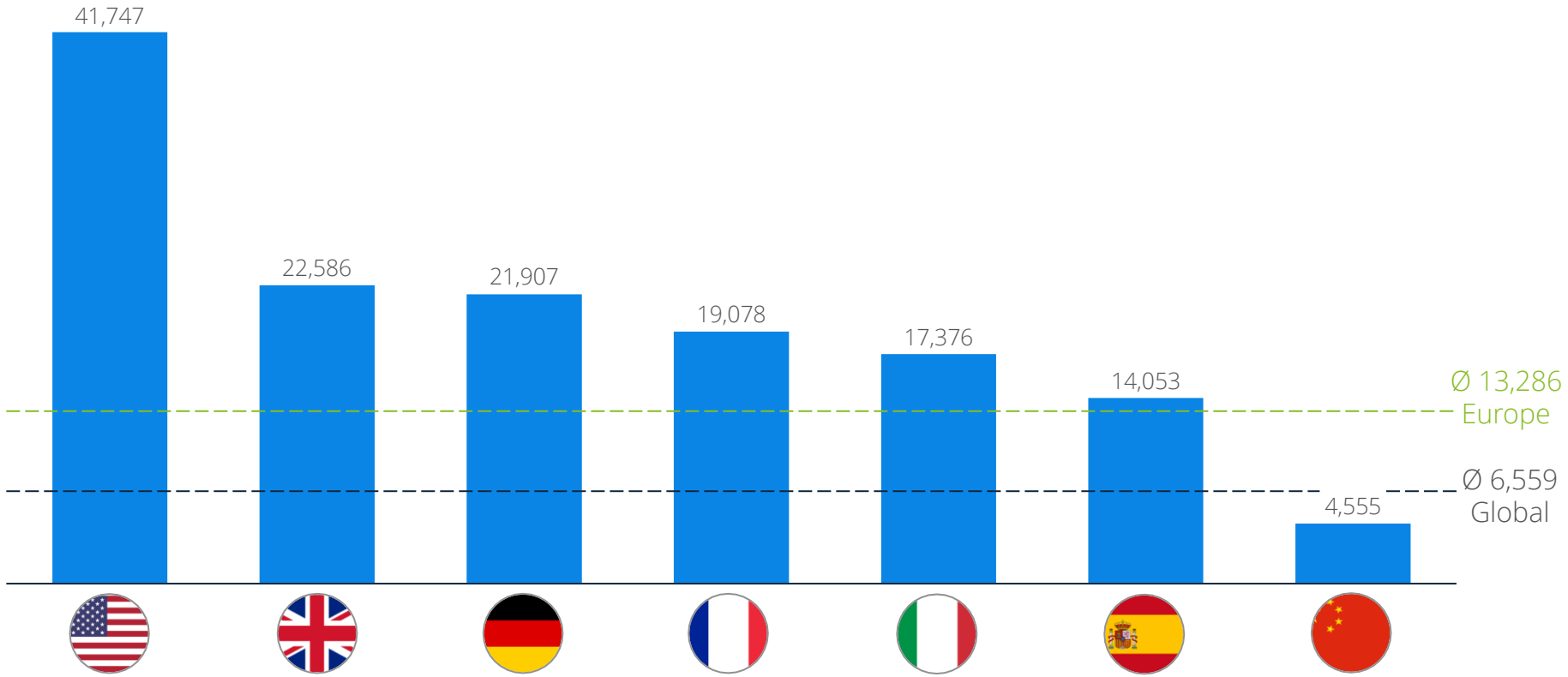


Sources: Statista Digital Market Outlook 2020

Per-head consumption expenditure in the U.S. is more than 8 times higher than in China

Key market indicators: consumer spending

Consumer spending per capita in 2020 in US$

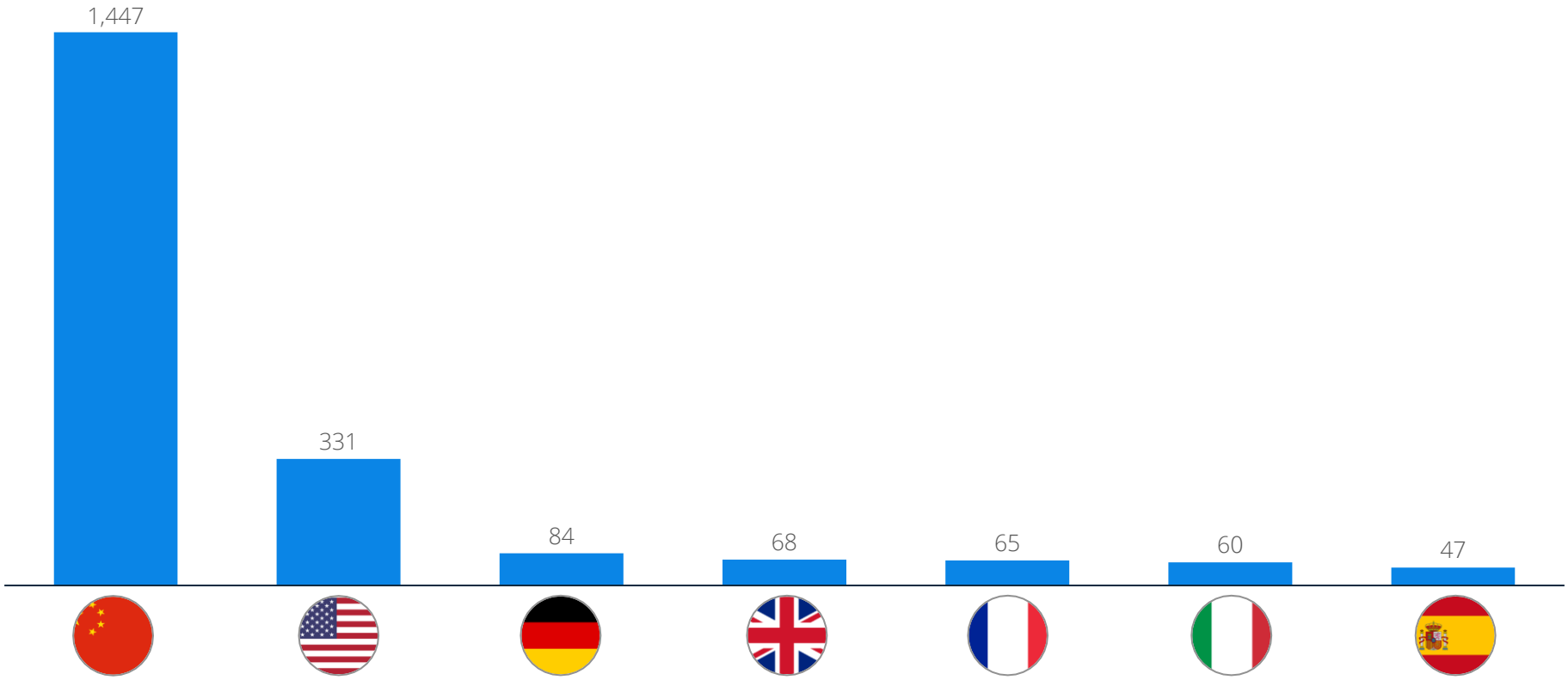


Sources: Statista Digital Market Outlook 2020

China has by far the largest population, making it potentially the biggest Digital Media market worldwide

Key market indicators: population (1/3)

Population in 2020 in million

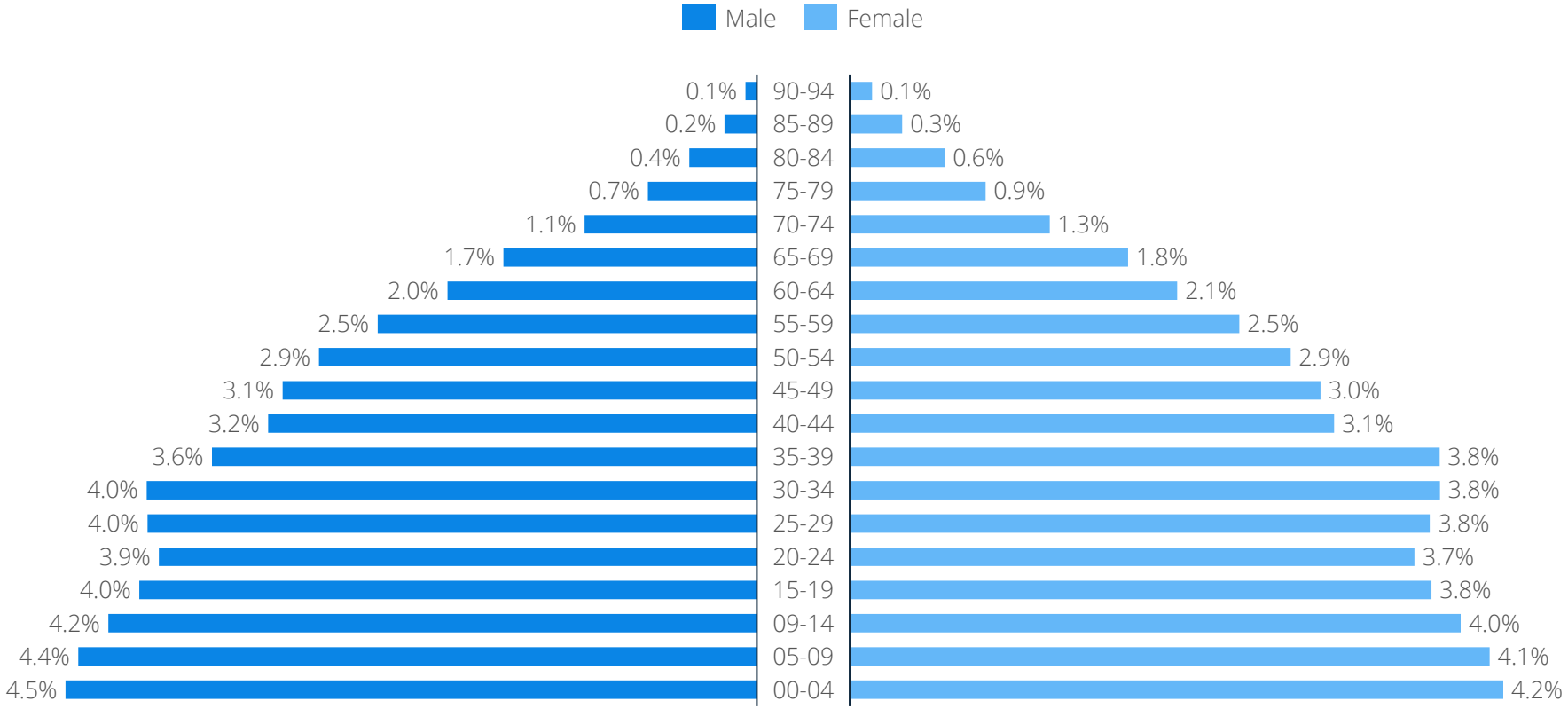


Sources: Statista Digital Market Outlook 2020

Although more boys than girls are born, the sex ratio changes over time since women live longer

Key market indicators: population (2/3)

Global age groups by gender in 2020

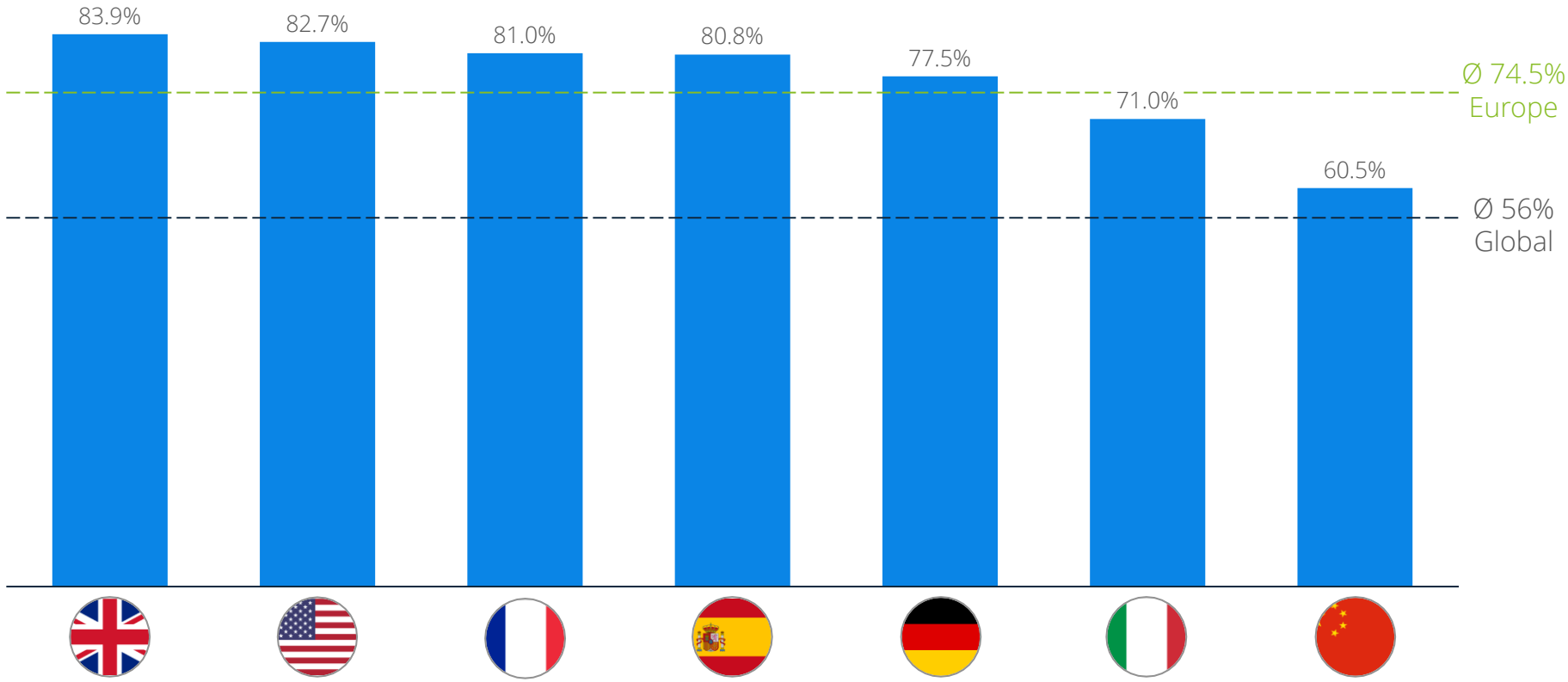


Sources: livepopulation.com

75% of the European and 56% of the global population are living in urban areas

Key market indicators: population (3/3)

Urban population share in 2020

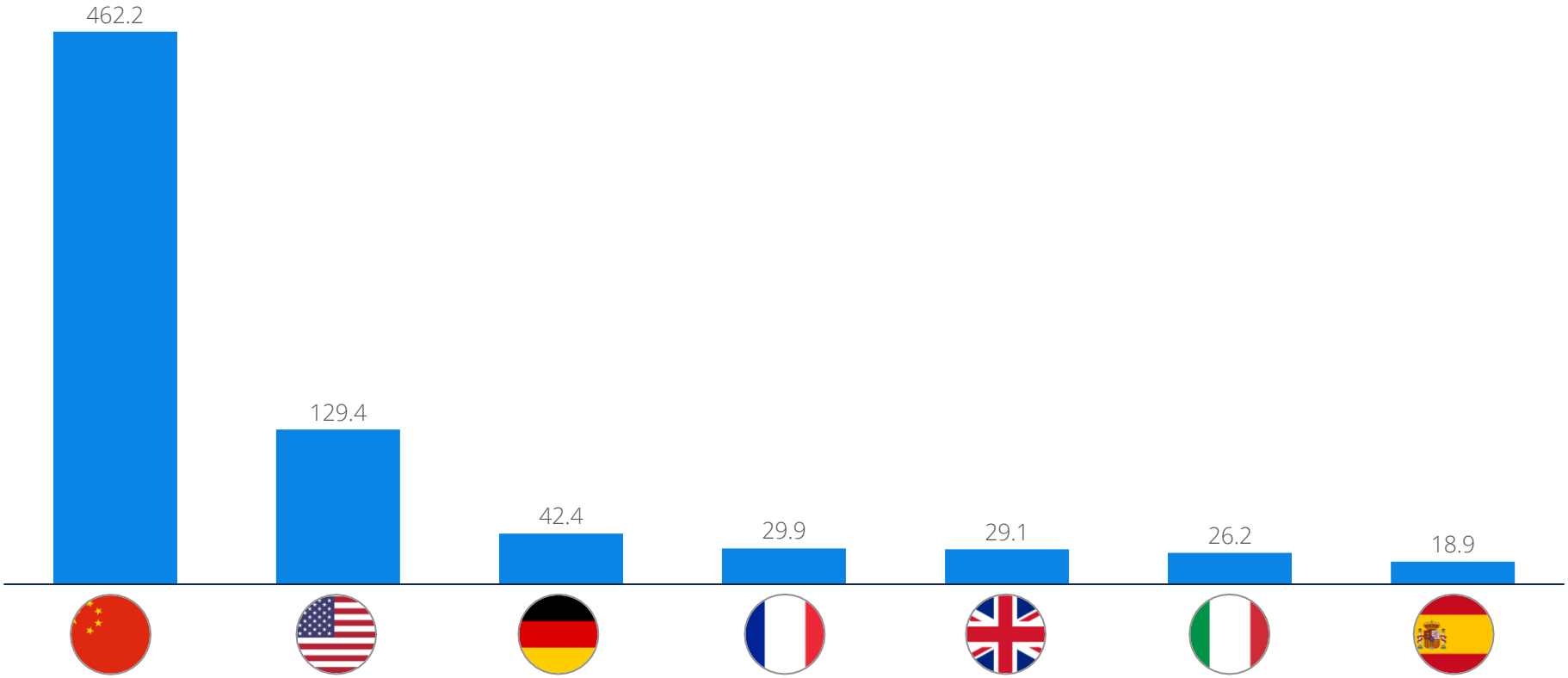


Sources: Statista Digital Market Outlook 2020

Due to its large population, China has the highest number of households

Key market indicators: households

Number of households in million in 2020



Sources: Statista Digital Market Outlook 2020, UN.org

Agenda

01 Market Outlook

- Overview
- Estimated market development
- Innovation diffusion
- Key player landscape
- Smart Home ecosystem
- Expert voices in the market
- Selected key success factors
- Home automation protocols
- Trend analysis
- Key market indicators

02 Segments

- Overview
- Market sizes
- Number of smart homes
- Average revenue per smart home
- Penetration rates
- Company profiles
- Start-up analysis
- Deep dives

03 Appendix

- User demographics
- Market structure
- Product overview
- Imprint

CONTROL AND CONNECTIVITY

The Smart Home segment Control and Connectivity includes the essential equipment (connected and remote-control devices) and services that are part of an intelligent home network. The segment includes smart speakers (Amazon Echo, Google Home, etc.), central control and communication units (hub/gateway), programmable control buttons (e.g. wall switches and adjustable dials) and smart plugs for the control of non-smart devices.

Smart Home Control and Connectivity: products and services

Overview: segment

In-Scope

The Smart Home segment Control and Connectivity includes the essential equipment (connected and remote-control devices) and services that are part of an intelligent home network. The segment includes:

- smart speakers with a primary focus on control and digital assistants (Amazon Echo, Google Home, Apple HomePod etc.)
- gateways/hubs (central control and communication units) that are capable of controlling devices of all segments
- control buttons (e.g. wall switches and adjustable dials)
- smart plugs/sockets for the control of non-smart devices

Revenues are also generated from services that support these hardware elements such as control apps and connectivity services.

Out-of-Scope

- Connected home appliances (see Smart Appliances)
- Multiroom speaker systems with a primary focus on entertainment (see Home Entertainment)
- Smartphones and tablets
- B2B/C2C sales of any kind (e.g. to hotels or office buildings)

Sources: Statista Digital Market Outlook 2020

The Control and Connectivity segment provides the basis for home IoT integration

Overview: customer benefit and market development

Customer benefit

The Control and Connectivity segment provides the infrastructure for the connection of smart home IoT (Internet of Things) devices. The products from this segment enable communication between devices as well as between humans and devices.

This segment includes smart speakers such as Amazon Echo, Google Home or JDs LingLong DingDong, whose primary purpose within a smart home is to control other devices. Next to voice control, touch devices such as control buttons (e.g. Logitech POP) and dedicated smart home panels are also included.

The Control and Connectivity segment also provides smart sockets and plugs, which control the power supply of regular devices remotely or automatically by software/algorithms.

The central device of almost any smart home is a hub which provides the central network to which the single IoT devices are connected. Thus, the customer can control multiple devices through one interface/ software without having to switch technologies. This also allows smart home users to synchronize devices easily, as all devices are connected to the central hub.

Market size and future development

The Control and Connectivity segment shows global revenues of US$15.6 billion in 2020. Due to the nature of the devices and software/services available in the segment, almost all revenue comes from integrated smart homes, where devices from at least two segments are in use.

The regional revenue distribution in 2020 is led by the U.S. with revenues of US$5.8 billion, followed by Europe with US$4.2 billion and China with US$2.2 billion. In Europe, the market revenue is smaller due to lower availability of smart speakers in several countries.

Depending on the individual product, several companies dominate the market. When it comes to smart speakers, Amazon, Google and Apple are the most relevant key players. Companies such as Samsung are about to enter the market.

The global market size will more than double to US$43.0 billion by 2026. While we expect products such as hubs and one-purpose touch buttons to show rather small growth rates, smart speakers will drive the market. We expect the largest growth to take place in China with a CAGR[1] of 19.2% between 2020 and 2026. Europe and the U.S. will see CAGRs[1] ranging between about 20.1% and 15.3%.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Smart speakers are the main drivers in the segment – hubs and gateways as single devices will vanish

Overview: assumptions and trends

Assumptions

With the arrival of Amazon's Echo, the whole digital economy including the smart home market was disrupted. There is no doubt that smart speakers will foster growth in the market. However, we believe that not all use cases will include voice control, touch will in other words remain an important way of device access. Moreover, there will be an influx of smart displays, such as Echo Show and the new Lenovo Smart Display. Smart speakers will also attract new customers as they will provide many additional services (e.g. creating shopping lists, reading the news) that have not yet entered the market. This will also positively influence sales of products from other segments such as bulbs.

With voice assistants as the segment's main driver, growth is slowed down by the convergence of multiple functionalities into single devices. What previously required several things will in the future be combined in fewer multifunctional devices. One obvious example of converging functionalities is the Google Home device, where the smart speaker is a gateway at the same time.

Smart plugs, which are also included in this category, only account for a small share of revenues in this segment. In the long run, they are likely to disappear completely since almost all relevant devices will become smart/remote-controlled at a certain point.

Nevertheless, the segment will remain highly relevant from a customer's point of view as its products constitute the basis of almost all modern plug-and-play/DIY smart homes.

Trends

Smart home devices communicate via wireless networks on bandwidths that are not compatible with each other in most cases. Many companies used and still use proprietary communication standards in order to build market entry barriers for potential competitors and to prevent customers from switching to existing competitors. For consumers this means that devices from different manufacturers might not be compatible.

We increasingly see companies tackling the challenge of interoperability, which is still one of the main weaknesses in the whole market and the connectivity segment. This year's launch of Bluetooth LE mesh was another step towards addressing the challenge of interoperability. In addition to that, there is an increasing amount of software solutions which support multiple communication standards.

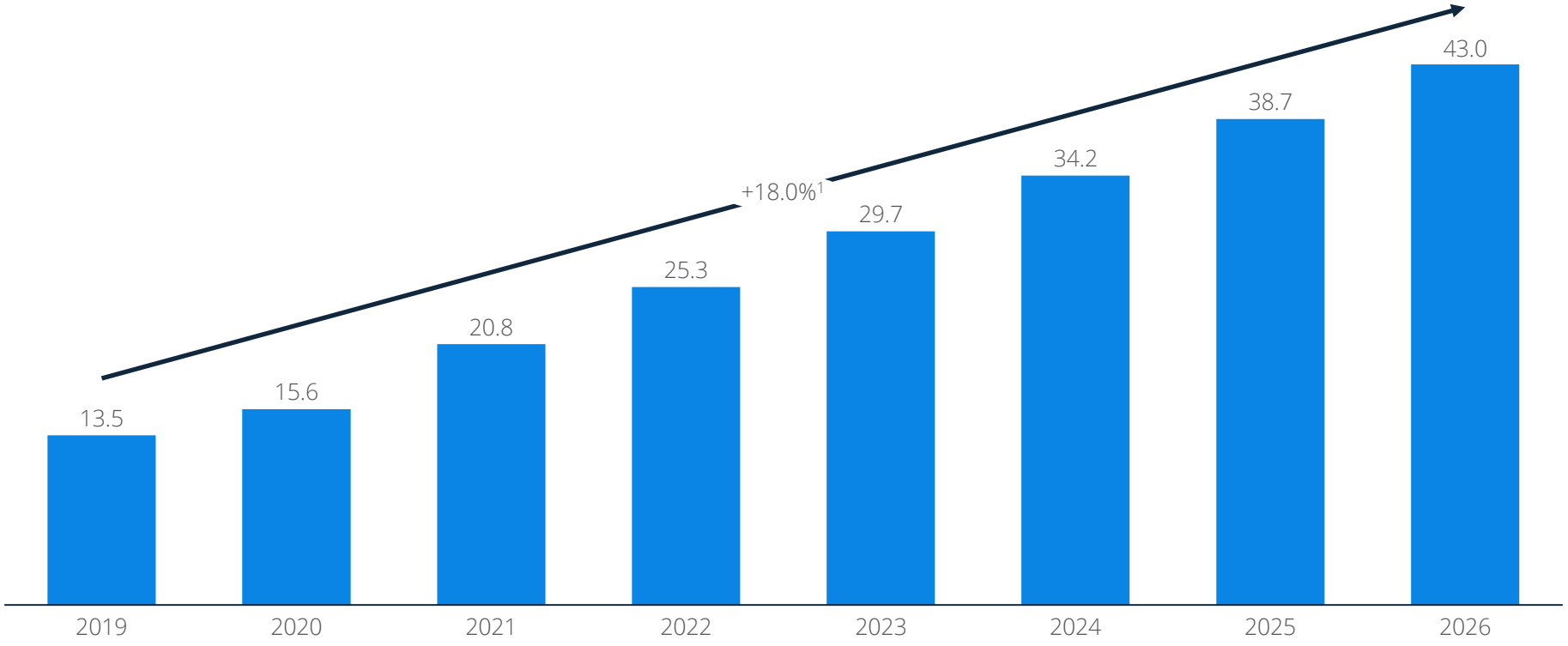
As another trend, hubs as we know them today are slowly vanishing. Hubs in their function as the center of the home IoT network used to be devices similar to WiFi routers. The trend is that the gateway or hub functionality is included into other devices. Leading vendors of routers such as AVM already offer their WiFi routers with a smart home hub functionality. In the long run, we expect smart home hubs and gateways that only exist for their connectivity function to disappear.

Sources: Statista Digital Market Outlook 2020

The Control and Connectivity segment will create revenues of US$43.0 billion in 2026

Market sizes: global

Global revenue forecast in billion US$

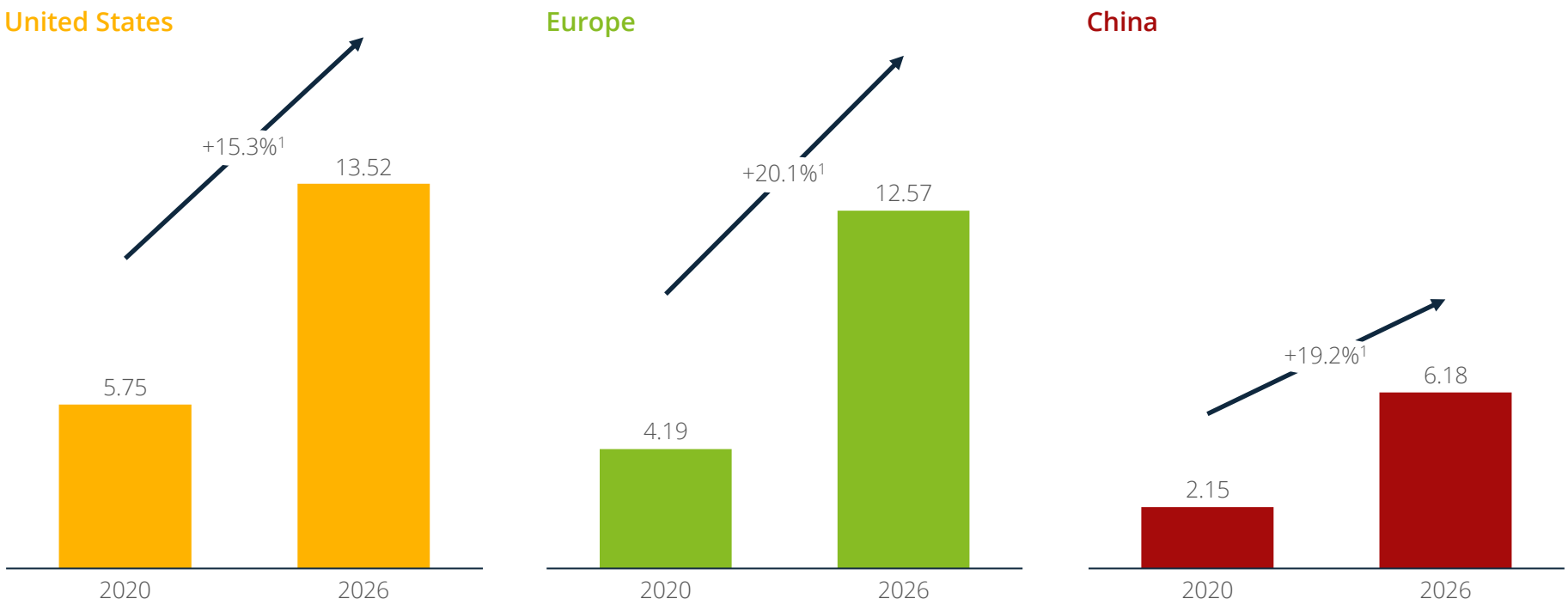


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

With 20.1%, Europe has the highest CAGR[1] up to 2026 and will reach US$12.6 billion in revenues

Market sizes: regional comparison (1/2)

Revenue forecast in billion US$

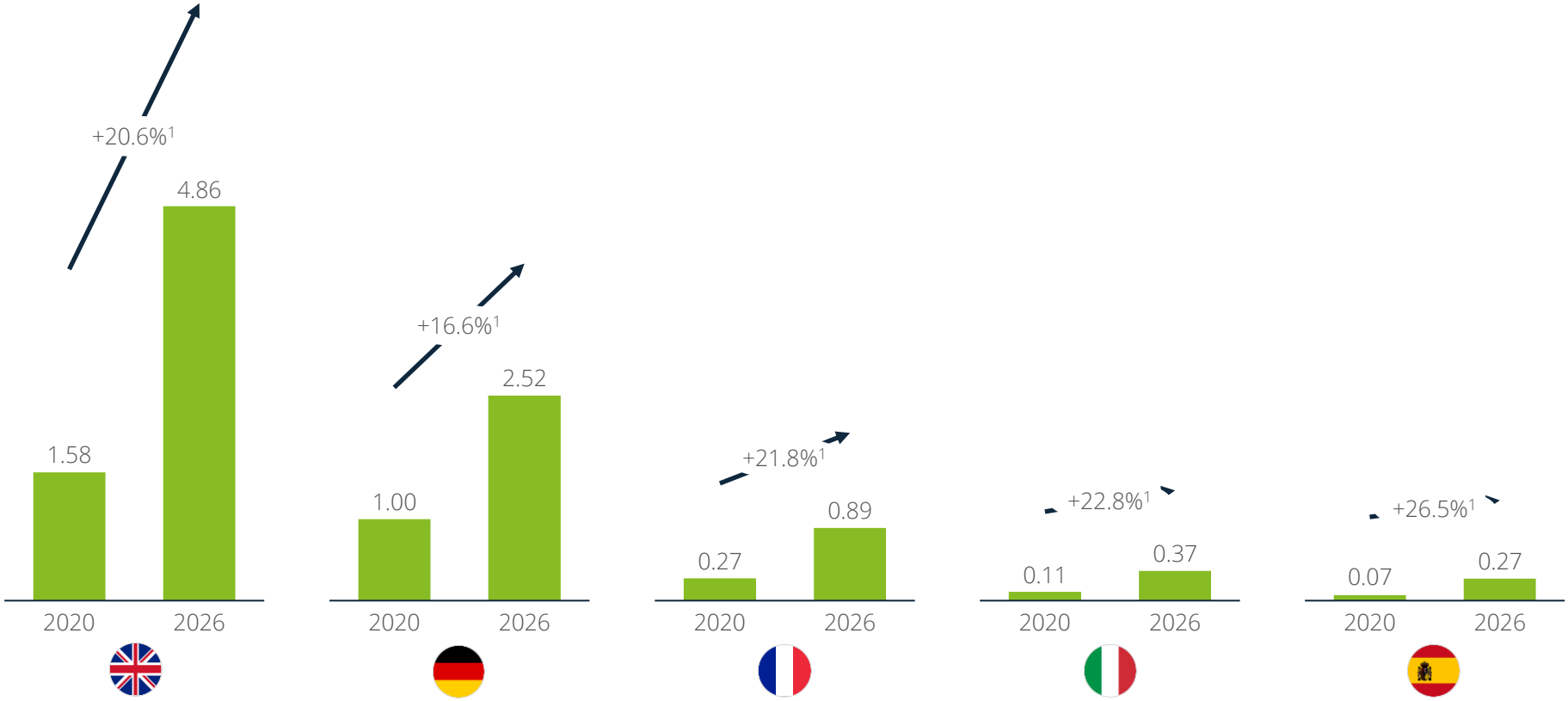


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Out of the European top 5, the UK and Germany have the highest revenues

Market sizes: regional comparison (2/2)

Revenue forecast in billion US$

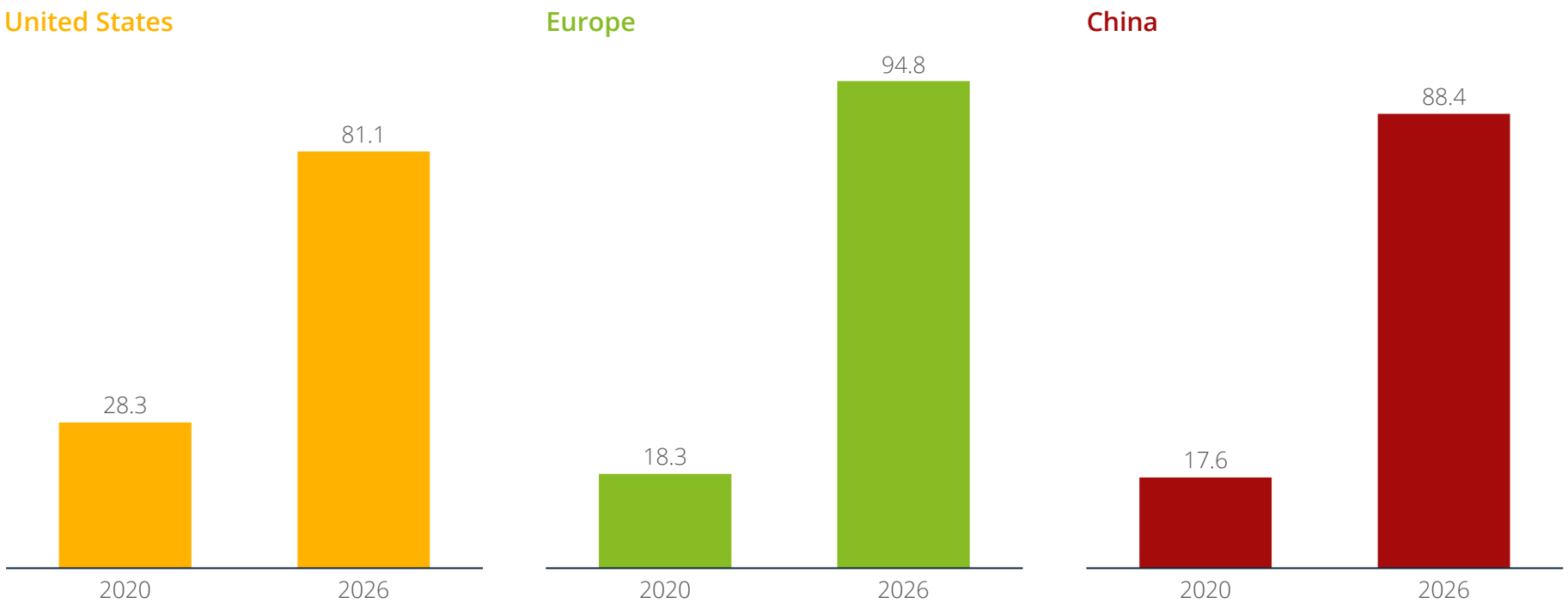


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Europe and China will overtake the U.S. in the number of smart homes in the segment by 2026

Number of smart homes: regional comparison (1/2)

Number of smart homes forecast in million

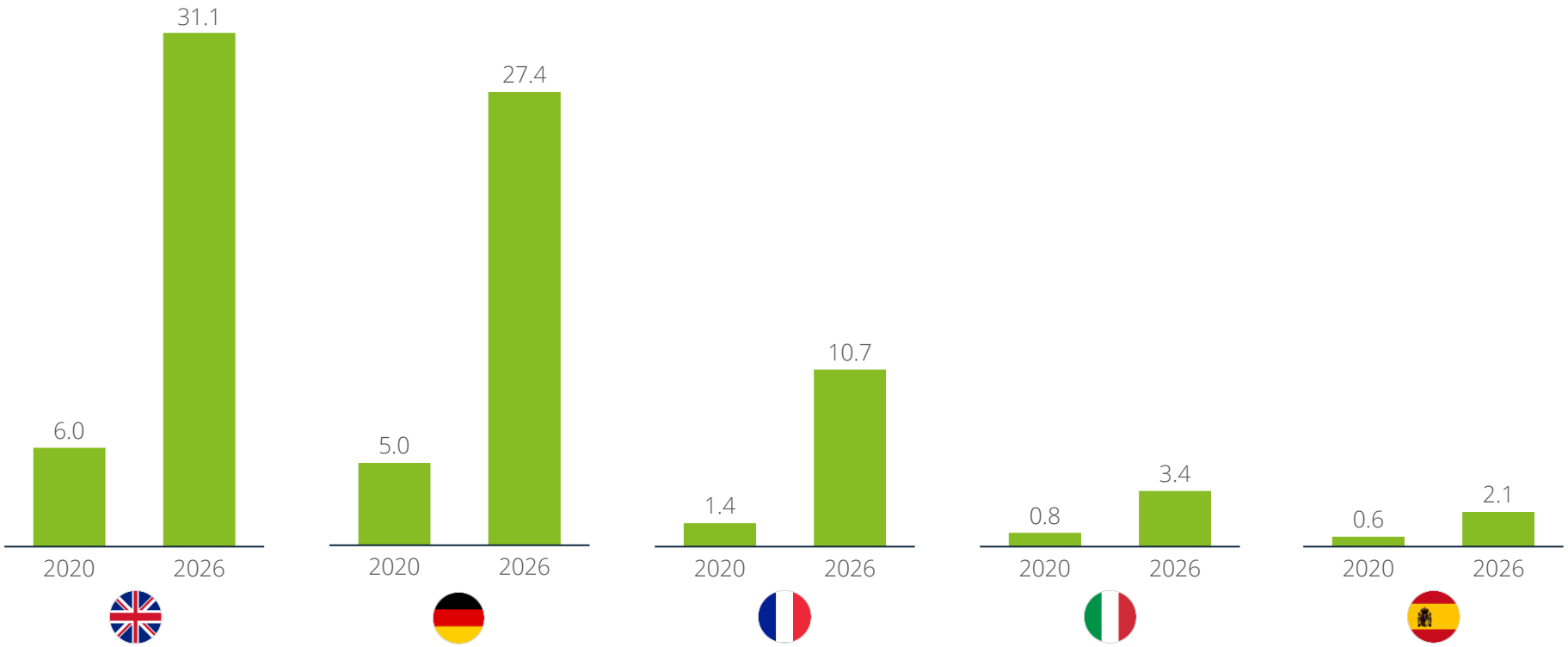


Sources: Statista Digital Market Outlook 2020

The UK has the highest number of smart homes in Europe in the Control and Connectivity segment

Number of smart homes: regional comparison (2/2)

Number of smart homes forecast in million

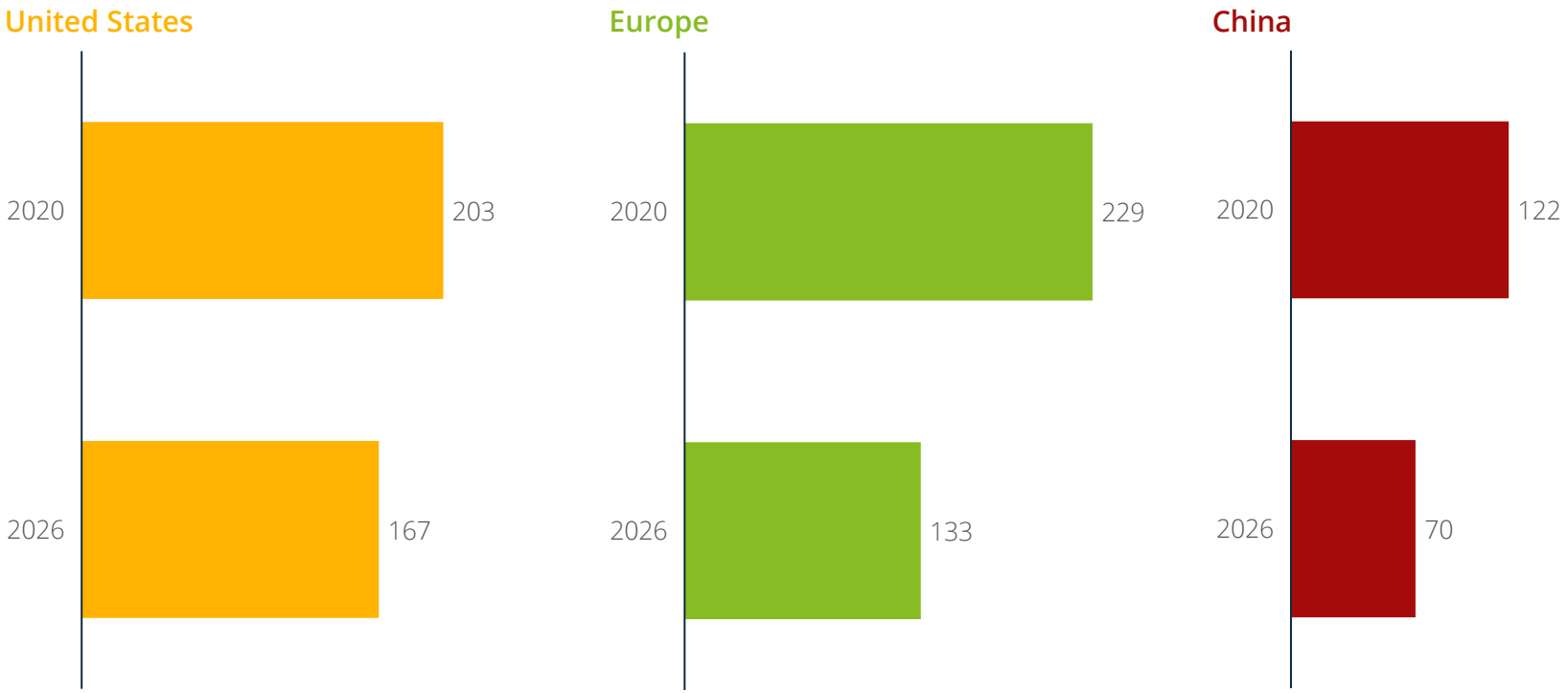


Sources: Statista Digital Market Outlook 2020

Out of the three regions, the U.S. shows the highest average revenue per smart home in 2026

Average revenue per smart home: regional comparison (1/2)

Average revenue per smart home forecast in US$

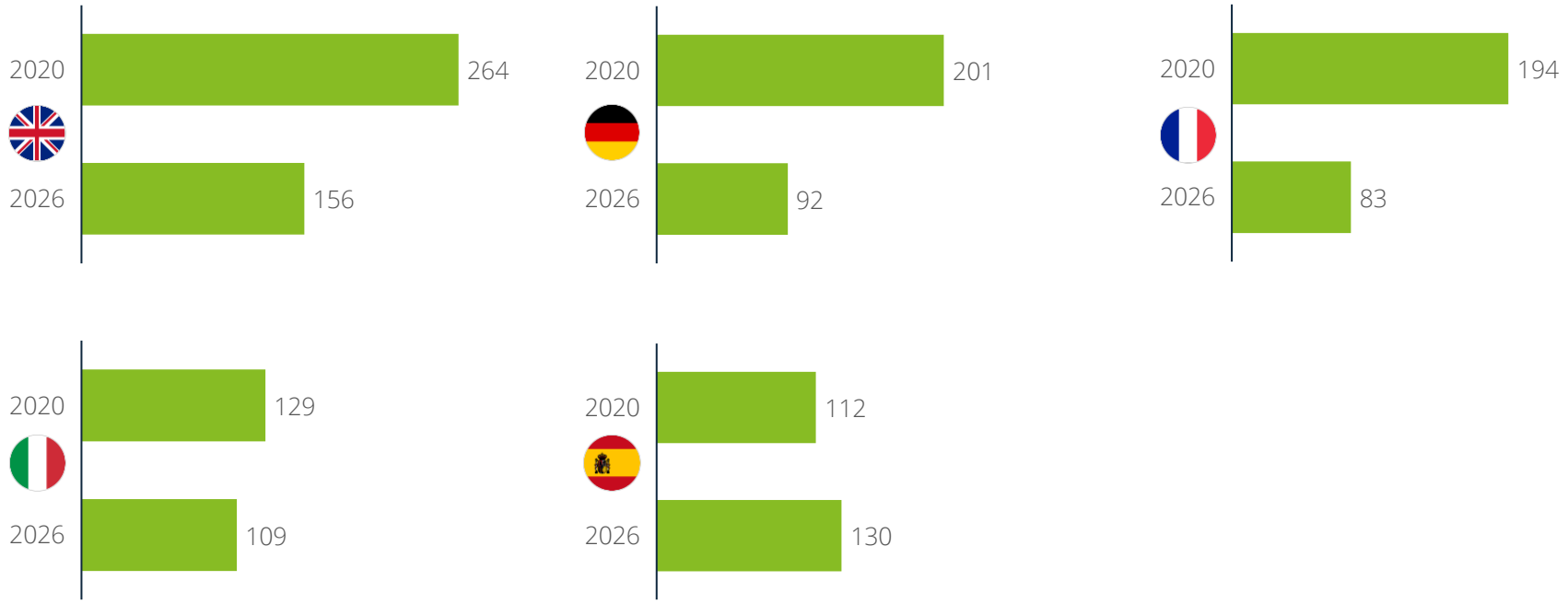


1: Only includes countries listed in the Digital Market Outlook
Sources: Statista Digital Market Outlook 2020

The UK shows the highest revenue per smart home in the EU top 5 for Control and Connectivity products

Average revenue per smart home: regional comparison (2/2)

Average revenue per smart home forecast in US$

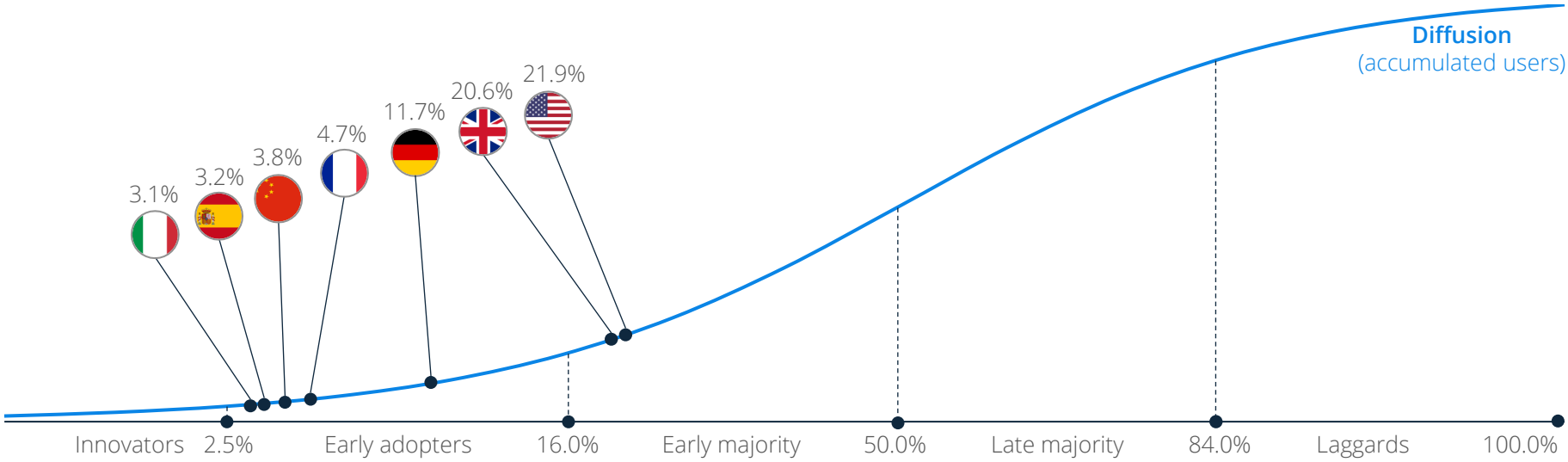


Sources: Statista Digital Market Outlook 2020

The adoption rate of Control and Connectivity devices is much higher in English speaking countries

Penetration rates: innovation diffusion

Innovation diffusion curve for 2020



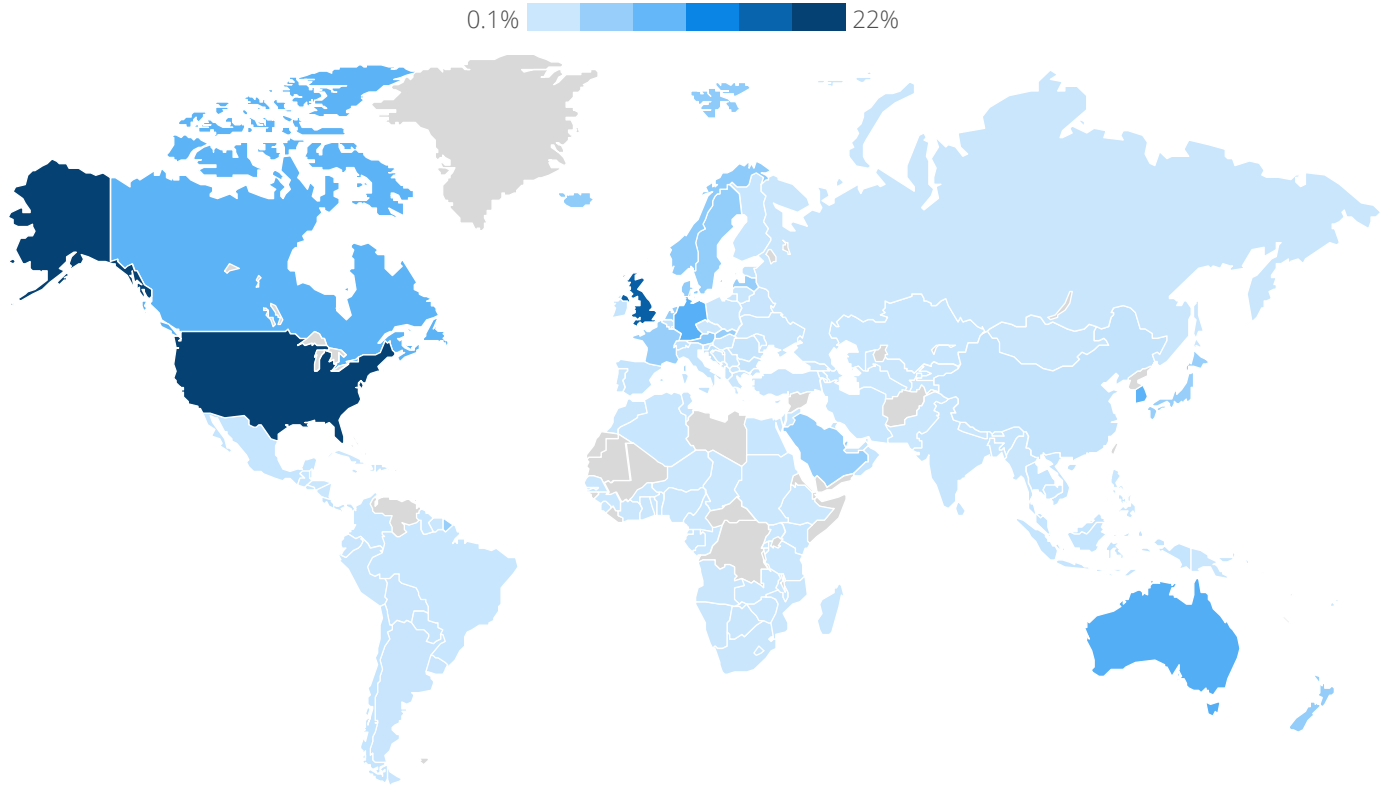
The diffusion of innovations graph shows successive groups of consumers adopting control and connectivity devices (the graph above shows the household penetration rate of selected countries). Innovations in general are not adopted by all individuals at the same time. Instead, they tend to adopt in a time sequence, and can be classified into adopter categories based on how long it takes until they begin using the service. Diffusion is considered to be the rate and volume at which innovations spread among their users (an adoption rate of 100% is theoretically possible but not realistic). Considering the already high adoption rates, due to increasing sales of smart speakers, the segment is one of the big growth drivers.

Sources: Statista Digital Market Outlook 2020

The U.S. and the UK are in the lead for Control and Connectivity due to English voice assistants

Penetration rates: global comparison

Control and Connectivity household penetration rate in 2020

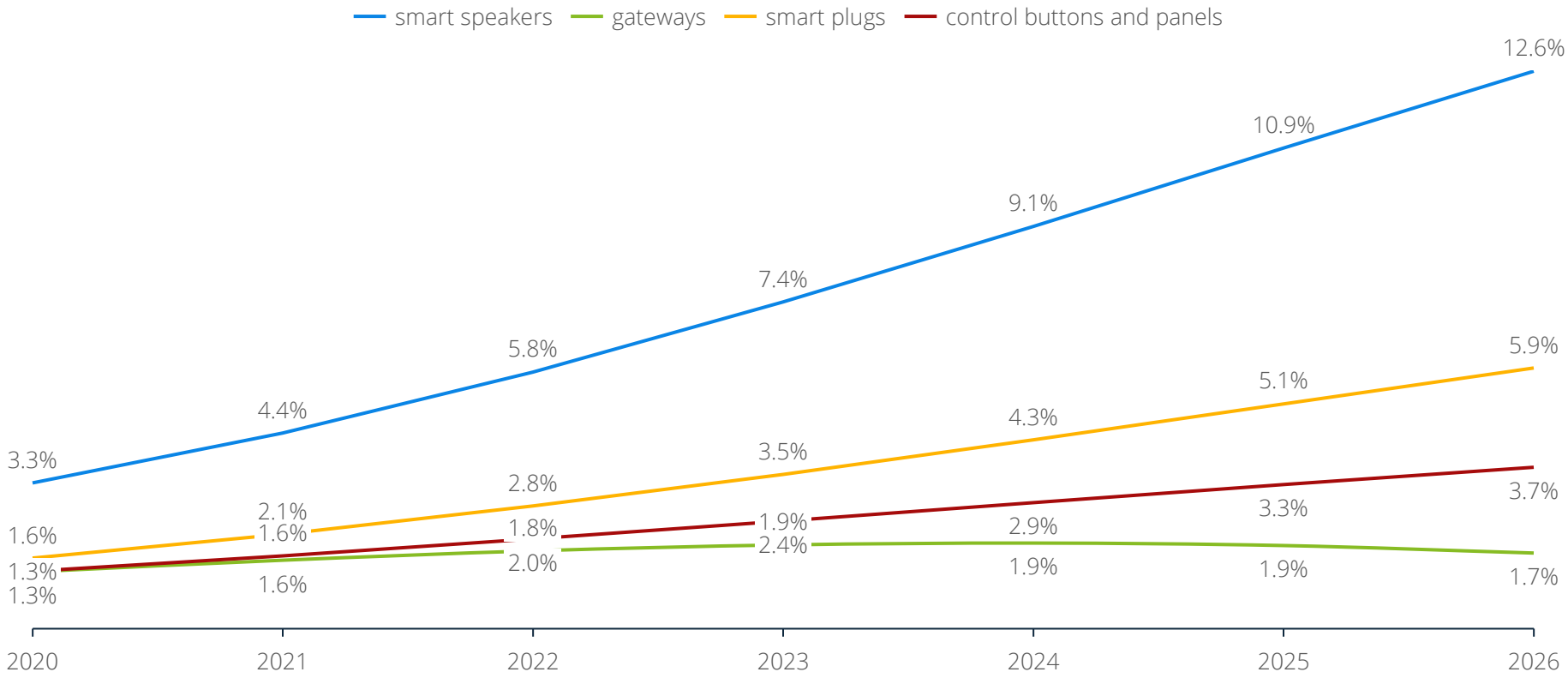


Sources: Statista Digital Market Outlook 2020

Gateways will start to stagnate and will be replaced in their function by smart speakers

Penetration rates: products

Global Control and Connectivity household product penetration rates



Note: The chart show the share of global Smart Homes with the respective product from the total number of private households of the segment.
Every Smart Home can own more than one product.
Sources: Statista Digital Market Outlook 2020

Control4 is a listed U.S. smart home pure player with a global network of direct dealers

Company profiles: Control4 (1/3)

Key facts

Revenue:	US$295 million[1] (2019)
CAGR[2]:	8.5% (18-19)
Countries[3]:	100+ (2019)
Employees:	700 (2019)
Headquarters:	Salt Lake City, Utah, USA
Founded:	2003

Selected SDDP[3] partners

Products

The Control4 platform is an operating system for smart homes which connects and manages devices. The mobile app 4Sight provides secure mobile access for all home devices. The open software platform and ecosystem is interoperable with 12,000 third-party products and partners shipping 5,600 SDDP[3]-enabled models. The SDDP[4] growth is mostly driven by LG, Samsung and Sony. For homes that are not fully equipped for home automation, Control4 also offers seamless, upgradeable and secure networks with their package network solutions. Other typical Control4 products are control panels and touch screens, multiroom amplifiers, remote controls or WiFi access points.

Strategy

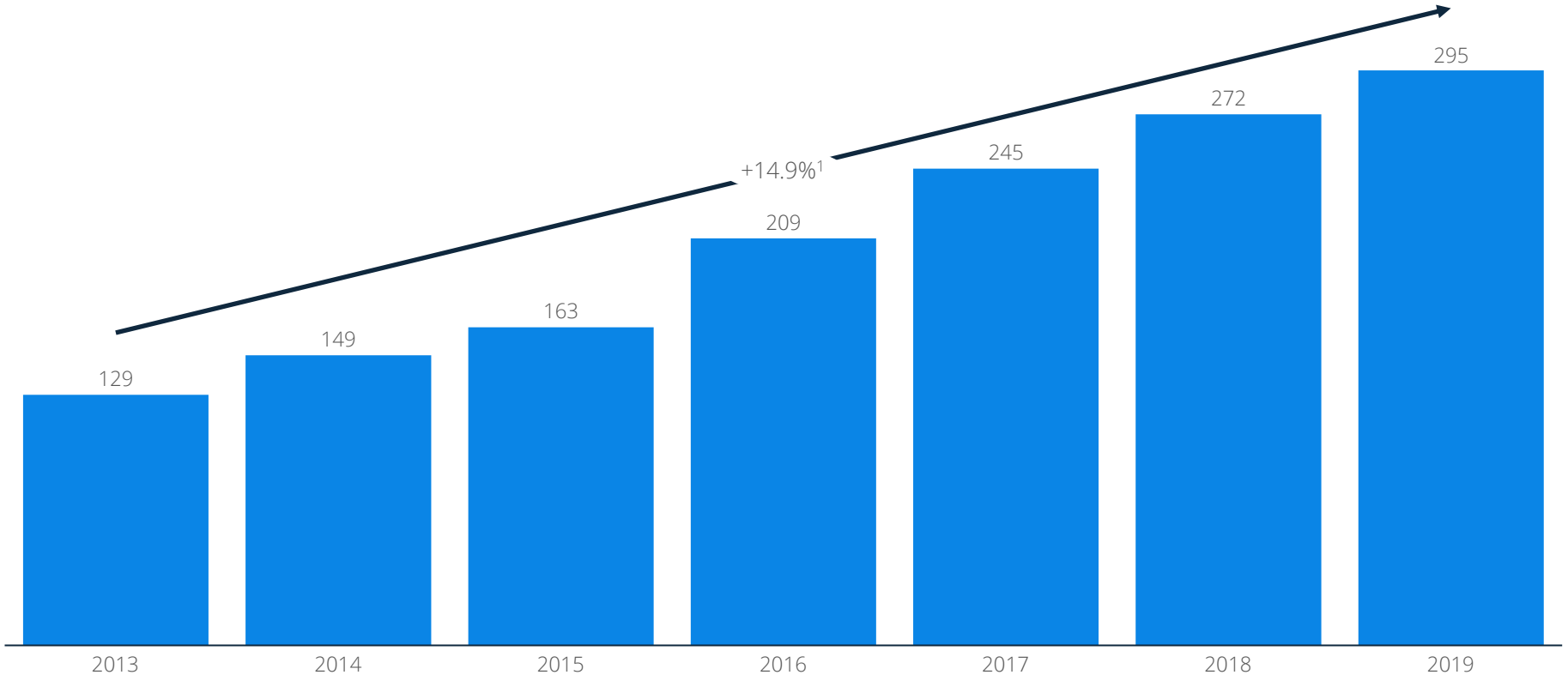
Control4 develops smart home automation systems to control lighting, entertainment, security, energy, and other connected devices. The company sells and delivers their solutions via a worldwide network of around 4,900 active direct dealers and 46 distributors to 97 countries. Control4 solutions are high-priced, professionally installed smart homes with a high number of integrated devices. In 2013, the company announced its IPO (first pure-play home automation IPO till then). Control 4 can be placed in the “pro-installed” connected home market segment, offering upfront systems and installations typically for a higher number of devices and a more personalized premium experience.

1: Expected revenue; still awaiting official announcement. 2: CAGR: Compound Annual Growth Rate / average growth rate per year 3: Over 4,500 active direct dealers were authorized to sell and install the full Control4 line of products in the U.S, Australia, China, Germany, the UK, and 57 other countries, and 31 distributors were authorized to cover an additional 43 countries (without direct dealer relationships). 4: Simple Device Discovery Protocol = Software for system integration
Sources: Company information

The consumer need for personalized home automation is driving growth for Control4

Company profiles: Control4 (2/3)

Revenue in million US$



1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

eQ-3 is one of the internationally expanding technology leaders for home control from Europe

Company profiles: eQ3

Key facts

Regional focus:	Sales Europe / production China
Product types:	200+
Smart Homes:	~2m with ~36m devices (2019)
Employees:	1000+ globally (2019)
Headquarters:	Leer, DEU
Founded:	2007

homematic IP

Photo: eQ-3 press release 2018

Connection with various products for:

- heating and air conditioning
- lighting
- shutters and blinds
- security and surveillance
- weather observation

Products

Today, eQ-3 is one of the most well-established smart home manufacturers in Europe. Their devices are mostly plug and play and target the DIY market. With the recent integration of Amazon Echo and Google Home into the Homematic ecosystem, the company proved that it quickly adapts to new challenges. Since grid currents and fitting of hardware devices differ regionally, the international expansion – beyond European borders – is a challenge eQ-3 will most likely not solve as easy as vendors whose solutions are almost exclusively based on software (e.g. Amazon). Entering a market with a platform and strengthening one's position with hardware might be a solution.

Strategy

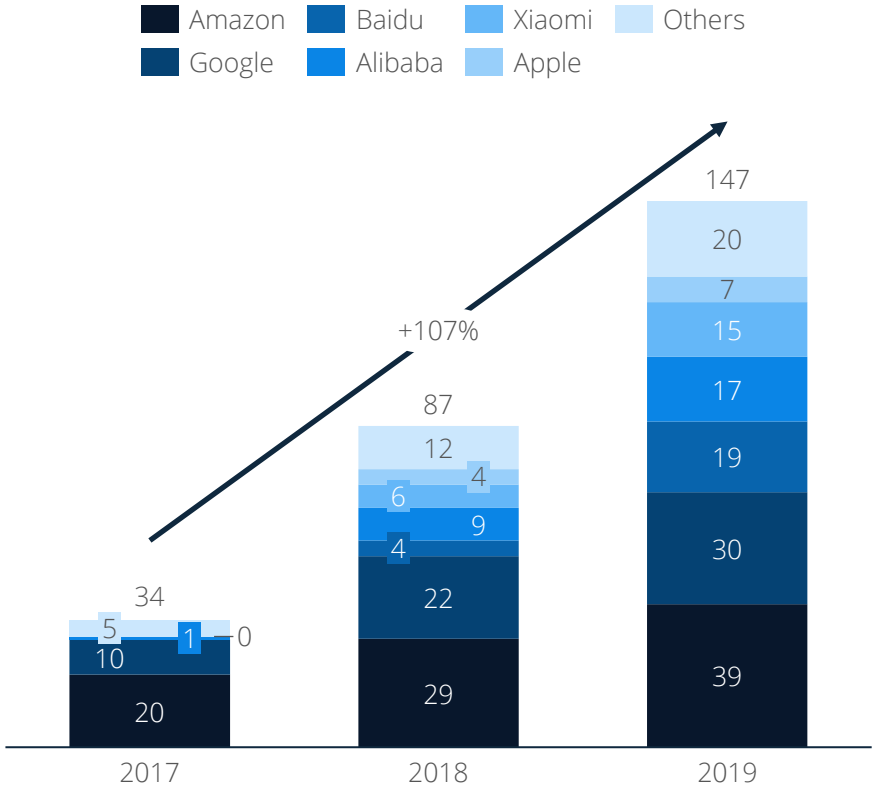
The company eQ-3 is a 2007 spin-off of the German electronics company ELV Elektronik AG, which was founded in 1978. The company is a device manufacturer as well as a platform provider for the open Homematic IP communication standard. The company has a portfolio of more than 200 devices across all smart home segments (door sensors, hubs, thermostats, plugs, smoke detectors, etc.). eQ-3 distributes their devices via traditional retail, online shops and partners with local utility companies like Deutsche Telekom, whose platforms their devices can be integrated into. The company mainly produces in China, while development is based in Germany.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

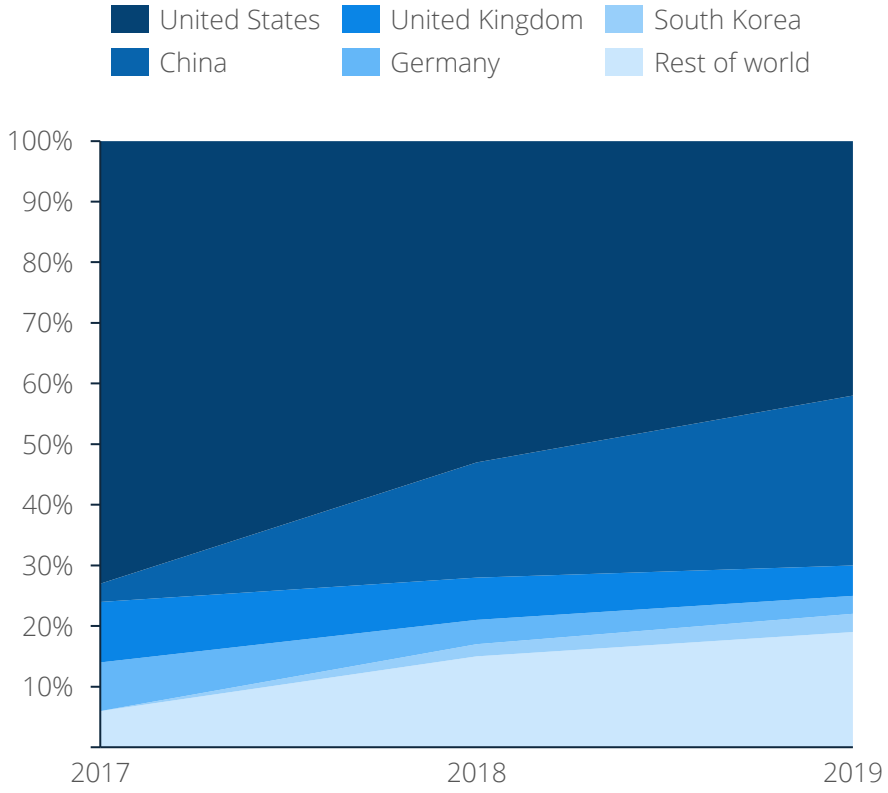
China is catching up with smart speakers and is responsible for around 30% of global sales

Deep dives: estimated smart speakers global sales share

Global smart speaker shipments by vendor in millions



Distribution of smart speaker installed base in percent

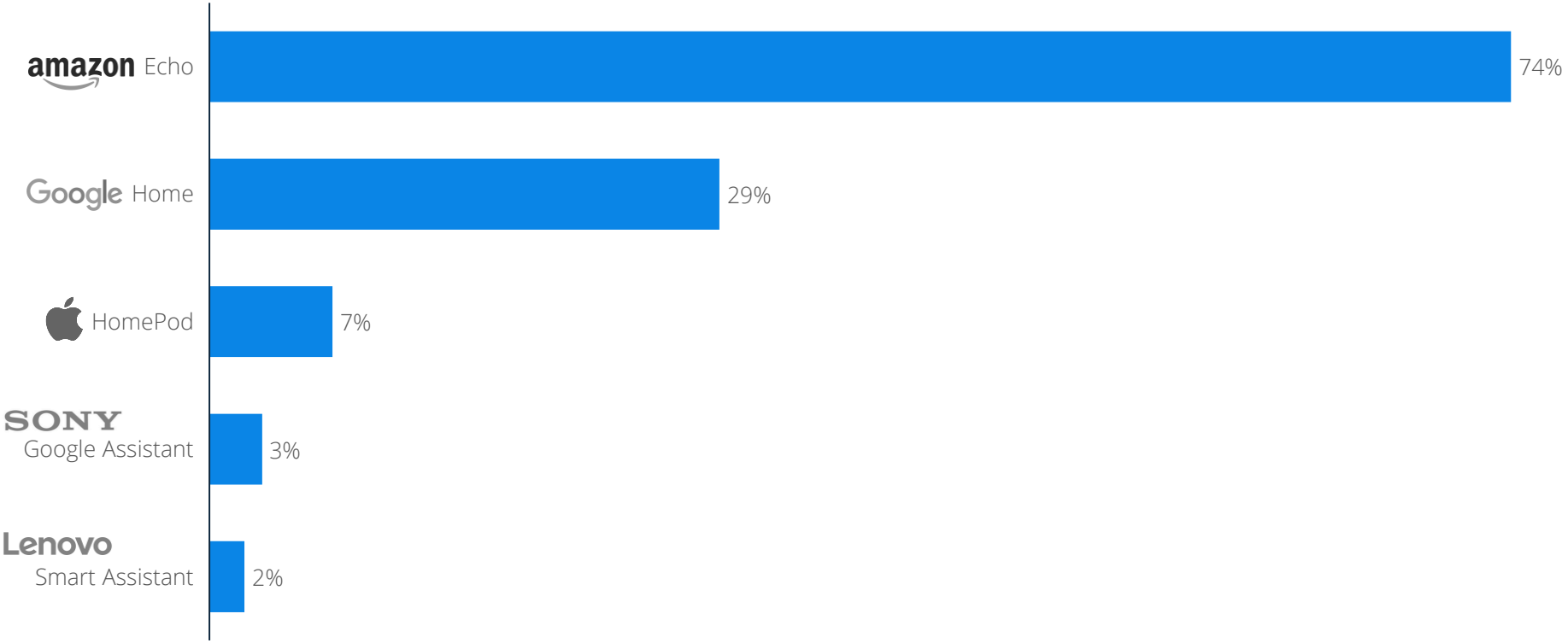


Sources: Strategy Analytics; Canalys 2020

Amazon's Alexa continues to dominate the smart speaker market in the U.S.

Deep dives: smart speakers in the U.S.

Most frequently used smart speaker models in the US

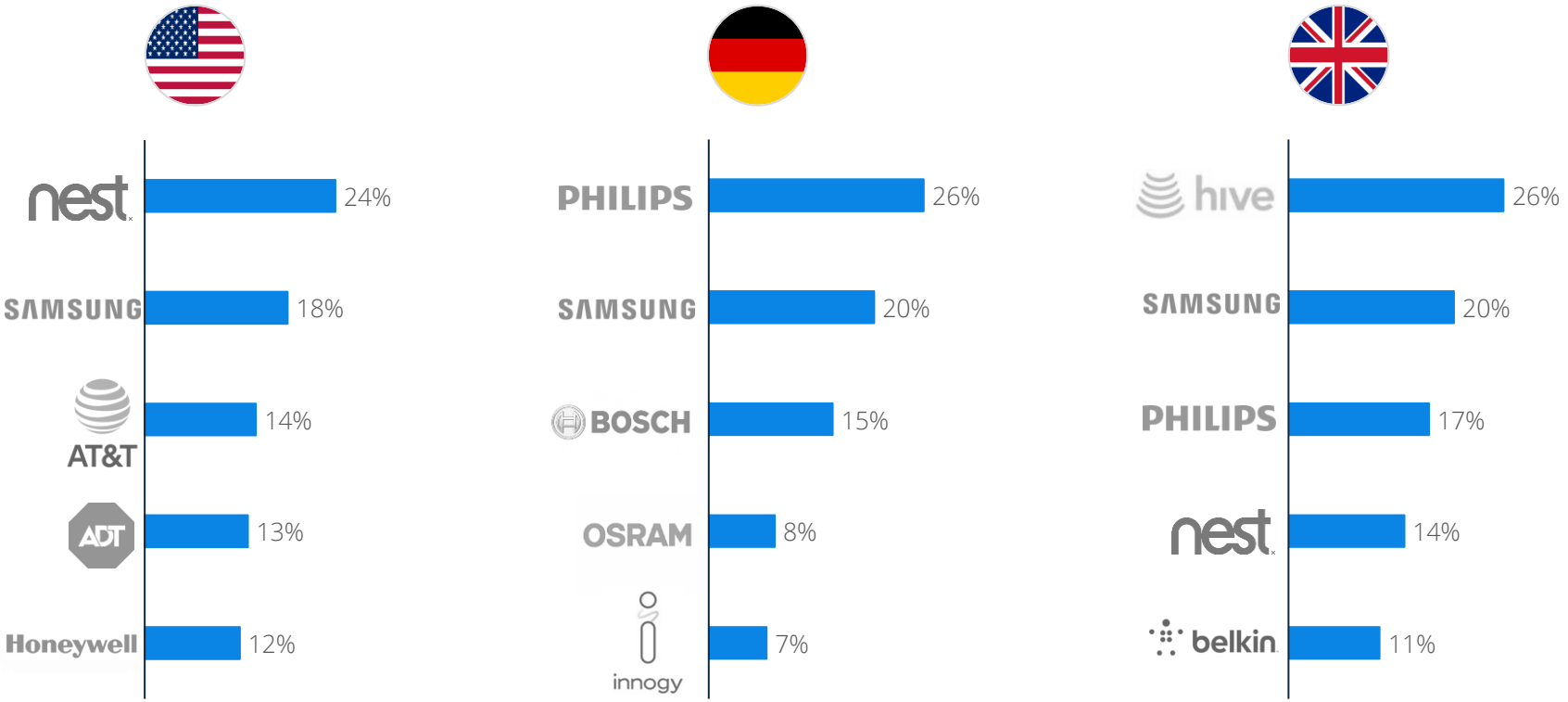


Sources: Strategy Analytics; Canalys 2020, Statista Global Consumer Survey, as of March 2021

The top Smart Home product brand in the U.S. is Nest, whereas Hive leads in the UK and Philips in Germany

Smart Home – Consumer behavior

Ownership of selected Smart Home automation devices in 2020



"Which of these providers do you own Smart Home devices from?" Multi Pick; U.S.: n=993; UK: n=445; Germany: n=483 respondents who own smart home devices for comfort and lighting, building safety/security, and/or energy management
Sources: Statista Global Consumer Survey, as of August 2020

SMART APPLIANCES

The Smart Home segment Smart Appliances includes connected versions of all kinds of household appliances. This includes large appliances (fridges, washing machines, ovens etc.) as well as small appliances (microwaves, coffee machines, vacuum and mowing robots etc.), provided they are connected to the internet.

Smart Home Appliances: products and services

Overview: segment

In-Scope

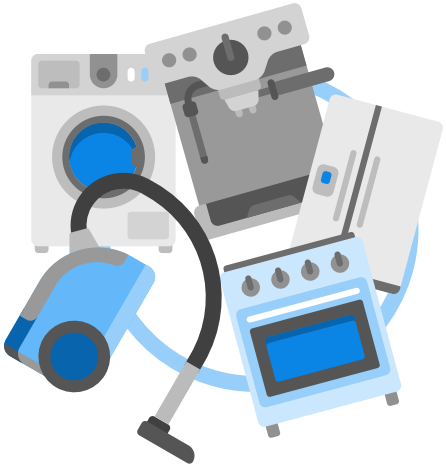
The Smart Home segment Smart Appliances includes connected versions of all kinds of household appliances. This includes:

- Directly or indirectly internet-controllable household appliances
- Large appliances such as fridges, washing machines, dish washers, ovens
- Small appliances such as coffee machines, vacuum and mowing robots, microwaves

An indirect connection via a local network is also possible, as long as the remote access and control of the respective appliances via the connection is given.

Out-of-Scope

- Any other smart home device (partially also referred to as “appliances”)
- Any non-connected household appliances
- B2B/C2C sales of any kind (e.g. to hotels or office buildings)



Sources: Statista Digital Market Outlook 2020

Innovations in the field of smart appliances are incremental and disruptive at the same time

Overview: customer benefit and market development

Customer benefit

In most cases, smart appliances are incremental innovations which add new features to existing products rather than creating totally new devices. Replacing existing home appliances with connected ones brings along several benefits for customers. Of course the individual advantages highly depend on the specific device.

In the kitchen, improving safety is among the top reasons to opt for smart appliances. Smart ovens, for example, are able to turn themselves off in potentially dangerous situations.

Next to the demand for safety, comfort is a strong driver. Tasks like creating shopping lists or shopping itself can be partly or fully automated with the help of connected appliances. Devices can turn themselves on and off at specific times or can be remotely controlled. Combining all these features with other devices delivers more benefits: The coffee machine that is activated by the alarm clock in the mornings, or the oven that is turned off by the last person leaving through the smart lock door.

Next to these incremental innovations, there are some with a more disruptive character. In this respect, we see devices which are completely redesigned as their handling has changed entirely. Automated vacuum cleaners – or vacuum robots – no longer need to be operated manually, but work totally independent.

Market size and future development

The global Smart Appliances market has a size of US$29.1 billion in 2020 and is still emerging.

There is a significant gap between the value of the revenue and the number of smart home households. In other words, we see that prices for single stand-alone devices are significantly smaller than those for integrated big appliance solutions. Many customers as a first step purchase lower-priced small appliances such as smart coffee machines or vacuum robots, whereas people who already own products from other segments (e.g. smart security cameras or smart speakers) are more likely to purchase large, higher-priced appliances.

The leading global market is China. Here, Smart Appliances generate revenues of about US$7.6 billion in 2020. In China, Smart Appliances are quite popular and due to strong growth, they are a driver of the whole Smart Home market. The market will face the strongest average growth rate of 20.5% p.a. and will reach US$23.3 billion by 2026.

In Europe, the Smart Appliances market is slightly bigger than in the U.S., with US$6.7 billion in 2020. Within Europe, Germany is generating the most revenues. The growth in the U.S. is mostly driven by small appliances like vacuum robots, generating a revenue of US$6.4 in 2020.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Smart appliances offer convenience, sustainability and customized functionalities

Overview: product examples

Smart technology is a key feature for every new appliance, from dishwashers and washing machines to coffee machines. Offering customized functionalities for all kinds of needs and preferences of the user. The trends towards smaller single households and integrated kitchen designs support the development of smart kitchens. From freestanding furniture and appliances to a built-in and smart kitchen design. In addition to the convenience and the easy handling, smart devices also serve sustainability purposes. For example, connected household appliances can not only store shopping lists, but with one view on the smartphone, it is possible to check what is still in the refrigerator and what needs to be purchased.

Photo: Miele press release 2018

Miele launched the new W1 Washing Machines and W1 Dryers in the U.S. Both devices are linked to the Miele mobile app allowing the user to monitor the cycle progress, time remaining and estimated completion time.

Photo: Samsung press release 2018

Samsung Electronics introduced the Family Hub refrigerator. A connected refrigerator with ingredient-tracking cameras and a whopping 21.5-inch touchscreen on the door, using Bixby voice control and Samsung's SmartThings IoT ecosystem.

Photo: Nespresso press release 2017

The Nespresso Expert Espresso Machine uses Bluetooth to connect to the smartphone, making personalized coffee using Nespresso capsules. It is possible to schedule the preferred brew time, start brewing remotely and order new capsules.

Sources: Company information, press releases (Samsung, Miele, Nestlé)

Smart appliances are expected to replace traditional devices within the regular replacement cycle

Overview: assumptions and trends

Assumptions

We expect devices to be adopted rather slowly in western Europe and North America, but more quickly in Asia. On a global scale, this leads to an average growth in the market in terms of shipments.

The first devices purchased in the segment will be smaller ones with a comparably low price. With rising trust in technology, more expensive devices in households will be replaced by connected ones. This leads to a rise in average device prices across device types over the coming years. The overwhelming part of the revenue will be generated by households with devices from multiple segments.

We expect traditional home appliances companies to shape the market. For smaller devices such as vacuum cleaners, a few start-ups might appear, but most likely they will soon be integrated into bigger corporations.

We also expect replacement cycles to have a similar length to those of traditional home appliances. This is another major reason for the slower adoption of larger appliances in comparison to smaller ones. Up-to-date values concerning the replacement cycle especially of larger appliances, however, simply don't exist to date. Changes to this development can of course affect market growth in both directions.

Trends

Home appliances will remain an essential part of future households. Similar to smart lighting products, we consider smart appliances an incremental innovation, which are likely to replace all existing devices in the long run: At some point there will only be connected appliances. As the replacement cycle for large appliances can easily take ten years, this change is not expected to be complete within the near future.

Experts are confident about the trend towards further automation. This includes:

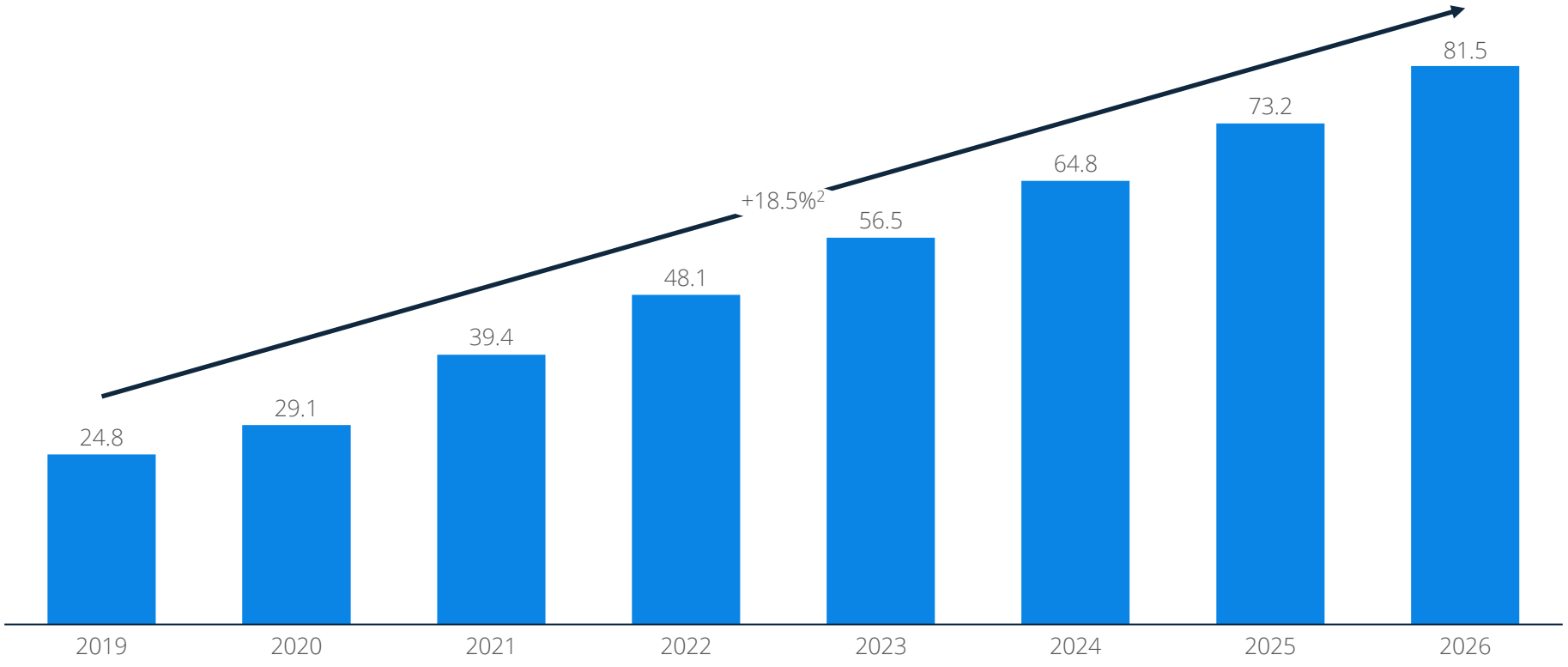
- Automated replenishment, e.g. of detergents for the dishwasher or food and drinks by the fridge.
- The interconnection of digital markets: The oven that starts heating up when the connected car signals itself approaching the house.
- Increasing energy and cost efficiency: This could be the washing machine that automatically finds a timeframe that optimally combines cost efficiency with acceptable noise.
- Individualization and pattern recognition: The coffee machine that uses facial recognition to automatically place all settings according to the person "ordering" a new coffee.

Sources: Statista Digital Market Outlook 2020

The Smart Home Appliances segment shows global revenues of US$29.1 billion in 2020

Market sizes: global

Global revenue forecast in billion US$

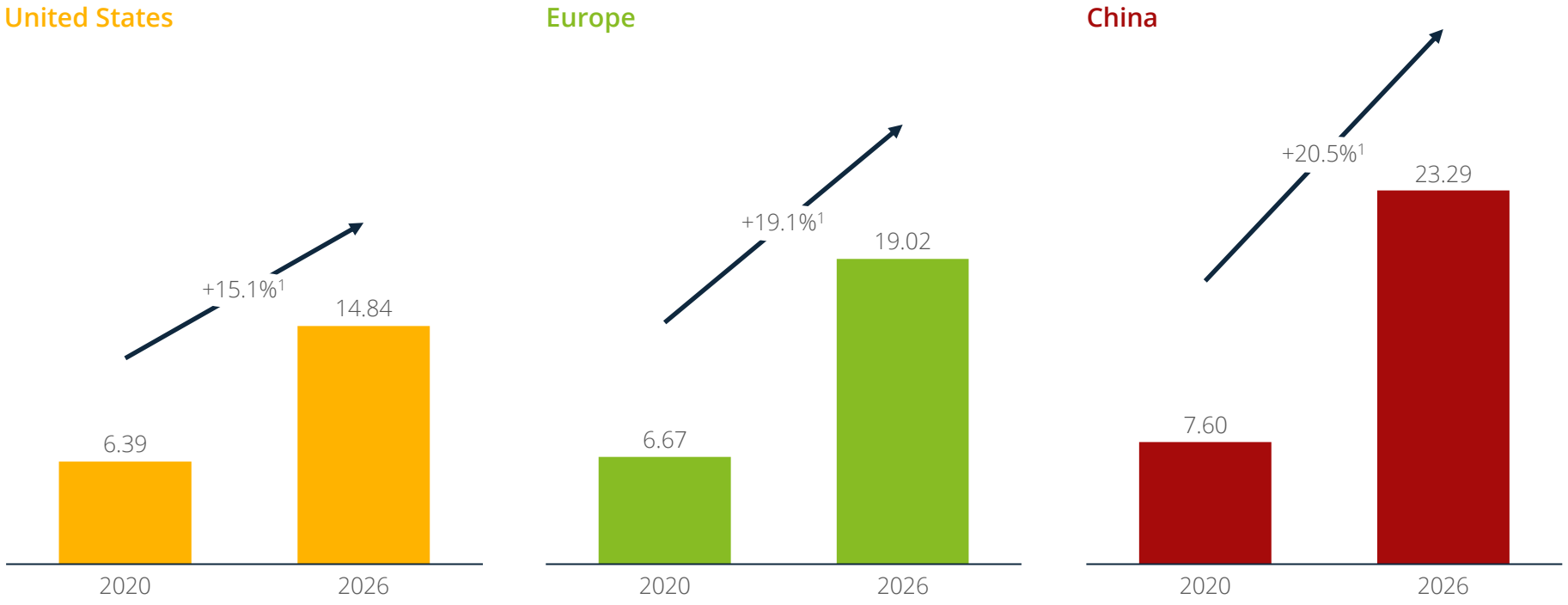


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

With 20.5 %, China has the highest CAGR[1] and will reach US$23.3 billion in revenues by 2026

Market sizes: regional comparison (1/2)

Revenue forecast in billion US$

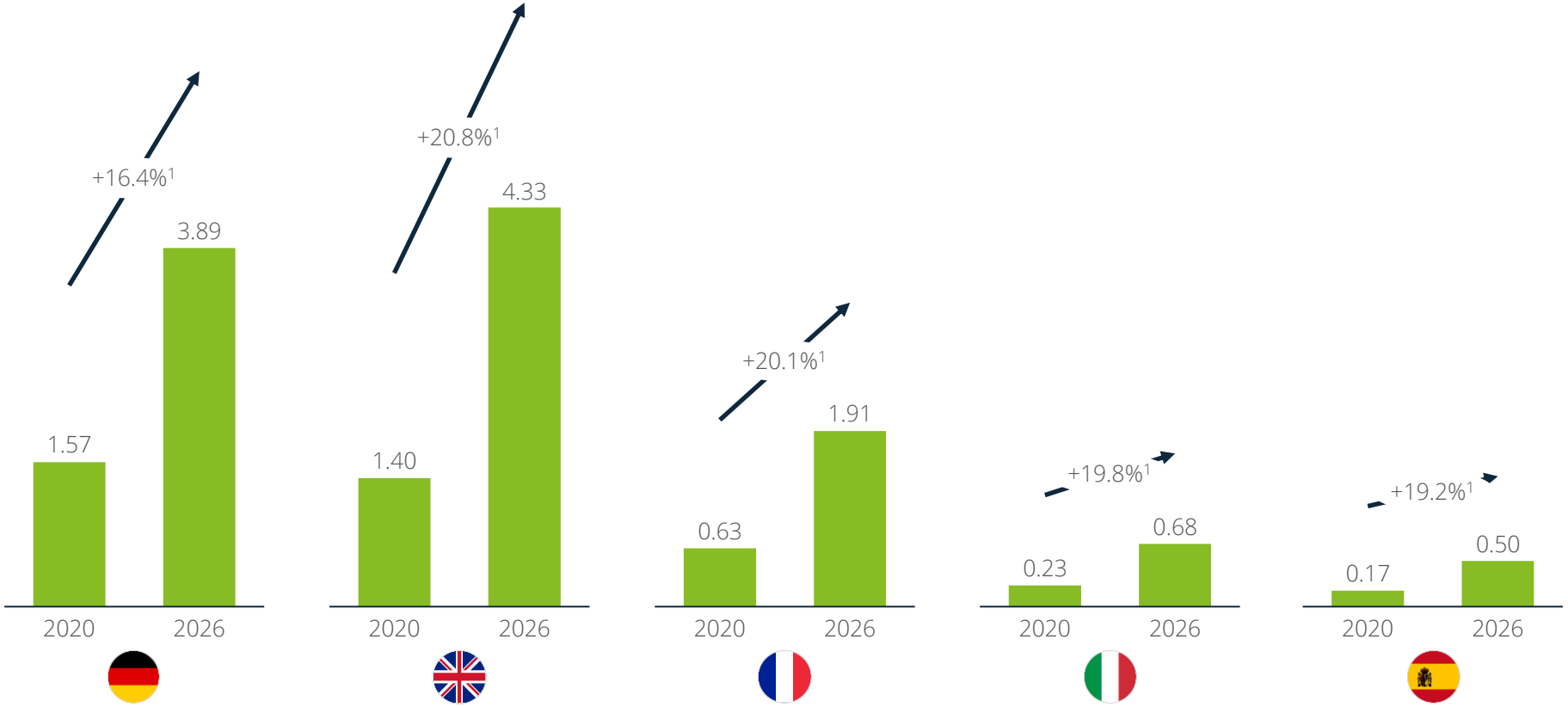


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Out of the European top 5, Germany and the UK generate the highest revenues

Market sizes: regional comparison (2/2)

Revenue forecast in billion US$

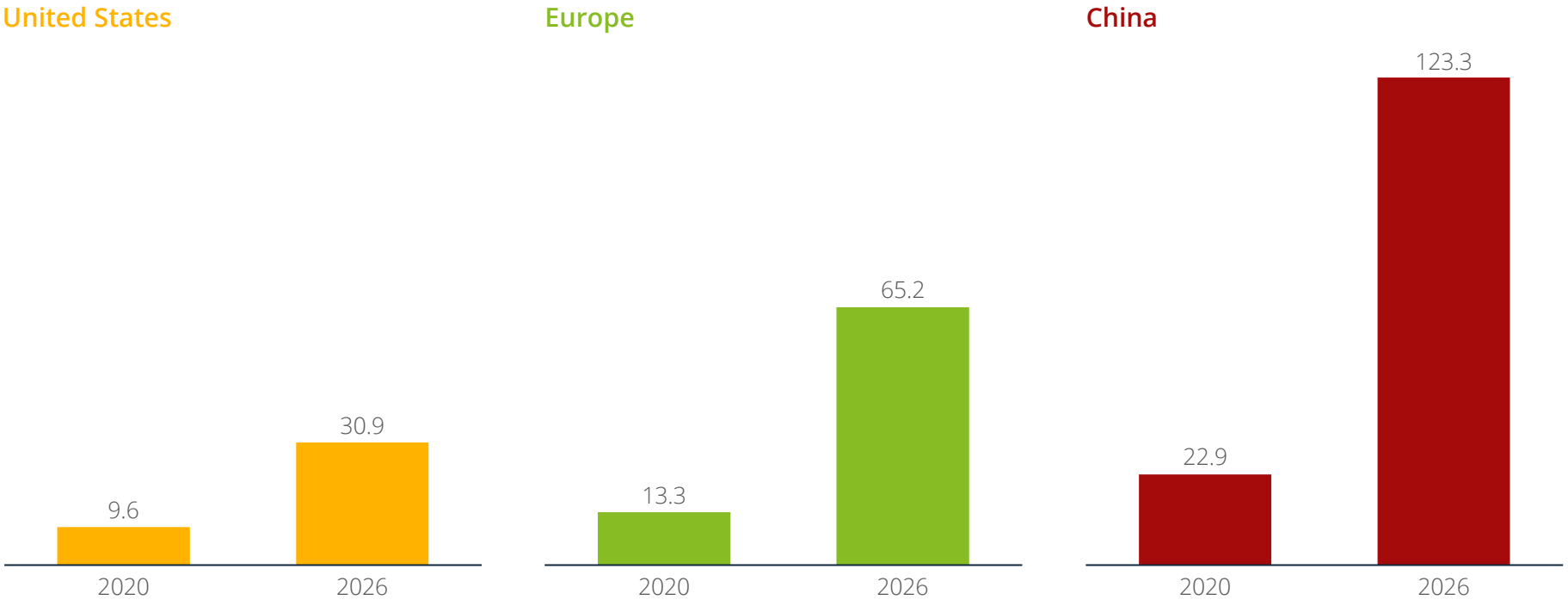


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

In the Smart Appliances segment, China shows a very high number of smart homes

Number of smart homes: regional comparison (1/2)

Number of smart homes forecast in million

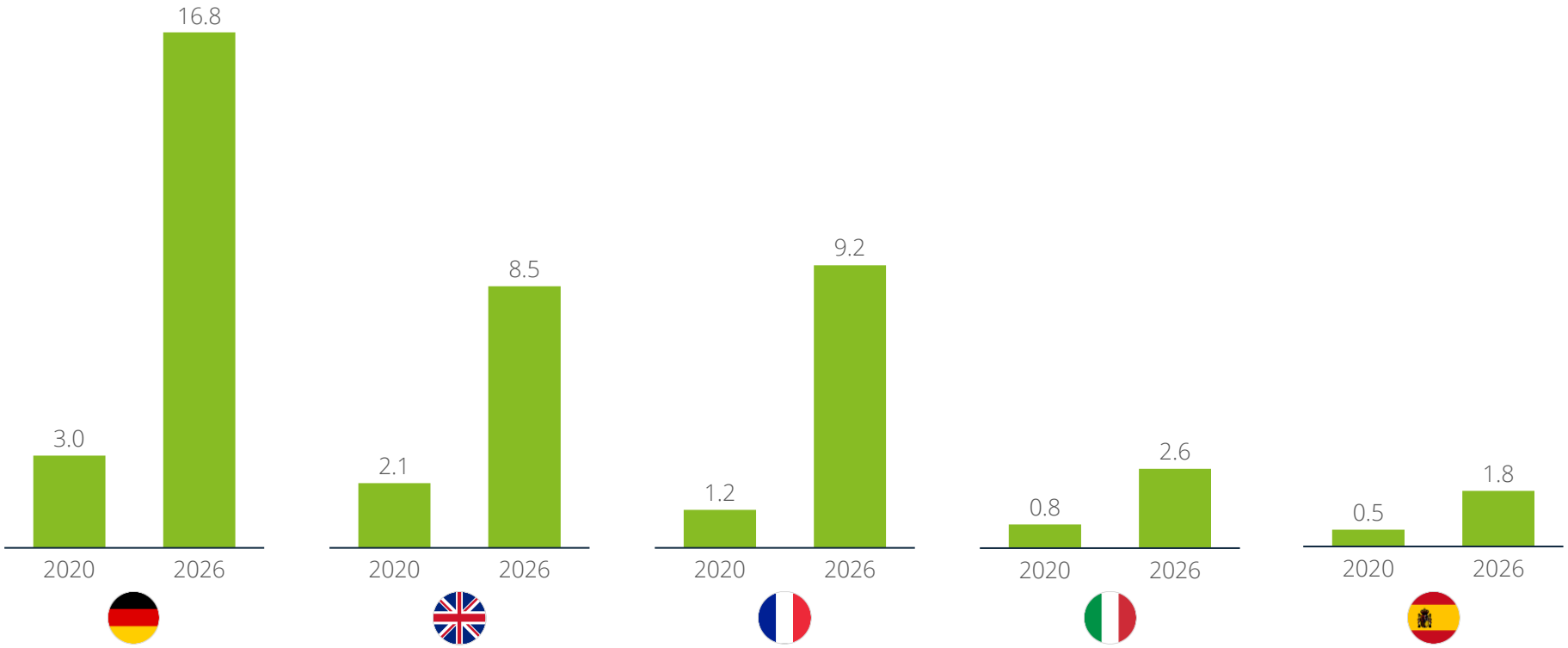


Sources: Statista Digital Market Outlook 2020

In Europe, Germany will have the greatest number of smart homes with Smart Appliances by 2026

Number of smart homes: regional comparison (2/2)

Number of smart homes forecast in million

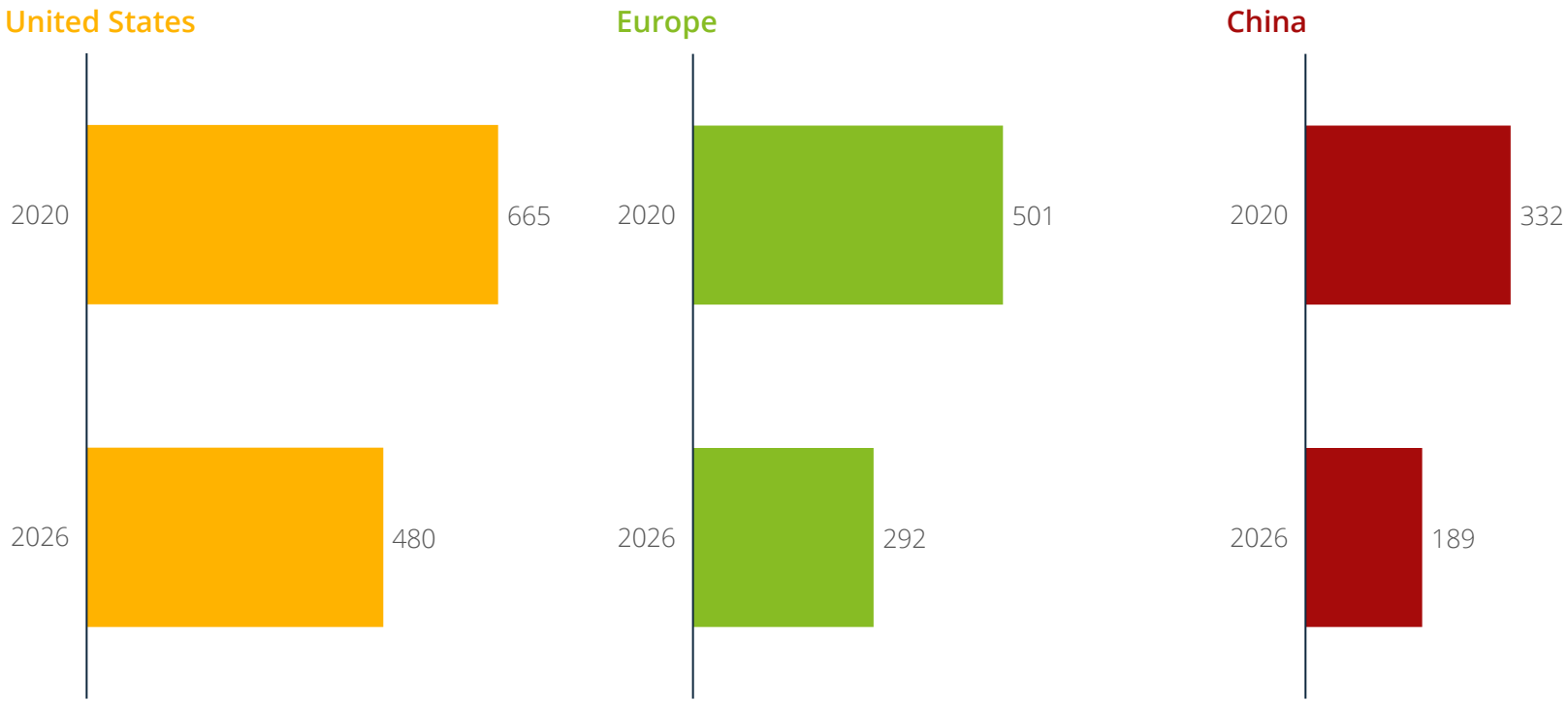


Sources: Statista Digital Market Outlook 2020

The U.S. shows the highest average revenue per smart home in the segment in 2020

Average revenue per smart home: regional comparison (1/2)

Average revenue per smart home forecast in US$

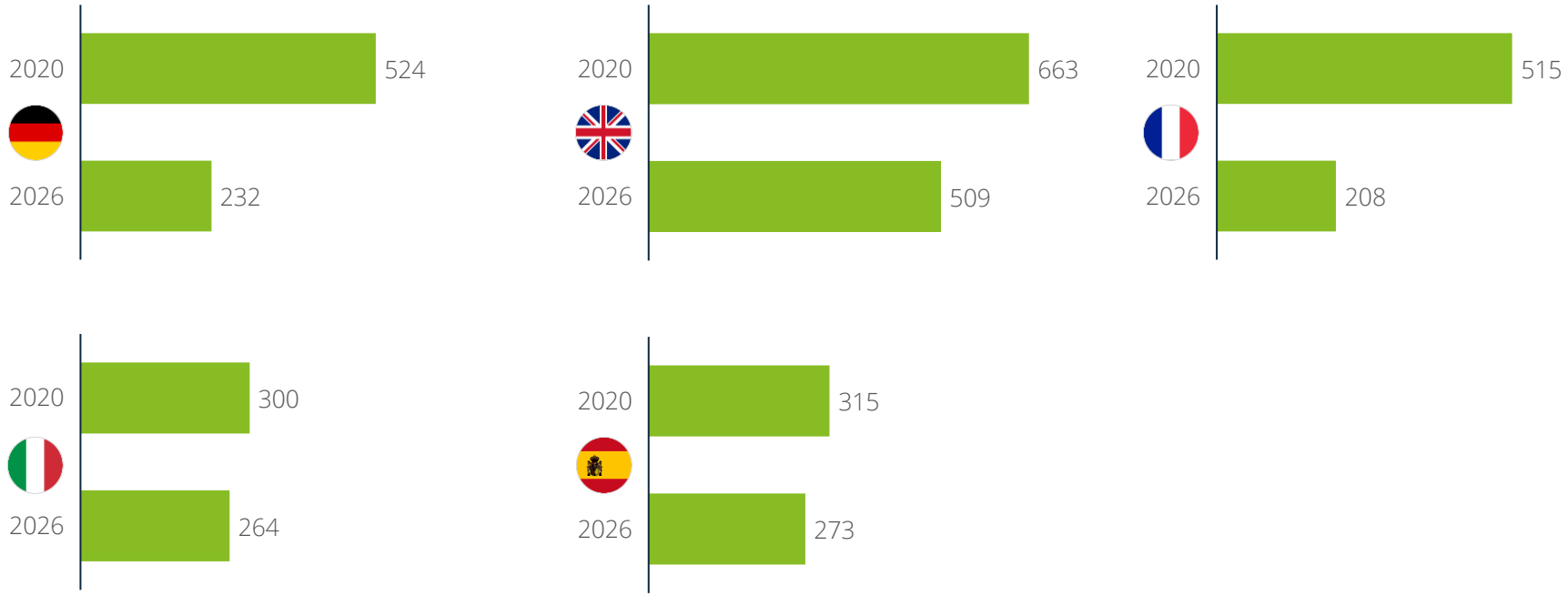


Sources: Statista Digital Market Outlook 2020

The UK consistently shows the highest average revenue per smart home in this segment

Average revenue per smart home: regional comparison (2/2)

Average revenue per smart home forecast in US$

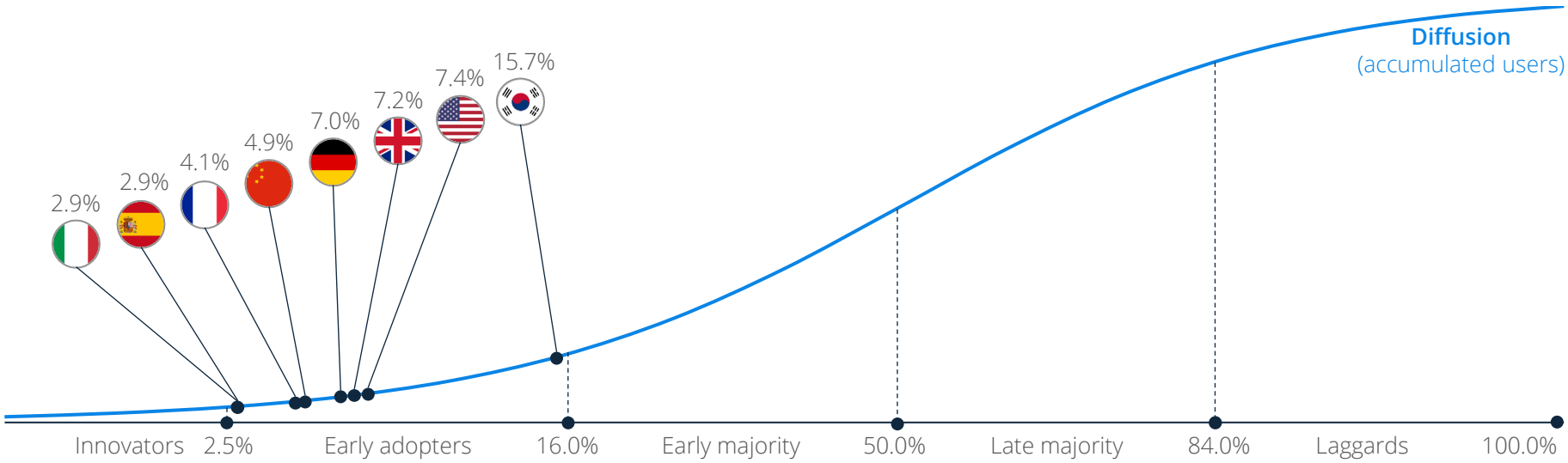


Sources: Statista Digital Market Outlook 2020

South Korea has a huge lead in the adoption of Smart Appliances when compared to other countries

Penetration rates: innovation diffusion

Innovation diffusion curve for 2020



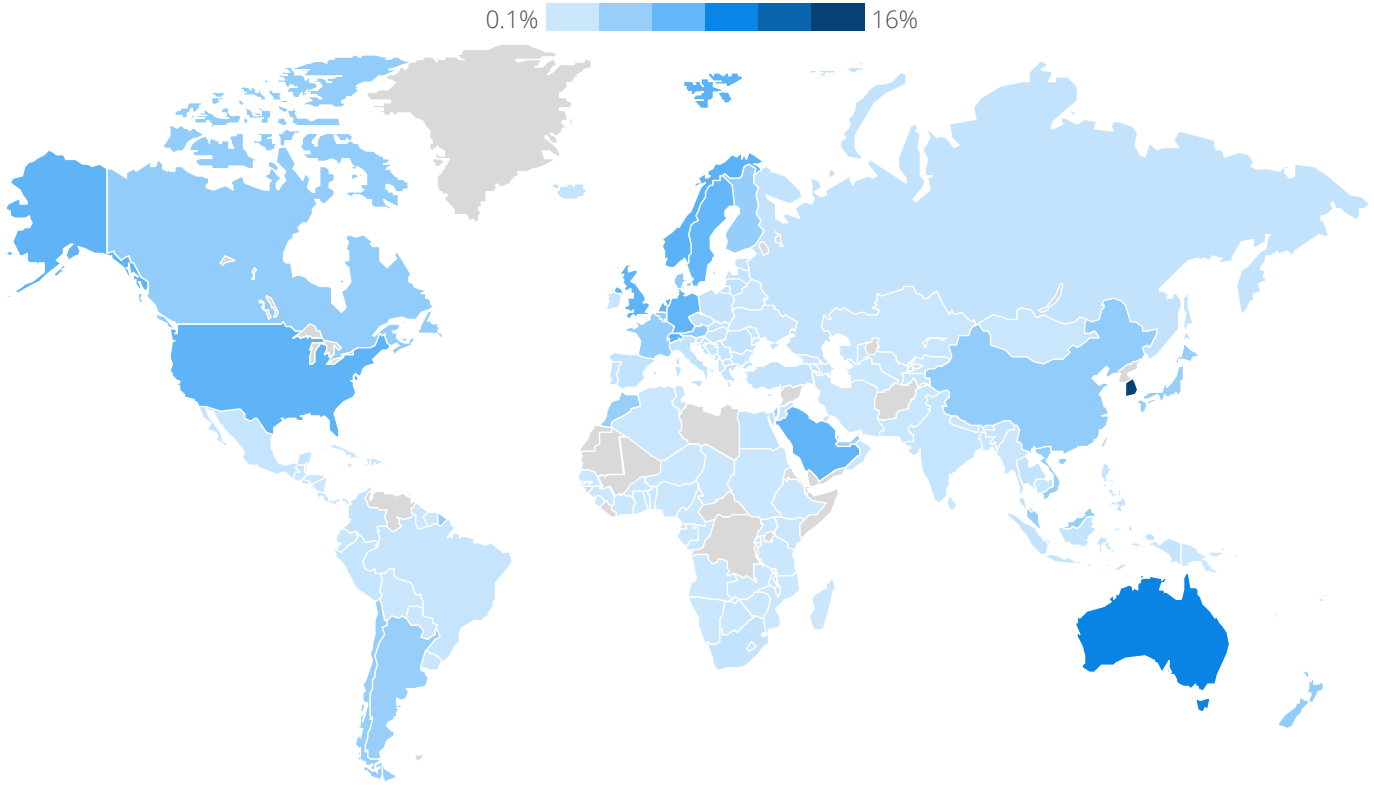
The diffusion of innovations graph shows successive groups of consumers adopting smart appliances (the graph above shows the household penetration rate of selected countries). Innovations in general are not adopted by all individuals at the same time. Instead, they tend to adopt in a time sequence, and can be classified into adopter categories based on how long it takes until they begin using the service. Diffusion is considered to be the rate and volume at which innovations spread among their users (an adoption rate of 100% is theoretically possible but not realistic). Smart appliances will replace all existing devices in the long run but just with a moderate adoption rate over time due to long replacement cycles for bigger appliances.

Sources: Statista Digital Market Outlook 2020

Smart Appliances penetration is highest in South Korea at 16%, and Australia a far second at 10%

Penetration rates: global comparison

Smart Appliances household penetration rate in 2020

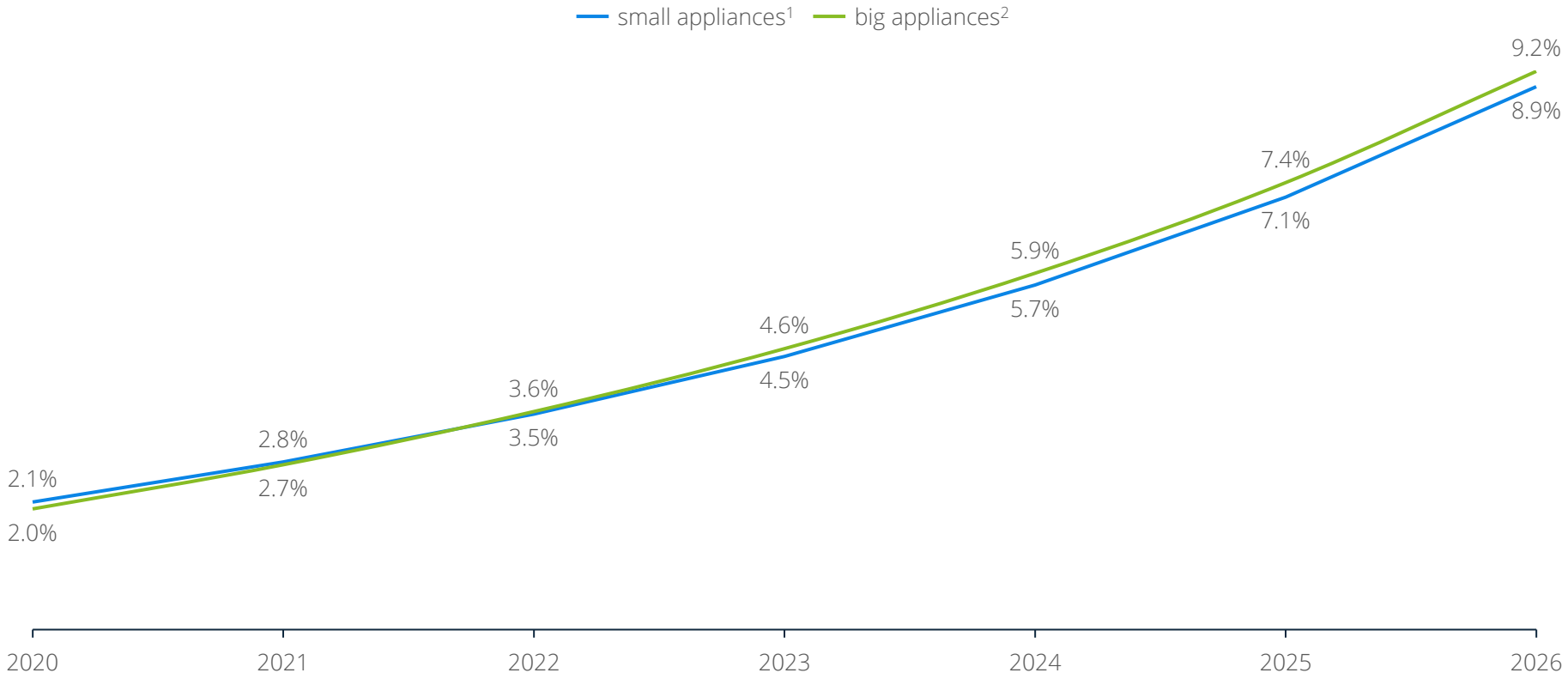


Sources: Statista Digital Market Outlook 2020

Small appliances like vacuum robots are driving adoption in the segment

Penetration rates: products

Global Smart Appliances household product penetration rates



Note: The chart show the share of global Smart Homes with the respective product from the total number of private households of the segment. Every Smart Home can own more than one product.
1: Appliances such as coffee machines, vacuum and mowing robots, microwaves
2: Appliances such as fridges, washing machines, dish washers, ovens
Sources: Statista Digital Market Outlook 2020

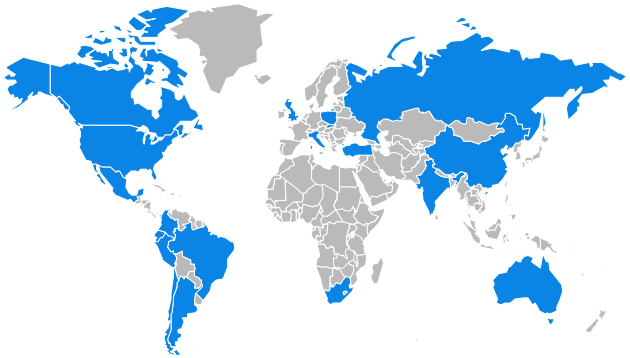
Whirlpool is one of the leading appliances providers in North America and strong in smart appliances

Company profiles: Whirlpool Corporation (1/3)

Key facts

Revenue:	US$19.5 billion (2020)
CAGR[1]:	-2.5% (19-20)
Manufacturing locations:	57 (2020)
Units sold:	67m (2019)
Employees:	78,000 (2020)
Headquarters:	Benton Harbor, Michigan, USA
Founded:	1911

Global manufacturing locations



Products

Whirlpool is constantly developing new connected home appliances and investing in new technologies, including scan-to-cook, voice control, and remote service diagnostics. In 2018 Whirlpool launched a fully connected kitchen suite that uses scan-to-cook technology and integrates with Yummly (acquired 2017) to recognize ingredients, recommend best recipes and provide on-demand videos to make cooking easier. Yummly recipes connect to selected Whirlpool wall ovens, ranges and microwaves. Besides that, Whirlpool has spent the past year setting up partnerships with big names like Google, Amazon and Apple to make its smart appliances appeal to a broader audience.

Strategy

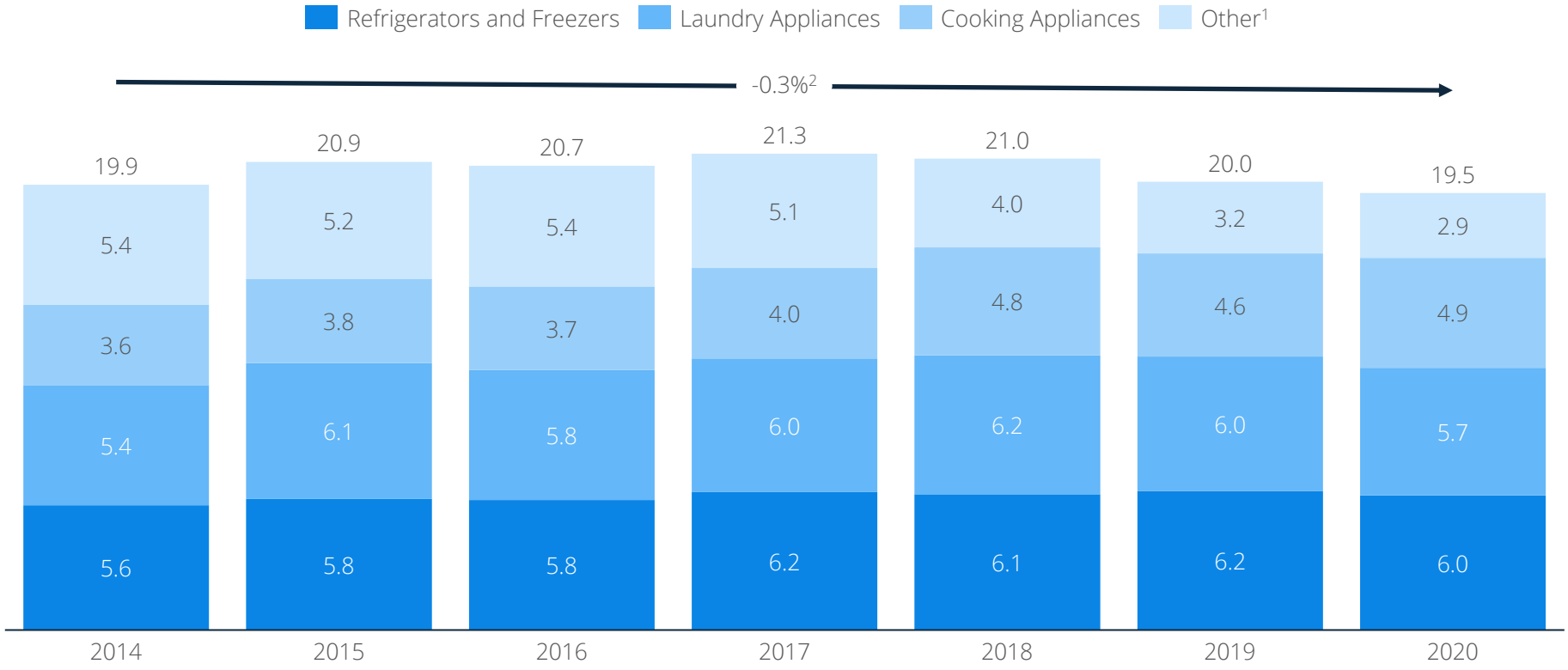
The Whirlpool Corporation was founded 1911 in the United States and is the biggest major appliances manufacturer and marketer of home appliances in the world. Whirlpool owns more than 57 manufacturing and technology research centers around the world and owns a variety of brands worldwide. Their brand portfolio includes 5 brands with each more than US$1 billion in sales. Whirlpool cooperated with Amazon on their Dash Service, e.g. for detergents, and the Jenn-Air brand provides remote control and monitoring for their ovens. Whirlpool sells their products in 170 countries, targeting 90% of the global consumers with their brand portfolio.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

The Whirlpool segments refrigerators and freezers account for the biggest share of revenues in 2020

Company profiles: Whirlpool Corporation (2/3)

Revenue by segment in billion US$

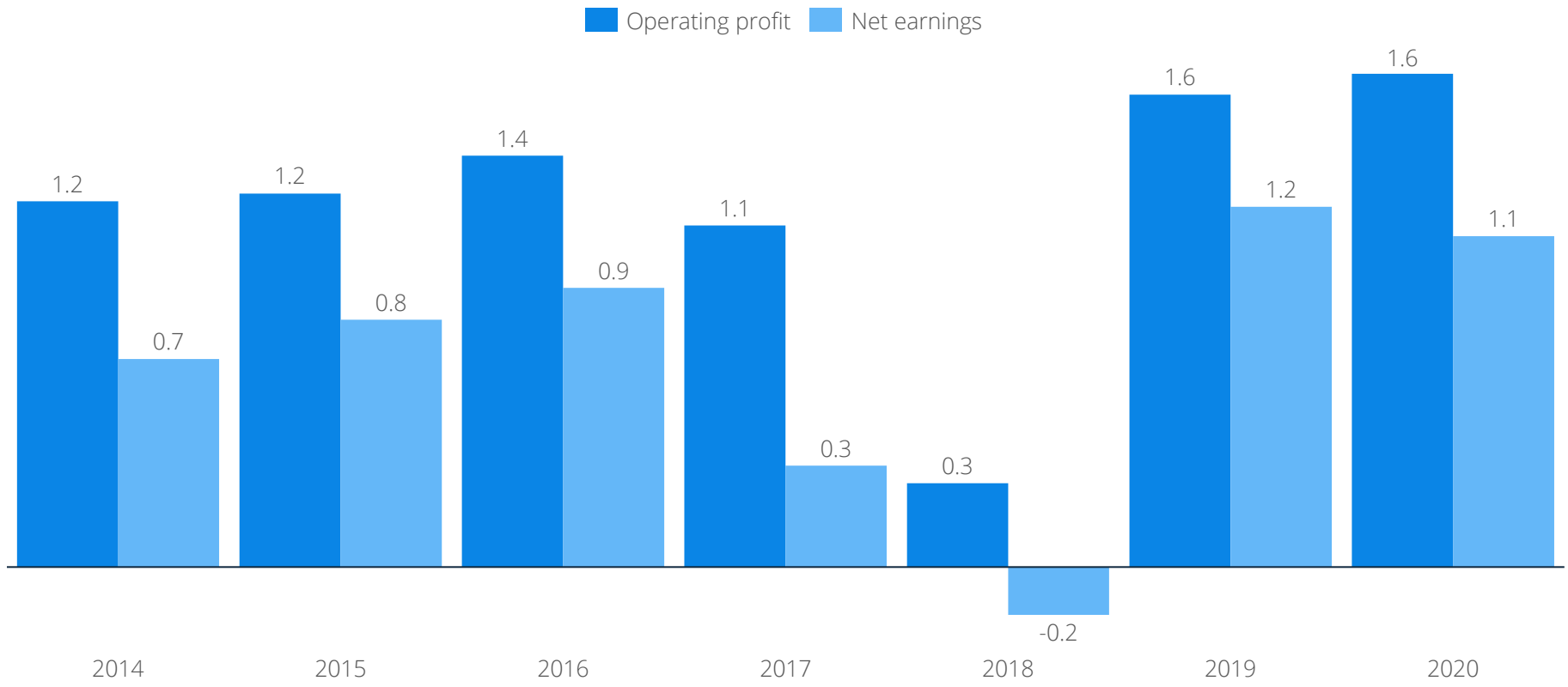


1: "Other" also includes dishwashing, compressors, spare parts and warranties
2: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

Operating Profit of Whirlpool reached a peak in 2020 with 1.64 billion US$ despite the COVID pandemic.

Company profiles: Whirlpool Corporation (3/3)

Global retail sales in billion US$



Sources: Company information

BSH is one of the largest home appliances manufacturers from Europe

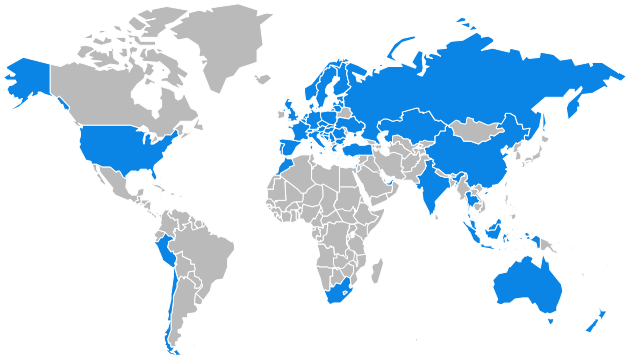
Company profiles: BSH (Bosch-Group) (1/2)

B/S/H/

Key facts

Revenue:	US$15.9 billion (2020)[1]
CAGR[2]:	7.4% (19-20)
Manufacturing locations:	38 (2020)
Brands:	11 (2020)
Employees:	60,000 (2020)
Headquarters:	Munich, DEU
Founded:	1967

Global presence



Products

In addition to the main brands Bosch, Siemens, Gaggenau and Neff, BSH also sells Junker and Viva, as well as Thermador, Balay, Coldex, Constructa, Pitsos, Profilo, Ufesa and Zelmer in various countries. The product portfolio of the 11 brands covers the entire spectrum of modern household appliances. For smart home solutions their portfolio includes connected coffee machines, washing machines, dish-washers, ovens and fridges with various features. In 2017 the main brand Bosch introduced a complete collection of connected home appliances with the Home Connect app, which allows to remotely monitor and control Bosch appliances from smartphones or tablets.

Strategy

BSH Home Appliances is the largest manufacturer of home appliances in Europe. The group was established as a joint venture between Bosch and Siemens and has been a full subsidiary of Bosch since 2014. Since that Siemens has been stepping back from the consumer goods business and Bosch is expanding their non-automotive business, focusing on connected appliances. BSH operates 40 factories in Europe, the U.S., Latin America and Asia, and a network of nearly 80 sales, production, and service companies in about 50 countries. In the last years BSH has put an emphasis on investments in research and development with a focus on digital technologies.

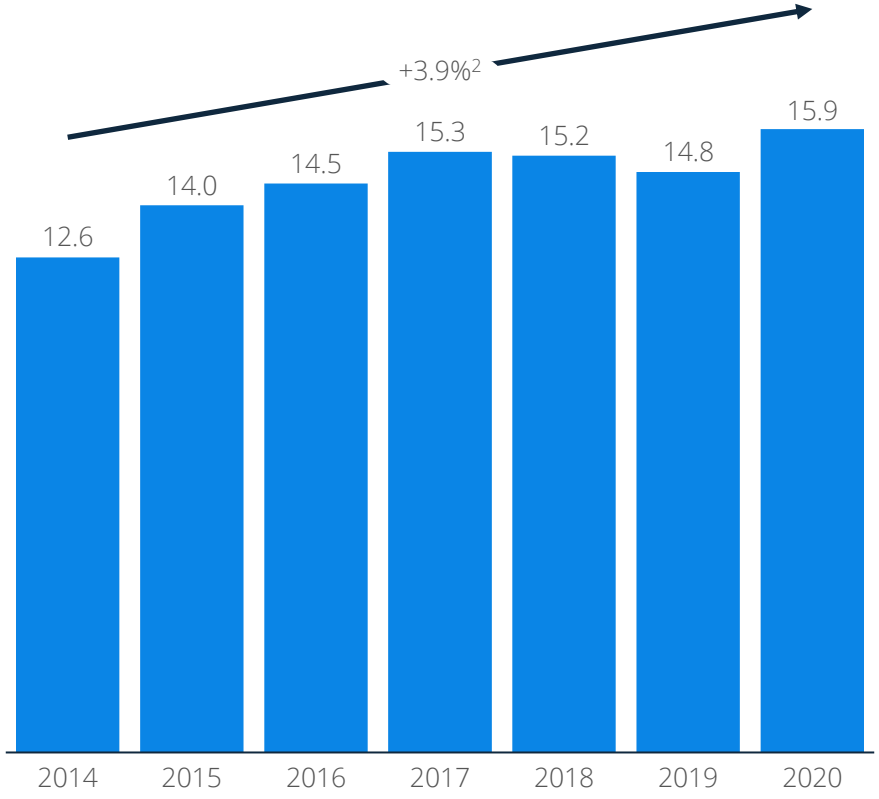
1: USD/EUR (2020) = 0.87476 2: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information, Oanda

Since 2014, BSH belongs completely to the Bosch Group

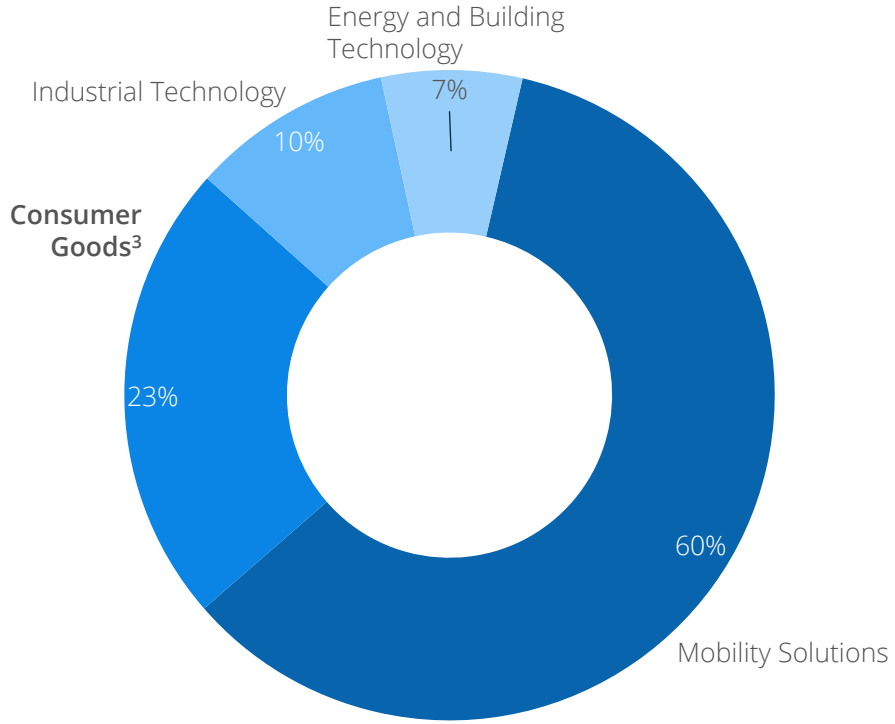
Company profiles: BSH (Bosch-Group) (2/2)

B/S/H/

Revenue in billion US$[1]



Bosch Group sales shares by business sector in 2019



1: Converted USD/EUR (2019) = 0.8925 2: CAGR: Compound Annual Growth Rate / average growth rate per year
3: Consumer Goods includes BSH sales
Sources: Company information

iRobot is pioneering in robotics for consumers and has sold more than 35 million robots so far

Company profiles: iRobot (1/3)

Key facts

Revenue:	US$1,430 million (2020)
CAGR[1]:	17.7% (19-20)
Net income:	US$147.1 million (2020)
Total sold robots:	35 million+ (2002-2020)
Employees:	1,209 (2020)
Headquarters:	Bedford, MA, USA
Founded:	1990

iRobot product examples[2]

Roomba i7

Roomba 980

Braava 380

Products

iRobot's portfolio includes the Roomba vacuum robot an the Braava mopping robot series. The Roomba family of vacuuming robots combine a cleaning system with intelligent sensors that enable the robots to move through homes, adapting to the surroundings to thoroughly vacuum floors. A robot makes 60 decisions every second, navigating through different rooms. Implemented is a 3-stage cleaning system with edge-sweeping brush, which is designed to loosen, lift, and suction dirt. The dirt detect sensors alert the robot to spend more time cleaning concentrated areas of debris. Most robots can be controlled via the iRobot HOME App to schedule, start or pause cleaning cycles.

Strategy

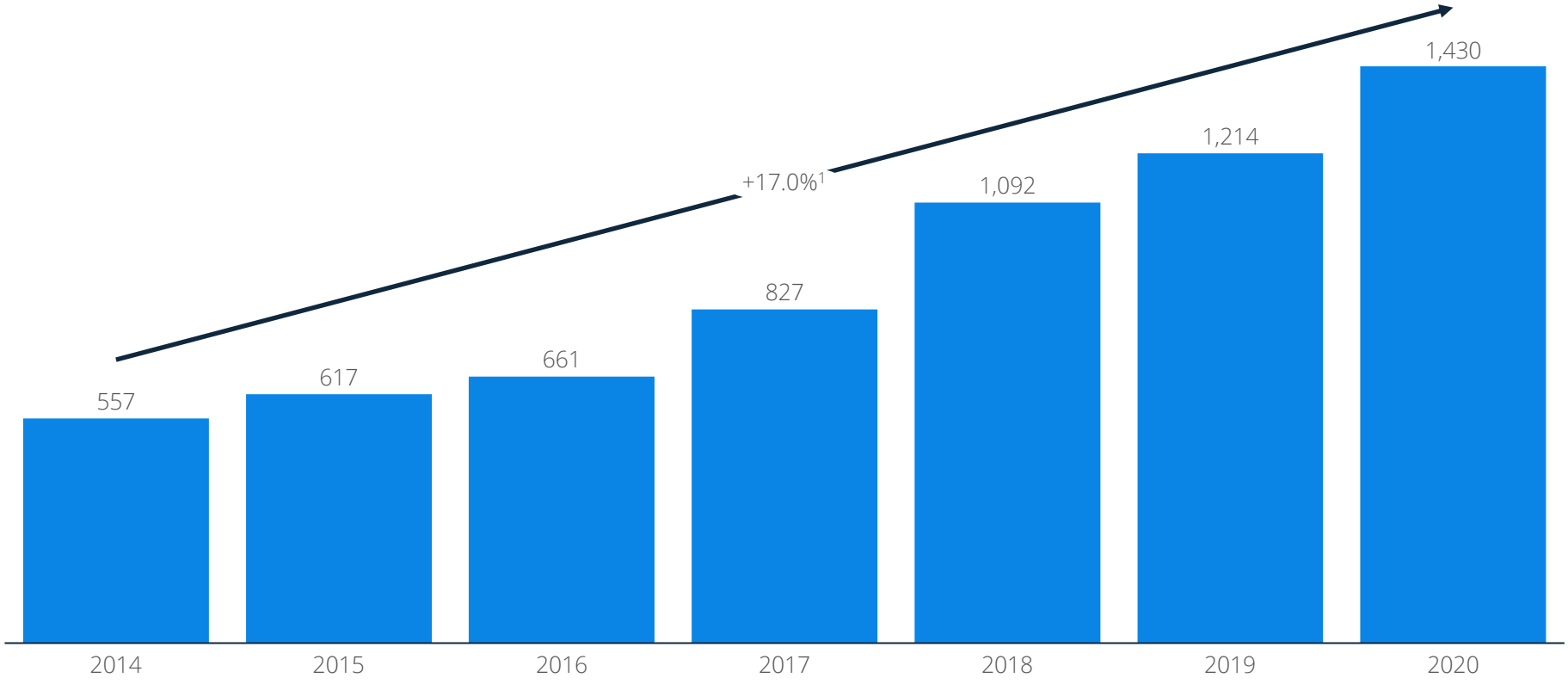
iRobot was founded in 1990 by Massachusetts Institute of Technology roboticists with the vision of making practical robots a reality. Nowadays iRobot is a pioneer in the home robotics segment. Their portfolio includes vacuum and mopping robots. The company estimates their market share in the vacuum robot market to be about 52% in 2019. The company has shown impressive growth in the past, but it is questionable how long iRobot with their limited offering will be able to compete against companies such as Panasonic, Philips or LG.

1: CAGR: Compound Annual Growth Rate / average growth rate per year 2: iRobot press kit 2018
Sources: Company information

iRobot has shaped the vacuum robot industry and has shown impressive growth with a limited portfolio

Company profiles: iRobot (2/3)

Revenue in million US$

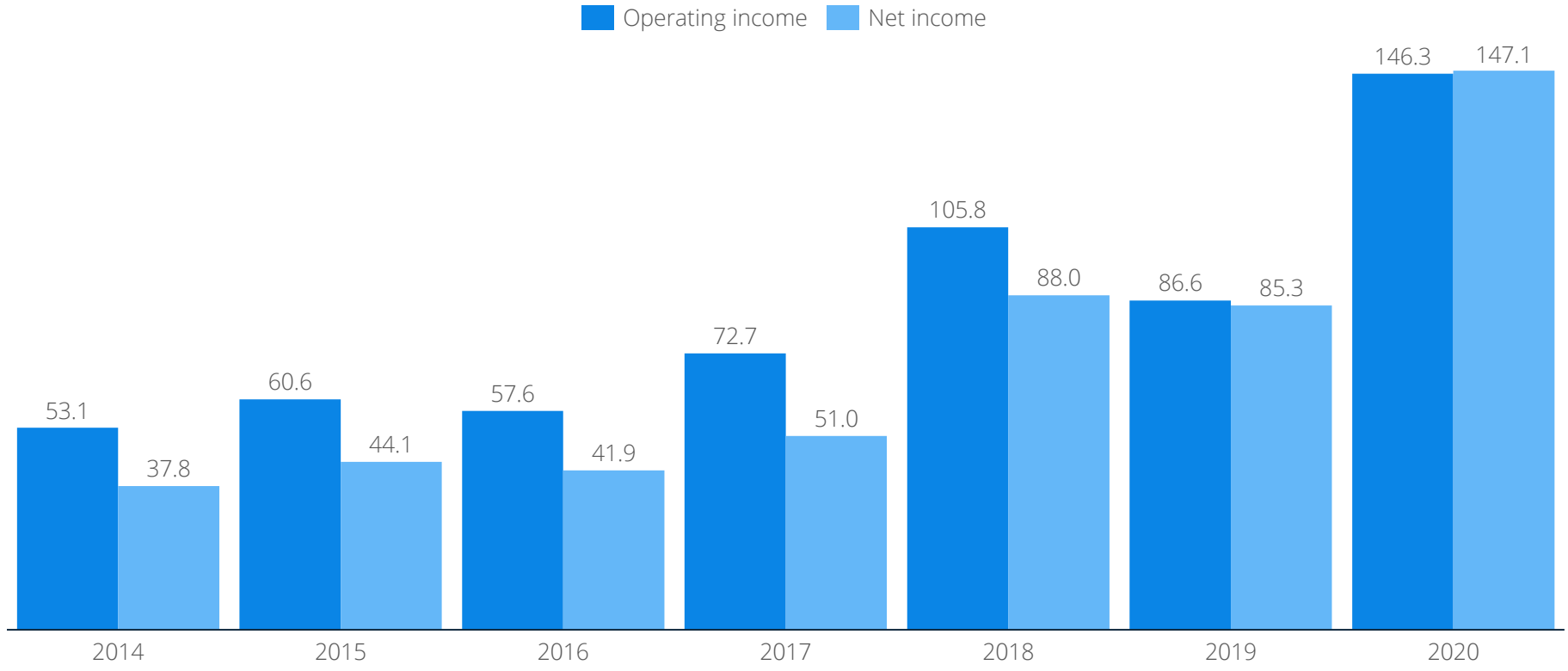


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

Net income of iRobot was highest in 2020 with 147.1 million US$

Company profiles: iRobot (3/3)

Operating and net income in million US$



Sources: Company information

Increased global spending on household goods shows potential for more spending on smart appliances

Deep dives: general consumer spending on household goods

Consumption behavior of private households

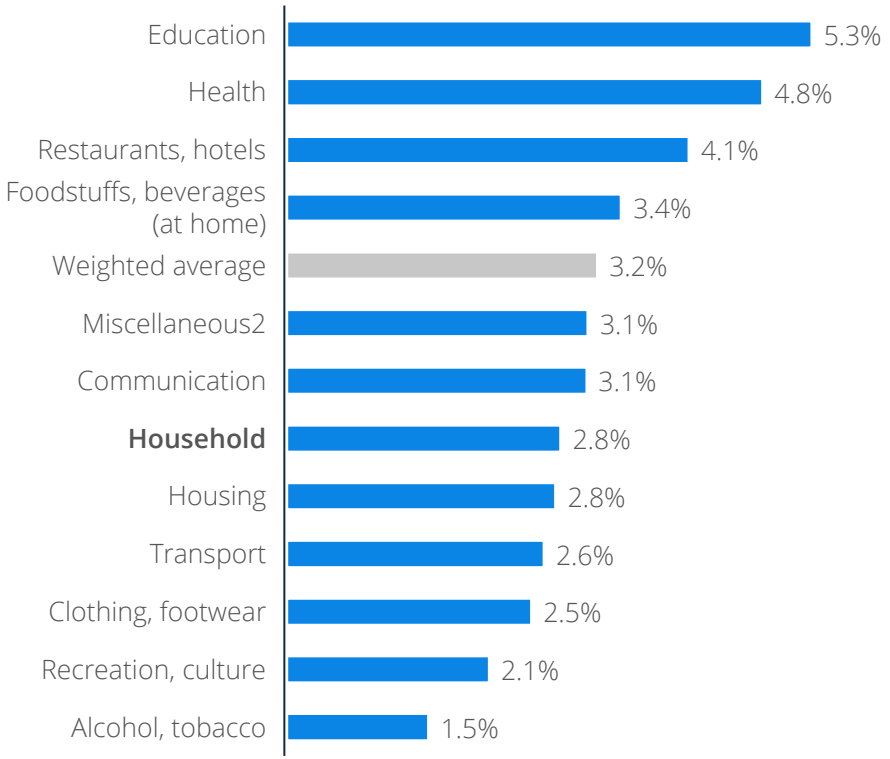
National statistical offices estimate the consumption behavior of private households as part of their mission to measure economic activity at large. This consumption expenditure, amounting to roughly US$40 billion in 2017 in the 50 countries included in the Statista Consumer Market Outlook, can be classified according to the Classification of Individual Consumption by Purpose (COICOP) into twelve categories.

The diagram shows the projected average annual growth rates of global consumer spending by category up to the year 2022. Spending on household goods is forecasted to growth at a CAGR[2] of 2.8%, a rate higher than that for clothing, footwear and transport.

As the rates for education and health mostly stem from actual and perceived necessities, the high growth in spending on household items indicates a willingness of consumers worldwide to spend more on everyday items to ensure quality and sustainability.

As we expect that nearly all household appliances will be connected to the internet in the future, increased spending on household goods certainly also means more possible spending on smart appliances in the next years.

Global consumer spending CAGR[1] 2017-2022



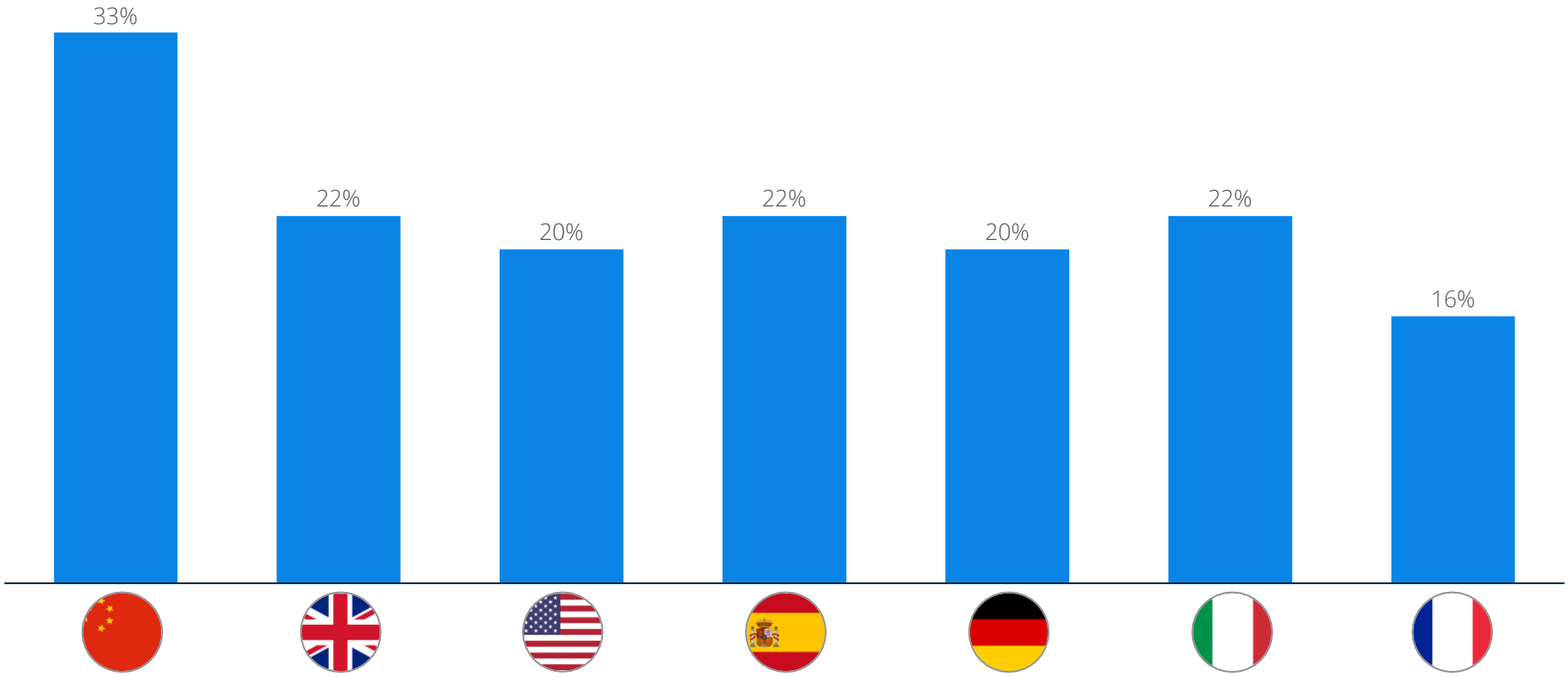
1: CAGR: Compound Annual Growth Rate / average growth rate per year; nominal growth (not adjusted for inflation) 3: Personal care, prostitution, personal effects, social protection, insurance, financial services, other services
Sources: Statista Consumer Market Outlook 2018, United Nations

In China 33% planned to buy household appliances in 2020

Deep dives: intention of purchasing household appliances

Statista Global Consumer Survey

Intention of purchasing household appliances in the next 12 months



"Which of these items are you planning to buy in the next 12 months, online or in store?" Multi pick
Sources: Statista Global Consumer Survey, as of December 2019

SECURITY

The Smart Home segment Security includes the sale of devices and services for networked access control and management for buildings and premises. This includes surveillance products (e.g. security cameras and related data storage and transmission services, motion sensors, programmable and remote control door locks) as well as equipment for risk monitoring (connected smoke detectors and humidity sensors).

Photo: Ring press kit 2018

Smart Home Security: products and services

Overview: segment

In-Scope

The Smart Home segment Security includes the sale of devices and services for networked access control and management for buildings and premises. This includes:

- Digitally connected and controlled devices for burglar prevention and other security issues
- Motion sensors, door locks, security cameras (with or without face recognition), surveillance services with connection to a broader smart home
- Hazard prevention devices like water or smoke sensors

Out-of-Scope

- Remote surveillance and emergency services from specialized security firms
- Classical security devices without smart home connection
- B2B/C2C sales of any kind (e.g. to hotels or office buildings)

Sources: Statista Digital Market Outlook 2020

The Security segment is driven by the replacement of traditional devices with connected ones

Overview: customer benefit and market development

Customer benefit

The Smart Home segment for connected Security devices targets the need for security at home. This includes the prevention/detection of burglaries, the quick notification about hazards such as fire or water leakage, emergency calls for the elderly, and access control.

The benefits of smart security systems range from preventing break-ins to automatically calling emergency responders. A smart home with security features can give their owners peace of mind, knowing that if potential trouble is detected, they will be immediately notified and can then take complete control of what to do next to minimize potential damage.

Unlike traditional security systems, smart home devices can be remotely controlled via the internet. This can happen directly or indirectly over independent devices. Like other smart devices, these products come with mobile apps for wireless access and information about the device status. Data can be gathered for example when someone enters or leaves through the door. This is valuable information for devices from the energy management segment as well, which can then automatically adjust the heating accordingly.

Additionally a lot of smart security products don't need professional installation anymore and can be set up without special knowledge, making these products interesting for a wider audience, who look for cheap and easy-to-set-up security solutions.

Market size and future development

The global market size of the Security segment is about US$12.1 billion in 2020. Its development is mainly driven by the replacement of traditional devices with connected ones. Across all regions we see customers entering the market through stand-alone solutions and slowly upgrading to integrated smart homes, where devices from multiple segments communicate with each other.

The leading country in our scope is the U.S. with a total revenue of US$4.1 billion in 2020, which represents more than 40% of the whole market. The large market size stems from the already relatively big security industry in the U.S. and its leading role internationally in terms of technological advancement. The U.S. market will grow at a CAGR[1] of 13.8% and will reach revenues of US$9.0 billion by 2026. Smart surveillance services contribute a significant share to the market.

Europe comes second after the U.S. with US$2.4 billion in revenue and 15.0 million households in 2020. The market is expected to grow by 17.4% annually.

The smallest region in this comparison is China with a 2020 revenue of US$2.3 billion. Growth in China is highest across all regions with almost 19.9% per year. A comparison of household counts and revenue numbers shows that device prices in China are significantly lower and service revenues hardly exist.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Security products can be categorized according to either surveillance or hazard prevention functions

Overview: product examples

Surveillance

All security products for surveillance functions, including smart cameras, smart locks, i-surveillance-s or motion sensors are meant to give more control and information about the safety of homes. In addition to their initial use case, these products can also offer new functionalities. Smart cameras for example are also able to potentially identify people by facial recognition, next to their actual filming function. When combined with a motion detector, they only start recording when necessary. The product category of smart locks adds an interesting twist to private home renting: With the help of smart locks, access to buildings or apartments can be controlled remotely, which makes a physical key exchange obsolete. Another example is Amazon key, an internet-connected lock that can allow access for delivery companies to drop off packages.

Photo: Canary (Canary View) 2018

Photo: Nest (Nest Cam-IQ) 2018

Photo: Nuki (Nuki Smart Lock) 2018

Hazard prevention

Security products for the prevention of hazards such as fire or water leakage can offer optimized functions as well as information when people are not at home. Connected smoke alarms for example can significantly increase security, especially in large apartments or houses with many rooms: If one of the detectors reacts to smoke, it sends the information to all wirelessly connected devices in the house and simultaneously triggers an alarm. Another example for more integrated functions is the Leeo Smart Alert: It also detects room temperature, humidity and carbon monoxide. Nest Protect can even locate the source of the smoke and indicate it by means of a voice message.

Photo: Nest (Nest Protect smoke alarm) 2018

Photo: Samsung (Samsung water leak sensor) 2018

Sources: Company information, press kits/ press releases (Canary, Nest, Nuki, Samsung)

Focusing on customer needs rather than technical features is the key to success in the security market

Overview: assumptions and trends

Assumptions

We assume a very strong connection between traditional and connected home security systems. I.e. the development in the traditional market defines the upper bound for the connected market. If, for example due to individual private data concerns in certain countries, the two markets drift apart, the connected market might develop more slowly than our forecast currently projects.

An important driver for market growth and device adoption is the burglary rate. Should the crime rate in a certain country rise or shrink significantly, this will also affect our forecasts.

Companies from several different industries compete in this market. Next to traditional security companies (e.g. ADT) and tech start-ups (Canary or Alarm.com), media companies and connectivity providers (e.g. AT&T or Comcast) also play an important role due to the high amounts of data that need to be transferred especially in the video surveillance case. In this respect, the implementation of 5G is vital. We are confident that telecommunication providers will stick to a rather tight schedule so that no delays in the developed markets are expected. In regions with more connectivity issues, a delayed implementation could negatively affect our estimates.

The question arises as to whether it will remain common to produce devices with clearly separate responsibilities, since we can already see more and more devices with multiple functionalities across all relevant smart home areas.

Trends

We believe that the clear divisions between the Smart Home segments will blur. This forces vendors to keep their products highly integrable and multifunctional so that customers won't need too many devices for a single purpose. Unlike for example in the Control and Connectivity segment, we expect services to remain a relevant revenue stream in the Security segment since variable personnel costs play a bigger role than fixed app programming costs in this segment.

The main device by start-up Canary for example has multiple sensors (for air quality, light, temperature, motion etc.) and comes with a cloud camera and a siren. Although the sensors would be part of the Energy Management segment, its major functionality is the security surveillance aspect, which makes it relevant primarily for the Security segment.

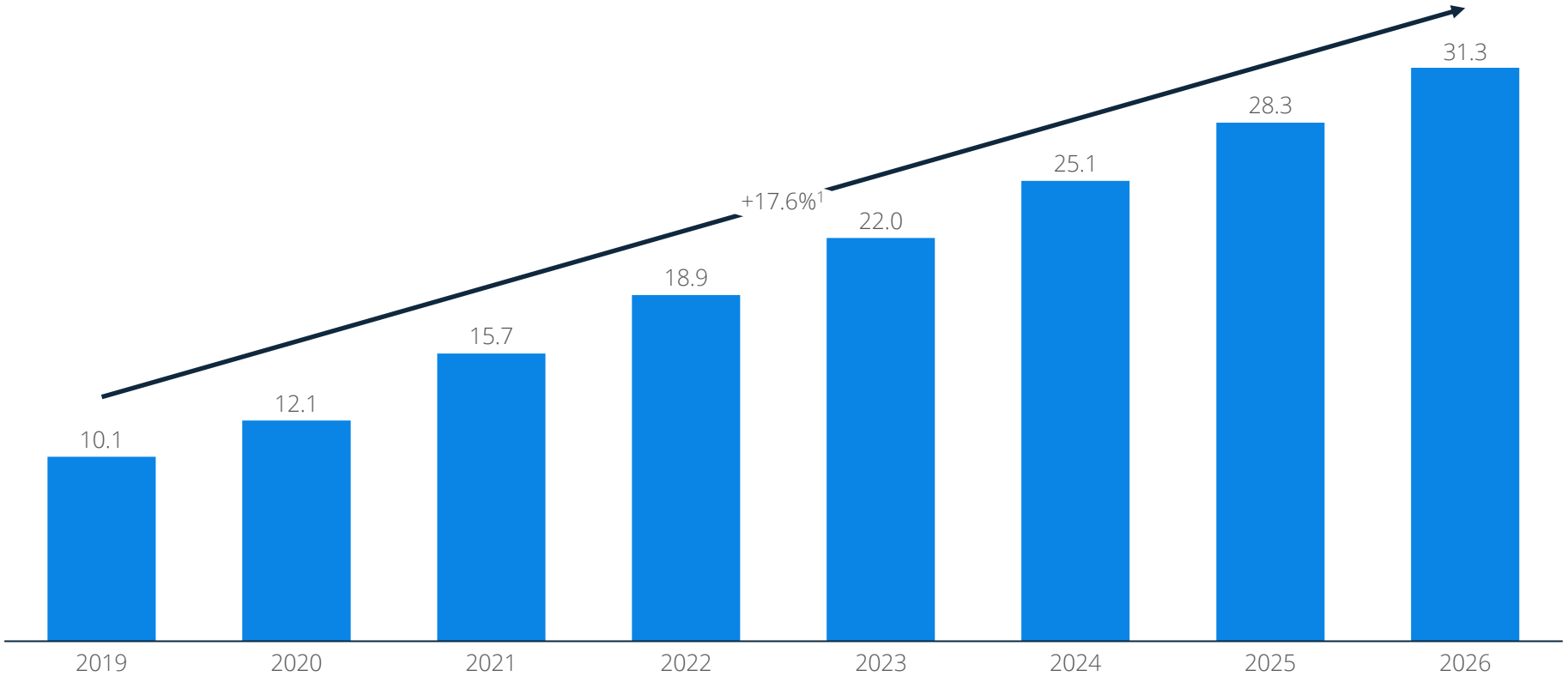
According to experts, the key to success in most smart home areas will be to focus on customer needs and use cases rather than on products and single functions. This means that vendors should not sell "security cameras", "motion detectors", "smart locks" or "presence simulation devices", but rather advertise burglar prevention, hazard prevention and access control. As a second step, this means that in order to be successful, business models need to bundle different features in one simple and easy-to-handle product. The focus should be to offer comprehensive individual solutions according to the customers' needs. Such bundles and customer-centered offers can already be seen in the more developed markets, offered e.g. by ADT.

Sources: Statista Digital Market Outlook 2020

The global Smart Home Security segment realized revenues of US$12.1 billion in 2020

Market sizes: global

Global revenue forecast in billion US$

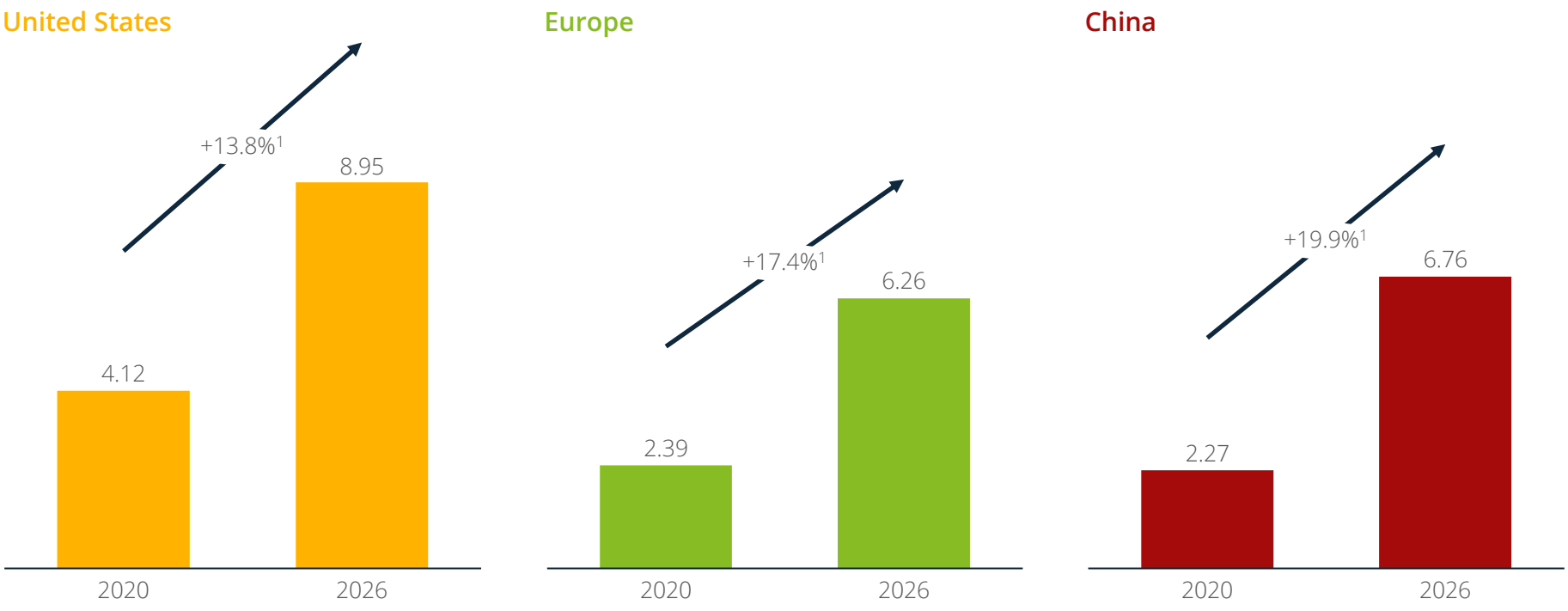


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

With 19.9%, China has the highest CAGR[1] but the U.S. generates most revenue

Market sizes: regional comparison (1/2)

Revenue forecast in billion US$

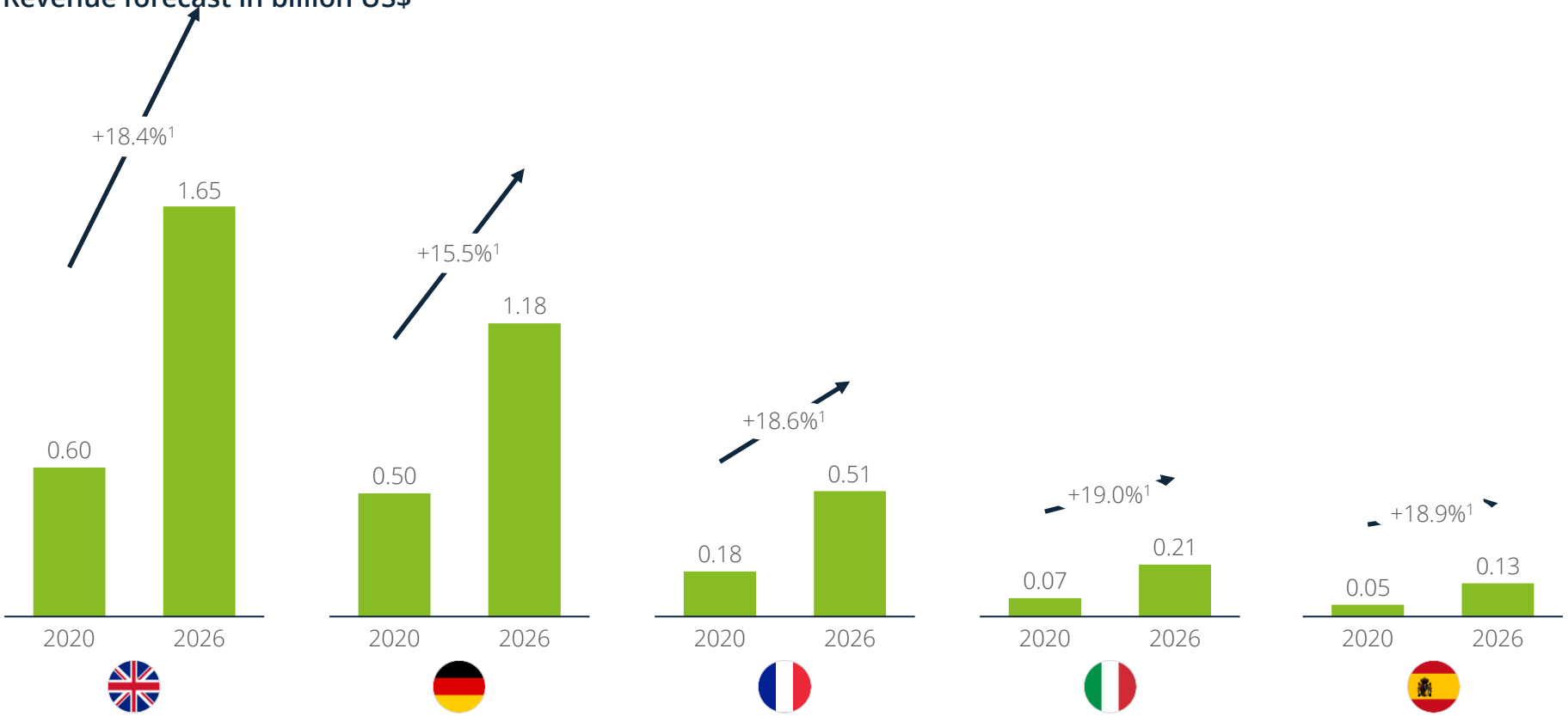


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

The UK has the highest revenues in the Security segment out of the European top 5

Market sizes: regional comparison (2/2)

Revenue forecast in billion US$

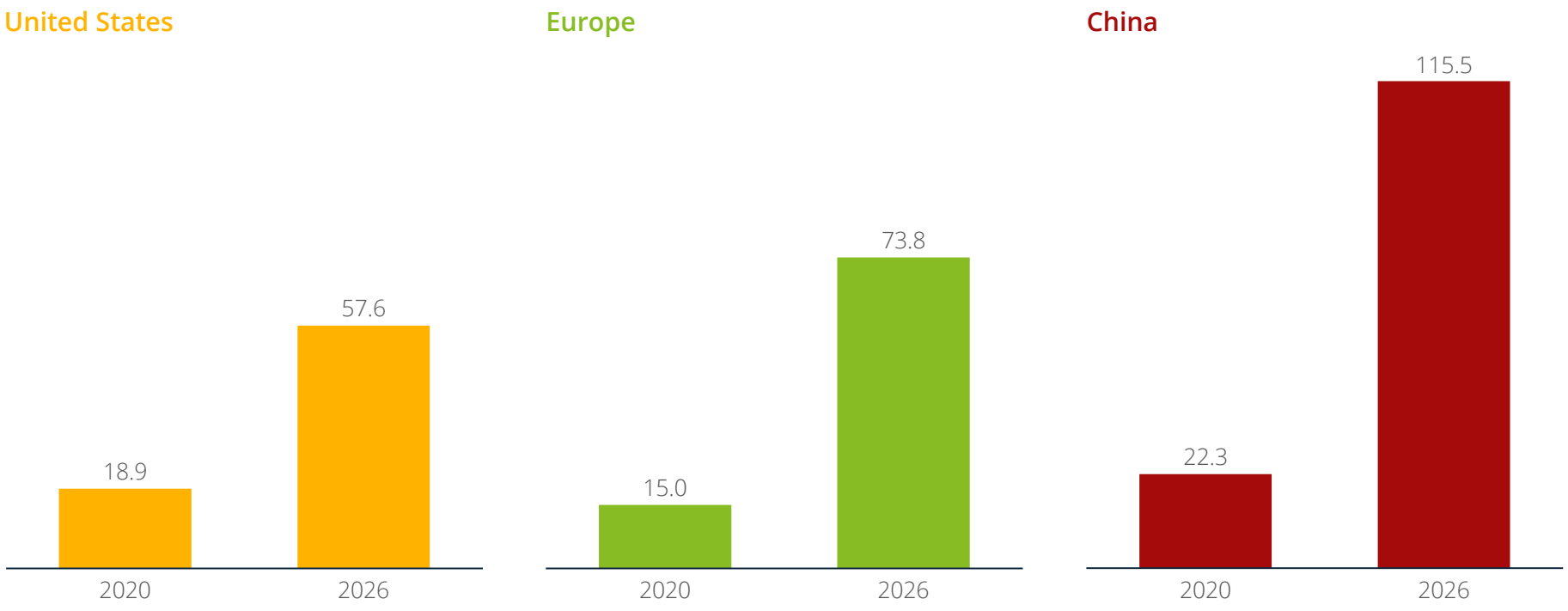


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Cheap smart security products foster wider adoption in China compared to the U.S. and Europe

Number of smart homes: regional comparison (1/2)

Number of smart homes forecast in million

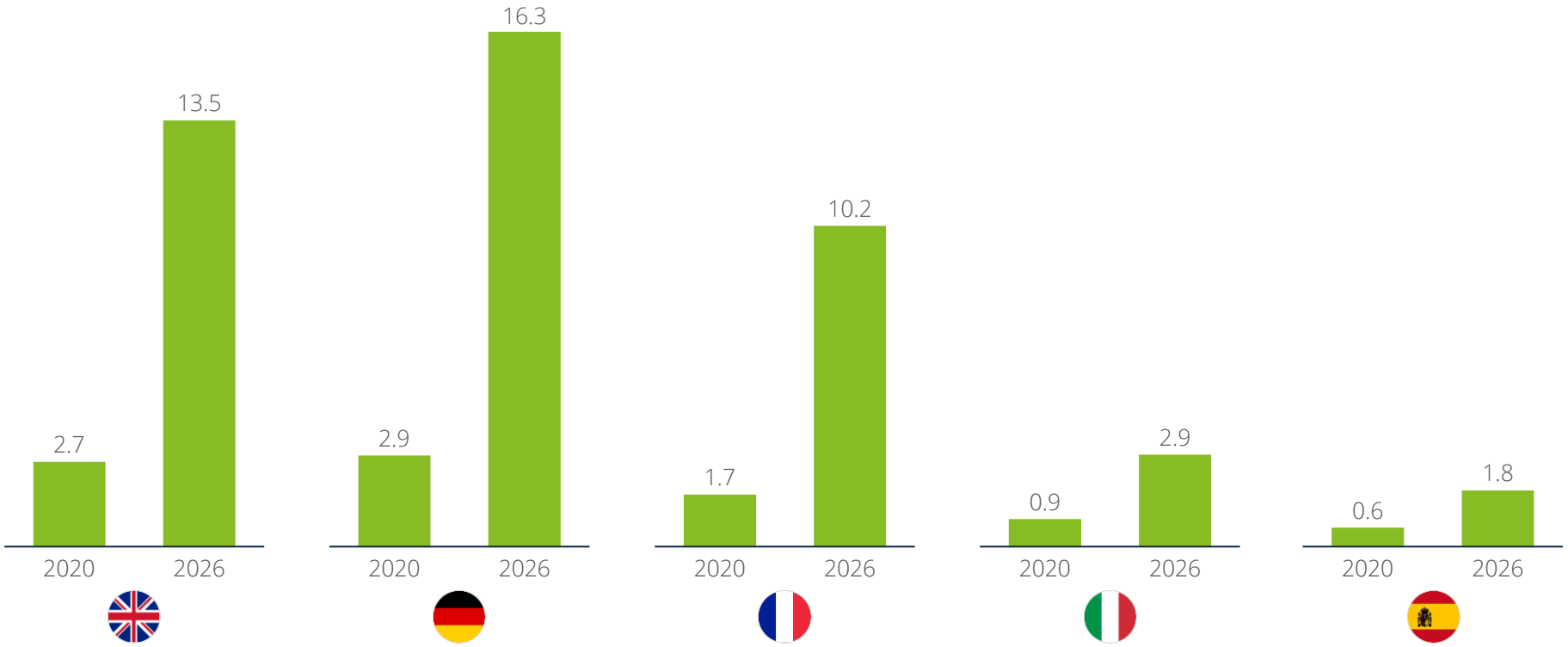


Sources: Statista Digital Market Outlook 2020

In Spain and Italy, far less smart homes are equipped with Security products than in the UK

Number of smart homes: regional comparison (2/2)

Number of smart homes forecast in million

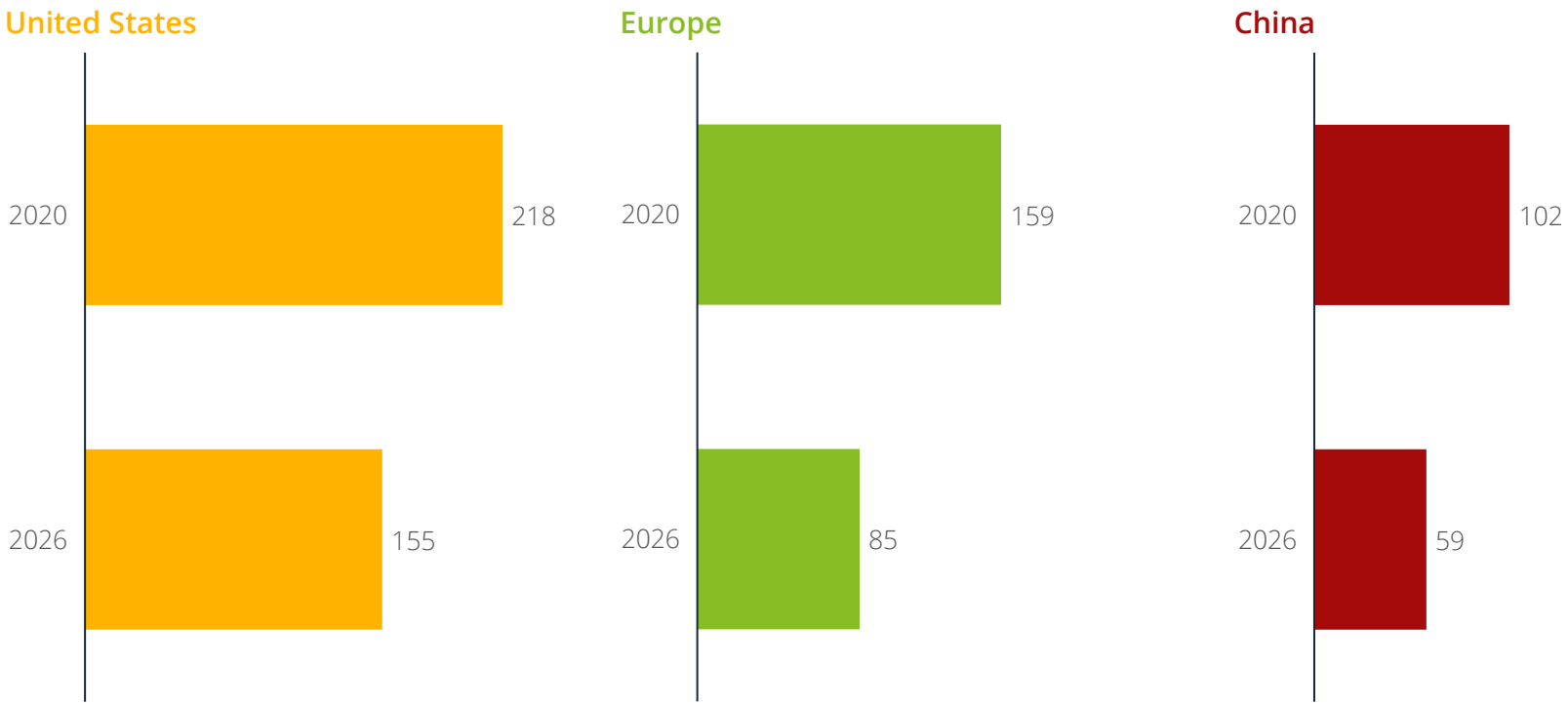


Sources: Statista Digital Market Outlook 2020

Out of the three regions, the U.S. shows the highest average revenue per smart home in the segment

Average revenue per smart home: regional comparison (1/2)

Average revenue per smart home forecast in US$

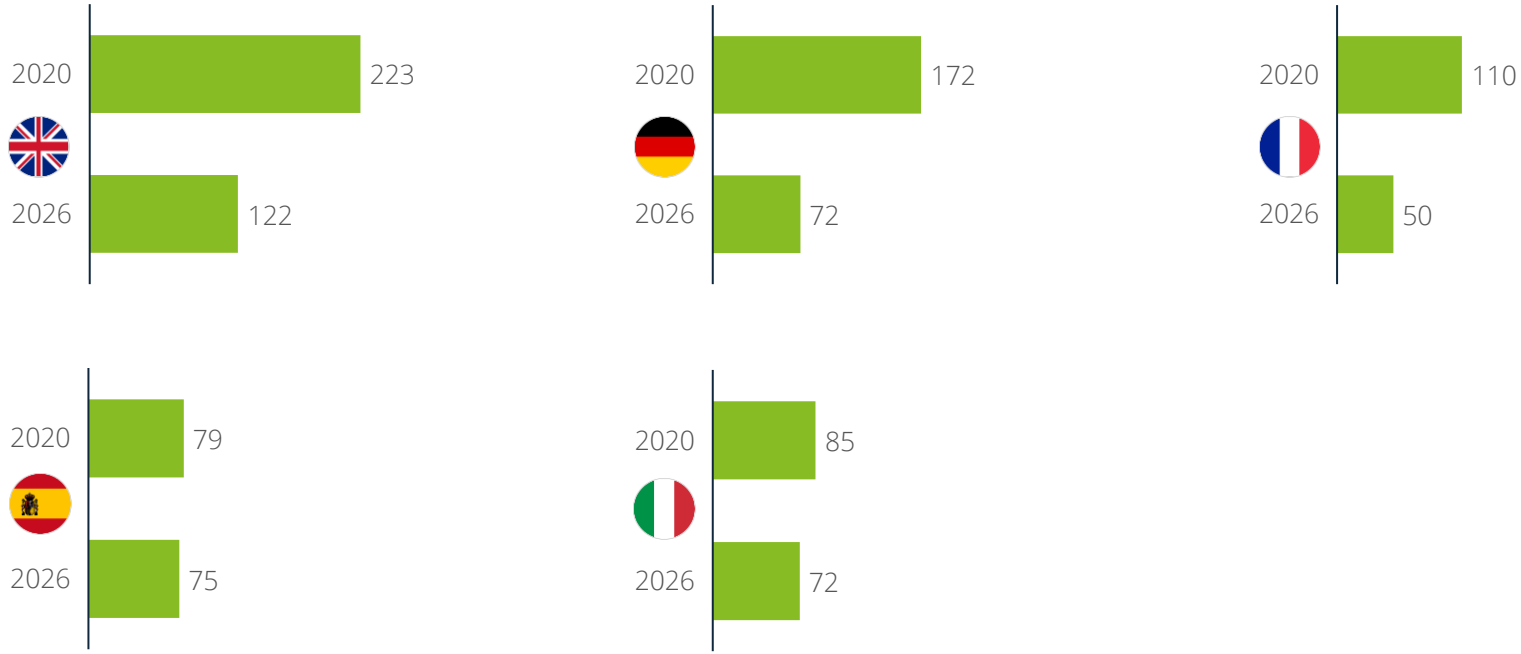


Sources: Statista Digital Market Outlook 2020

In Europe, Smart Security product owners in the UK pay the most

Average revenue per smart home: regional comparison (2/2)

Average revenue per smart home forecast in US$

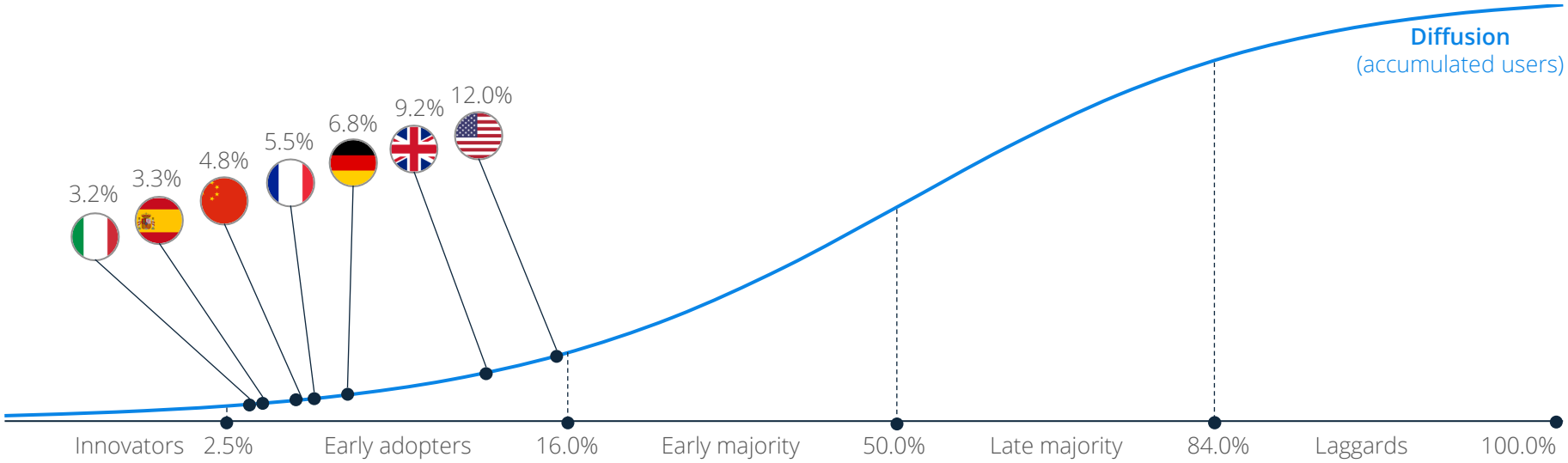


Sources: Statista Digital Market Outlook 2020

The adoption rate of smart Security products will go up as product prices will fall in the next years

Penetration rates: innovation diffusion

Innovation diffusion curve for 2020



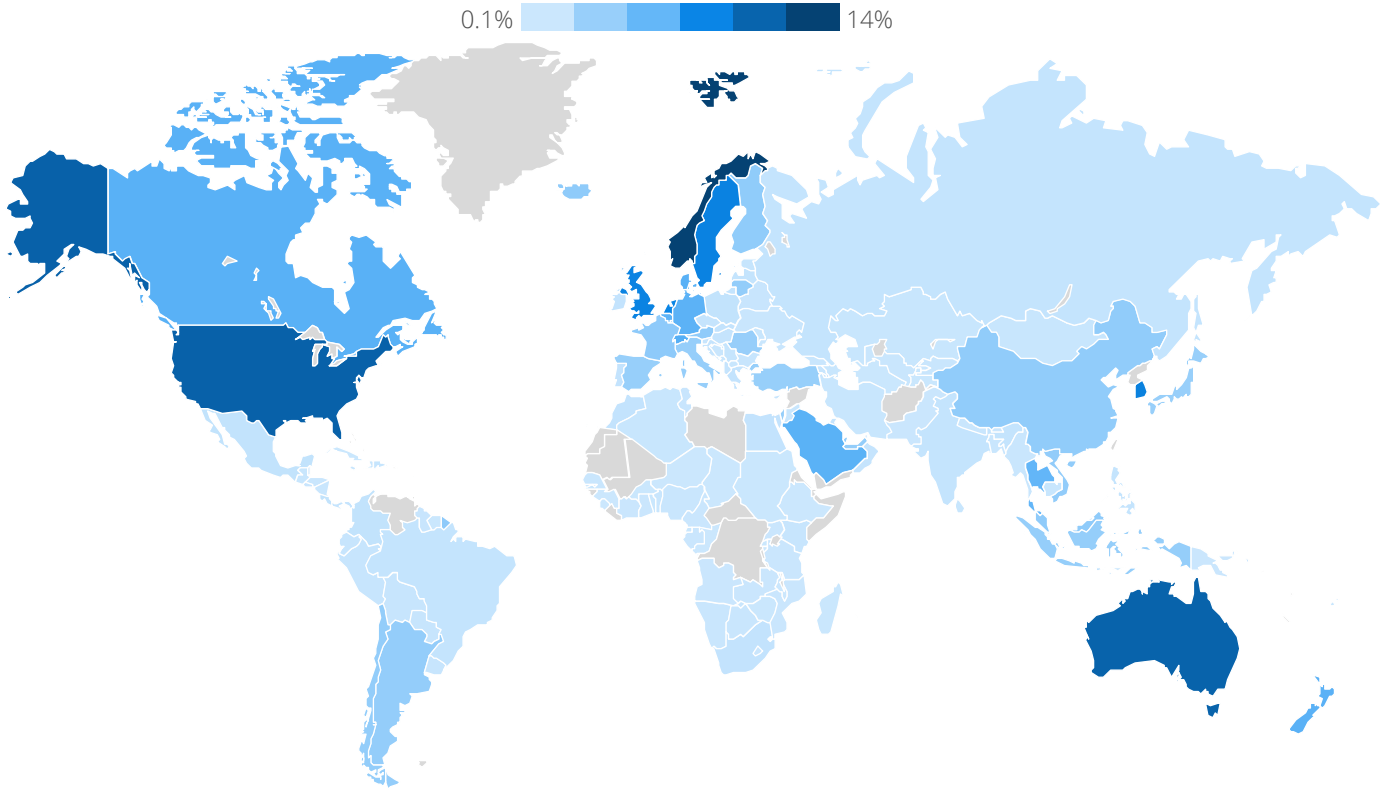
The diffusion of innovations graph shows successive groups of consumers adopting smart security products (the graph above shows the household penetration rate of selected countries). Innovations in general are not adopted by all individuals at the same time. Instead, they tend to adopt in a time sequence, and can be classified into adopter categories based on how long it takes until they begin using the service. Diffusion is considered to be the rate and volume at which innovations spread among their users (an adoption rate of 100% is theoretically possible but not realistic). The residential end-user segment will grow mostly through smart lock and smart security camera sales. Developments vary strongly with country-specific conditions.

Sources: Statista Digital Market Outlook 2020

In terms of household penetration of Security products, Norway and the U.S. are in the lead

Penetration rates: global comparison

Smart Security household penetration rate in 2020

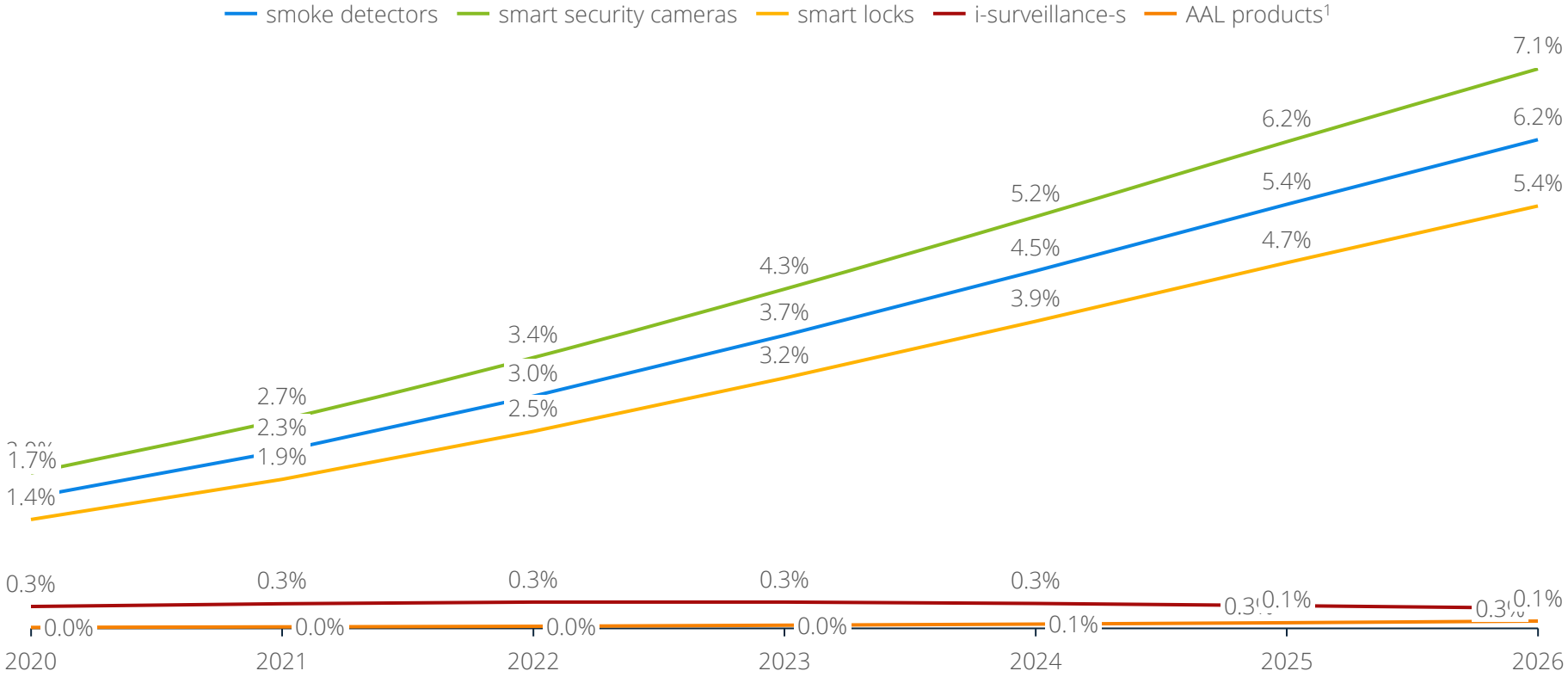


Sources: Statista Digital Market Outlook 2020

Smart security cameras are the single most bought product in the Security Segment

Penetration rates: products

Global Security household product penetration rates



Note: The chart show the share of global Smart Homes with the respective product from the total number of private households of the segment.
Every Smart Home can own more than one product.
1: AAL = Ambient Assisted Living products like emergency buttons and pressure mats
Sources: Statista Digital Market Outlook 2020

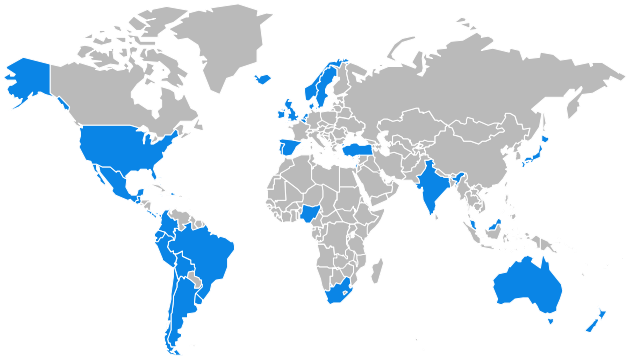
Alarm.com is a security-oriented service provider of about 1 million smart homes in North America

Company profiles: Alarm.com (1/3)

Key facts

Revenue:	US$618 million (2020)
CAGR[1]:	23% (19-20)
IPO:	June 2015; NASDAQ: ALRM
Net income:	US$76.7 million (2020)
Employees:	1,160 (2019)
Headquarters:	Vienna, Virginia, USA
Founded:	2000

Global presence



Products

Alarm.com provides home and business security solutions based on wireless, web and mobile technologies. They offer cloud-based solutions including interactive security, video monitoring, intelligent automation and energy management. Each system can be customized to a home's unique configuration and be controlled via different apps. Alarm.com systems can communicate even if the phone or cable line is cut, power is out or the internet or broadband is down. In 2016, Alarm.com integrated its cloud-based connected home platform with Amazon's Echo and voice-command devices as well as the HomeKit-compatible Apple TV.

Strategy

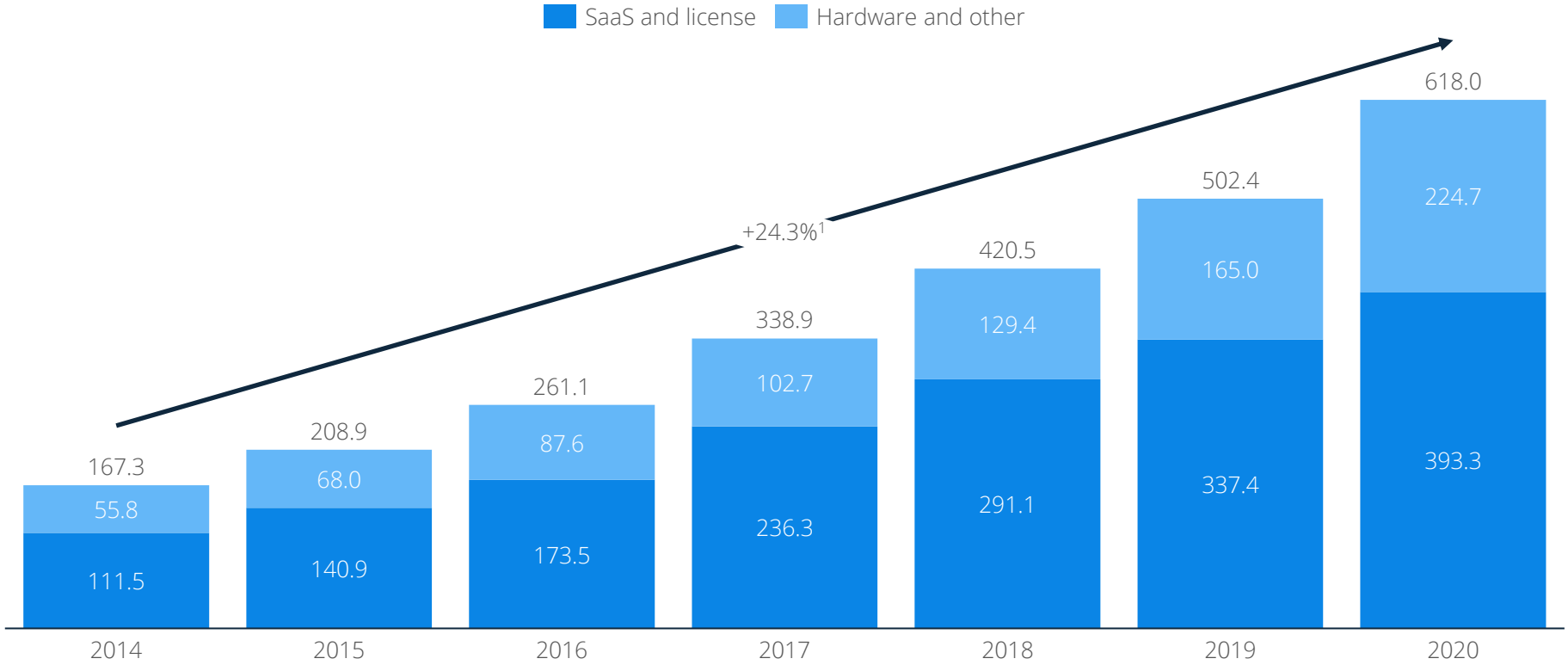
Alarm.com was founded in 2000, launching a security solution that enabled remote monitoring. The company has since expanded its platform to offer integrated smart home and business solutions that include video monitoring, energy management and other home automation functions. In February 2009, Alarm.com was acquired by ABS Capital Partners for $27.7 million. In 2015, Alarm.com filed for an initial public offering and went public in June of the same year. Their solutions are delivered by over 6,000 service providers in 29 markets with a focus on North America. Revenue is primarily generated through SaaS, and license revenue through the service providers.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

Revenue is primarily generated with SaaS and license revenue through the service providers

Company profiles: Alarm.com (2/3)

Revenue by product group in million US$

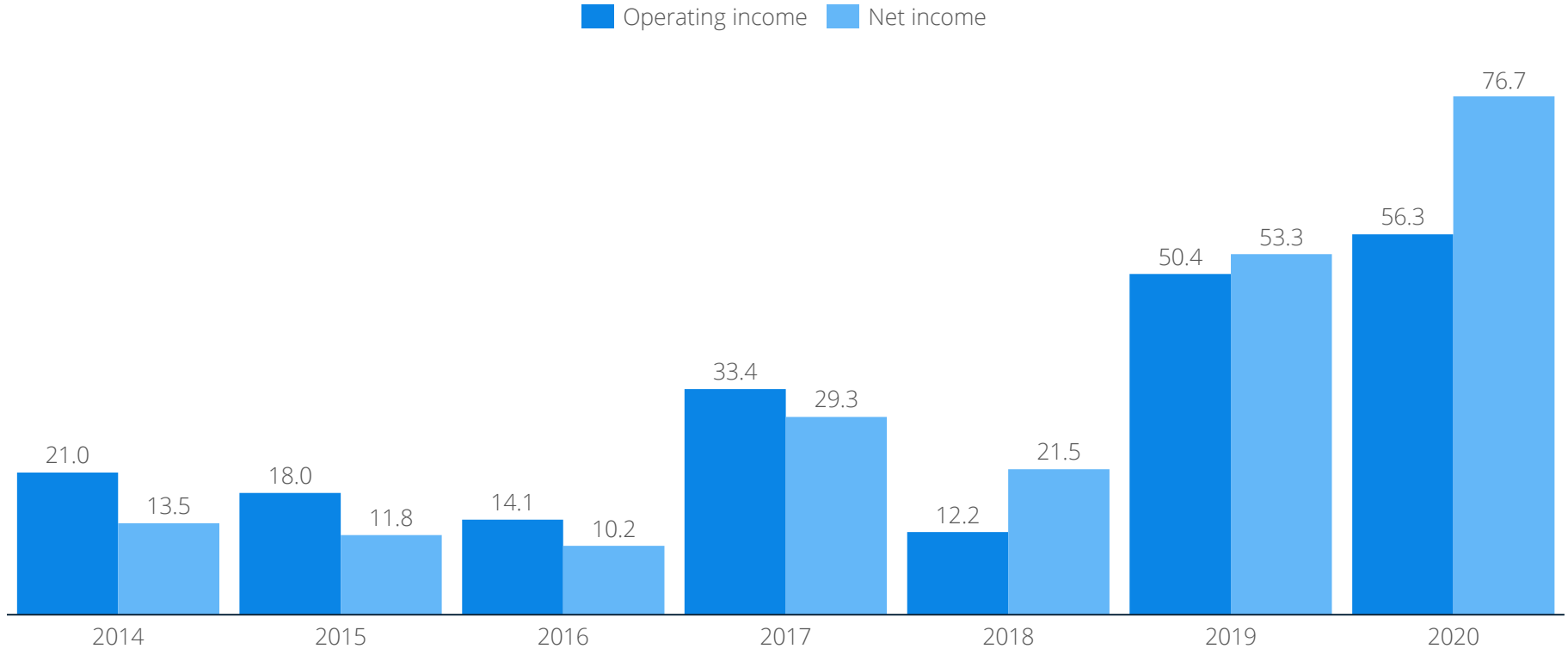


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

Net income was highest in 2020 for Alarm.com with 76.7 million US$

Company profiles: Alarm.com (3/3)

Operating and net income in million US$



Sources: Company information

By acquiring August Home, Assa Abloy have turned their focus to the smart home security business

Company profiles: Assa Abloy (1/3)

ASSA ABLOY

Key facts

Revenue:	US$9.54 billion (2020)[2]
CAGR[1]:	-4% (19-20)
Net Income:	US$1 billion (2020)[2]
Smart Home Subsidiaries:	Yale, August Home
Employees:	48,000 (2020)
Headquarters:	Stockholm, SWE
Founded:	1994 (Assa Ab and Abloy Oy)

Selected Assa Abloy brands

Products

In the fast-growing smart security segment, the group has activities in areas such as access control, identification technology, entrance automation and hotel security. One example is the Yale Keyless Connected smart door lock. Through the touch panel control the door can be locked with one simple tap and prevent unauthorized access. The lock works with the Z-Wave Module 2, which also allows a connection to Samsung SmartThings and is battery powered. Centering around the smart lock, Yale also offers a whole security ecosystem with CCTV, IP cameras and home alarms under one single point of access – the Yale Home App.

Strategy

Assa Abloy is a global supplier of door opening solutions that are not limited to the smart home business. The group is represented in both mature and emerging markets worldwide, with leading positions in Europe, North America and Asia Pacific. The group was founded in 1994 when ASSA AB separated from the Swedish security company Securitas AB. Shortly afterwards, the Finnish manufacturer of security locks, Abloy Oy was taken over. In the same year, the Assa Abloy Group was listed on the Stockholm Stock Exchange. Important for smart home solutions was the acquisition of Yale in 2000 and August Home in 2017. Forbes ranks Assa Abloy 78th among the most innovative companies globally.

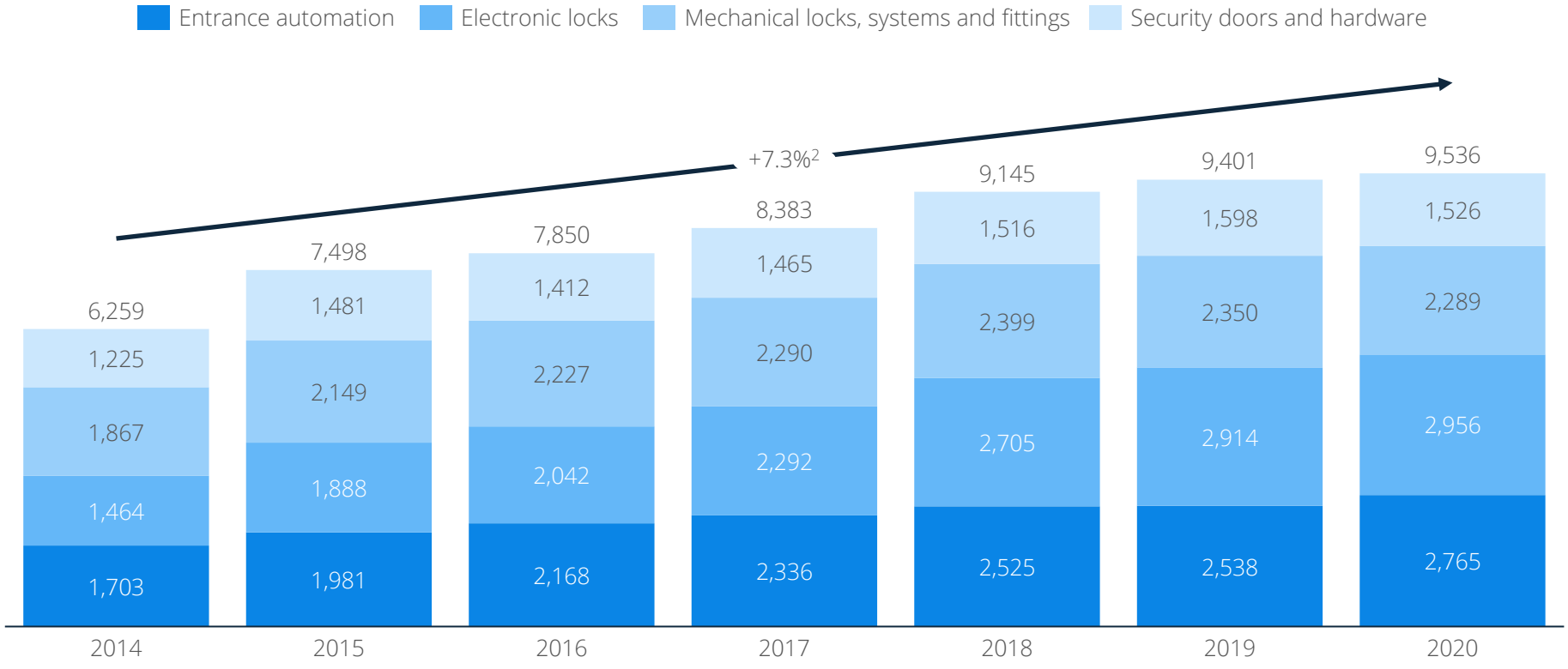
1: CAGR: Compound Annual Growth Rate / average growth rate per year 2: Converted USD/SEK (2020) = 9.19096
Sources: Company information, Oanda

Most of Assa Abloy's revenues come from electronic locks in 2020

Company profiles: Assa Abloy (2/3)

ASSA ABLOY

Revenue by product group in million US$[1]

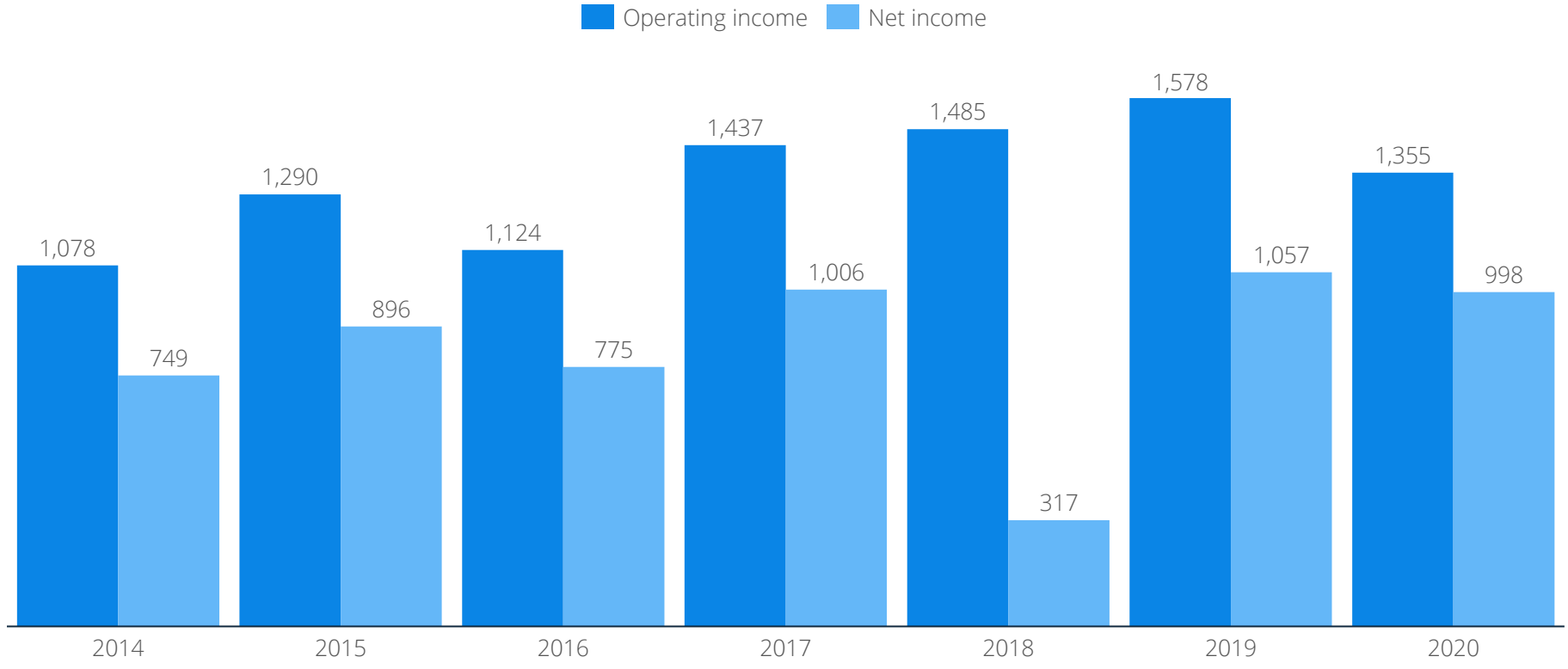


1: Converted USD/SEK (2018) = 8.69252 2: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

Net income for Assa Abloy was highest in 2020 with more than 1 billion US$

Company profiles: Assa Abloy (3/3)

Operating and net income in million US$[1]



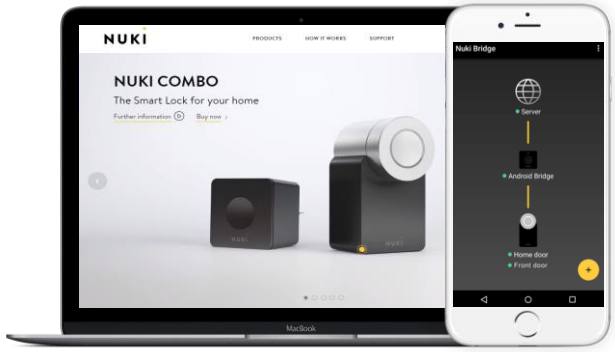
1: Converted USD/SEK (2017) = 8.58953
Sources: Company information

The Austrian start-up Nuki offers smart locks which can be installed DIY in less than 5 minutes

Start-up analysis: Nuki

Overview

In May 2015 Nuki was launched on kickstarter, became a success and won the Futurezone Award in the smart invention category. The official market launch was 2016. The product became available in more and more European countries like France, Italy and Spain. Through the Nuki smart lock, doors can be opened on a short range with a smartphone or the Nuki Fob via Bluetooth 4.0 or with a Nuki Bridge from everywhere via the internet. The Nuki App is available for iOS and Android devices. The app offers several features and up to 100 smart locks can be managed. The LED light ring signals the status of the electronic door lock. The lock works with 4 AA batteries as a power supply. The product works with all major platforms (Amazon, Google, Apple) and also supports IFTTT and Zigbee integration. In April 2018 Nuki announced a cooperation with Airbnb, and in 2020 they won the IoT Breakthrough award.



Analysis

Is the product rare ✓

The unique selling point of the Nuki smart lock is without doubt the easy and fast installation, which works with nearly every door. Nuki works with the door cylinder that is already in use and is simply clamped or glued to the door surface around the cylinder in less than 5 minutes.

Are there advantages compared to imitations? ~

Nuki was not the first smart lock solution on the market. There are many other companies with more financial power and higher market penetration, like dedicated security companies such as August or Yale, or big tech companies like Amazon (key), offering similar products.

Can the product withstand possible constraints? ✓

Nuki has been on the market for four years and is well connected to strong retail partners in many countries. A major investment from security leader Allegion in 2018, and the numerous security awards won from AV-Test make it a strong and reputable brand in smart security.

The security segment is complex and highly competitive. Users only expect the best quality and will choose the company they trust most. The Nuki smart lock is easy to operate, relatively self-explanatory and offers high quality. The products have good chances of high sales volume and building long-term customer loyalty.

Sources: Company information, Statista Digital Market Outlook 2020

In the security segment, ambient assisted living products play a special part

Deep dives: ambient assisted living

Ambient assisted living (AAL)

Smart home devices in the area of ambient assisted living (AAL) help people with special needs to manage their household activities on their own. The use cases are embedded in all our Smart Home segments but the most important ones are located in the area of Security.

Two examples for security devices are pressure mats, which detect whether a person has fallen and whether he or she gets up again, and emergency buttons that are either attached to walls or worn on the body. With these buttons users can notify emergency services whenever needed. Unlike smartphones, such buttons allow a direct connection to the emergency services without having to dial a telephone number. In addition to these hardware devices, the underlying services for elderly monitoring and on-demand contacts are also important.

Of course the use of AAL products is not limited to elderly people, but might also be used for people with special needs or who require monitoring in general including, for instance, children or chronically ill people.

One example of how this can be achieved and how AAL devices might change the way multiple generations can live together is the pill robot Pillo. Pillo is a stationary robot, which, based on facial recognition, dispenses an individual set of medication. This shows how such tasks might be integrated into smart assistants in general.

Assumptions for AAL

Elderly people's reluctance to use digital technology is a considerable adoption barrier. This applies to computers, smartphones and also to smart home devices. Therefore, mass market adoption will be slow in coming and possibly not realistic before current technology-affine generations are old enough to enter the respective target group.

The main challenge for companies will remain to ensure usability along with complex functionalities. Big potential also lies in a cross-selling AAL products approach in combination with security devices such as motion detectors, security cameras or smoke detectors.

The market for AAL devices bears great potential for companies from any industry, because market shares can be won without strong competition. We furthermore expect a strong market growth as advances in medical treatment and, along with that, a demographic shift will be inevitable. The need to automate repetitive tasks, a broad availability of communication networks and older generations adopting technology will further stimulate market growth.

It is without question that a great potential for AAL devices also lies in the application within residential homes and other B2B use cases. Though these are not part of our forecasts, similar trends as for private households can be expected. With ageing societies in most countries, the absence of staff in the care industry could be compensated by technological solutions, which are likely to be subsidized by governments or the insurance industry.

Sources: Statista Digital Market Outlook 2020

HOME ENTER-TAINMENT

The Smart Home segment Home Entertainment comprises the sale of products and services for multi-room entertainment (e.g. sound systems) as well as connected remote controls and streaming devices (e.g. Amazon Fire TV, Google Chromecast).

Photo: Sonos media kit 2018

Smart Home Entertainment: products and services

Overview: segment

In-Scope

The Smart Home segment Home Entertainment comprises the sale of products and services for multi-room entertainment. This includes:

- Various multiroom entertainment systems (audio and/or video) with a primary focus on entertainment (e.g. Sonos)
- Streaming devices (e.g. Amazon Fire TV stick, Google Chromecast)
- Entertainment remotes

Out-of-Scope

- Classical entertainment devices without smart home connection
- Smart TVs and receivers without smart home integration
- Smart speakers with a primary focus on control and connectivity (Amazon Echo, Google Home etc.)
- B2B/C2C sales of any kind (e.g. to hotels or office buildings)

General, freely programmable buttons and switches (see Control and Connectivity) or light bulbs for different lighting scenarios (see Comfort and Lighting) are not included. Smart TVs are also not considered here because their functions are, in most cases, not directly controlled via the Internet but networking is primarily used for the retrieval of media content.

Sources: Statista Digital Market Outlook 2020

The main benefit for customers lies in the seamless integration of speakers into all household processes

Overview: customer benefit and market development

Customer benefit

Smart home entertainment devices are products that are used for entertainment purposes within a smart home. The main products are multi-room music devices, remote controls that are dedicated to entertainment use cases and streaming devices (e.g. Amazon Fire TV, Google Chromecast). The main benefit for customers lies in the seamless integration into all household processes. In addition, devices no longer need to be wired, which makes their installation very easy.

Multi-room audio systems or streaming devices can be remotely controlled in three different ways: through a smartphone, through other devices or apps (e.g. smart assistants) or with remote controls.

Along with the most obvious use case of pure entertainment, multi-room systems are highly useful when connected to security systems. Motion sensors, for example, can activate entertainment devices to simulate the presence of a person in the house when they notice activities on the outdoor premises.

By definition we exclude smart TVs, since only a small share of their revenue is related to their ability to connect to the internet.

Smart speakers with a primary focus on control such as Google Home or Amazon Echo are excluded here and are part of the Control and Connectivity segment.

Market size and future development

In 2020, the global market for Smart Home Entertainment solutions has a size of US$9.3 billion.

The U.S. market is the biggest market globally with a revenue of US$2.75 billion in 2020. Especially in the U.S. market, the growing adoption of smart speakers has a substitutive impact on market growth of purely entertainment-oriented devices. This leads to a small growth in revenues of 6.6% annually up to 2026. By 2026, revenues of US$4.0 billion will be generated by 31.5 million households.

With US$2.73 billion in revenue, the market in Europe is far bigger than the Chinese market. The annual growth of 9.3% in revenue is smaller compared to other segments. As with the other Smart Home segments, the market in China is comparably small with revenues of US$1.3 billion in 2020. This is a result of the typical price erosion we observe in many other hardware-dominated markets. China is expected to grow strongest with revenues of US$4.2 billion by 2026 and 97.0 million households. This is the result of a CAGR[1] of 21.4%. The market in China is expected to get bigger than the size of Europe by 2026 without losing its growth momentum.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

The Home Entertainment market faces many challenges like price pressure in the mass market

Overview: assumptions and trends

Assumptions

The only difference between smart entertainment and traditional hardware is that the smart devices are directly or indirectly connected to the internet. This leads to quite similar price levels when comparing countries as well as consistent trends in adoption. The competitors in the market are both traditional companies with a focus on audio devices such as Bose, Sony or Panasonic, as well as young companies such as Sonos or Klipsch.

The market for streaming devices is dominated by four major players: Amazon (Fire TV), Google (Chromecast), Roku (Roku streaming players) and Apple (Apple TV).

Like smart bulbs from the Comfort and Lighting segment, we believe multi-room entertainment hardware to be an entry-level product for many smart home customers. We assume that Entertainment devices will mostly be bought without the explicit motive to transform one's household into a smart home. However, when customers get used to the convenience of controlling devices with a smartphone, the ecosystem is likely to be expanded to other segments, slowly transforming the household into an integrated smart home.

Our forecasts are based on the assumption that smart speakers from the Control and Connectivity segment will compete with multi-room audio systems, but will not completely substitute them. Entertainment vendors such as Sonos already implement smart assistants like Alexa with their speakers in order to compete successfully.

Trends

Last year's biggest trend of smart speakers is already hitting the industry and especially companies in the Entertainment segment have to adapt. Companies like Sonos already found a solution by integrating smart assistants like Alexa or the Google Assistant. In the long run, this could degrade Home Entertainment companies to hardware manufacturers which provide the foundation for the assistants. There are regional differences with regard to this phenomenon. Smart speakers will slow down growth in the U.S. However, as the Chinese market is growing rapidly, a similar slowdown will be barely visible there. Europe will react conservatively and will adopt smart speakers more slowly.

In the past, companies used to focus on high-priced sound systems as the whole smart home phenomenon was seen as a luxury niche. As solutions become cheaper and more and more self installable, we see an increasing need for entertainment companies to adapt. An alternative would be to partner with companies that offer smart home products in other low-price/DIY segments. Sonos pioneers yet again in this respect: They have just started a cooperation with IKEA[1].

The rise in video streaming activities has driven the streaming devices market to a considerable share of revenues in the segment. However, we predict to see a potential loss in revenues in the future as smart TVs will integrate similar features and smartphones become the main control devices for mirroring media content on other devices.

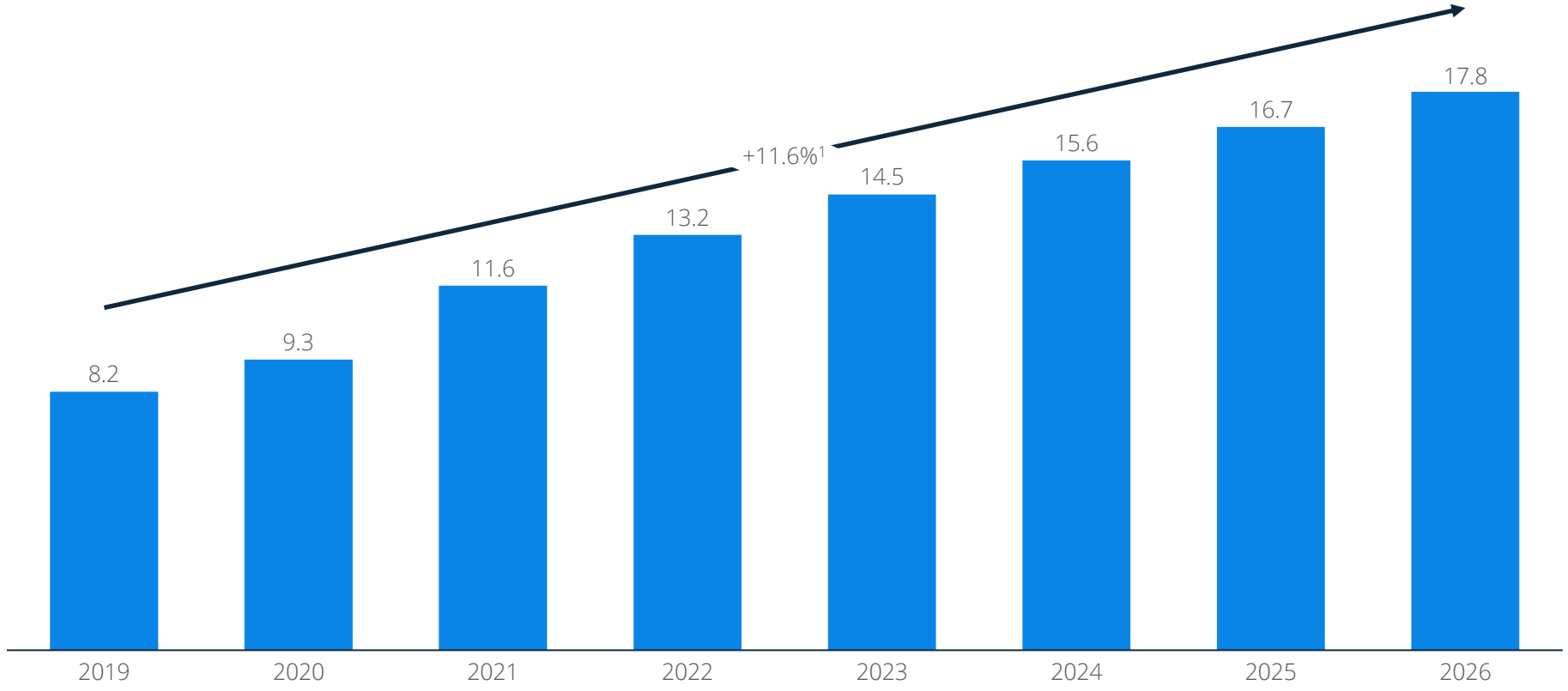
1: IKEA has also announced a partnership with Xiaomi in 2018

Sources: Statista Digital Market Outlook 2020

The Smart Home Entertainment segment shows global revenues of US$9.3 billion in 2020

Market sizes: global

Global revenue forecast in billion US$

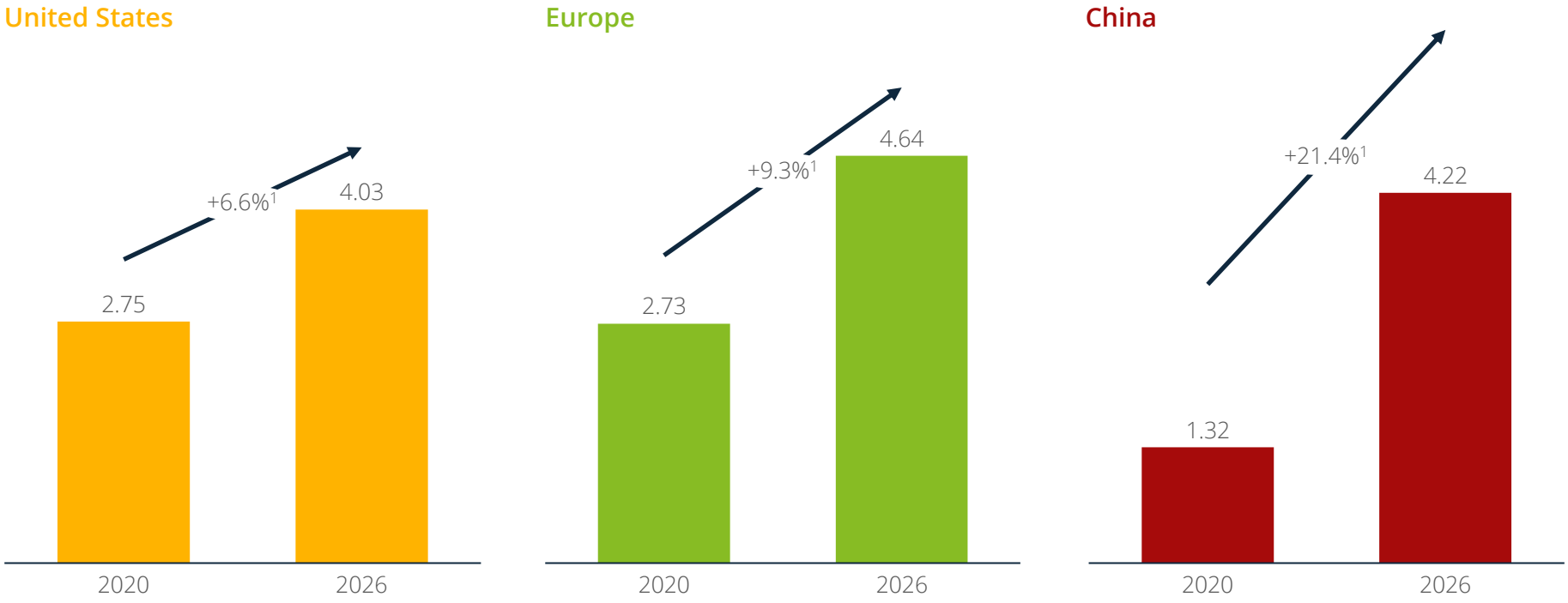


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

With revenues of US$2.8 billion in 2020, the U.S. is the biggest market

Market sizes: regional comparison (1/2)

Revenue forecast in billion US$

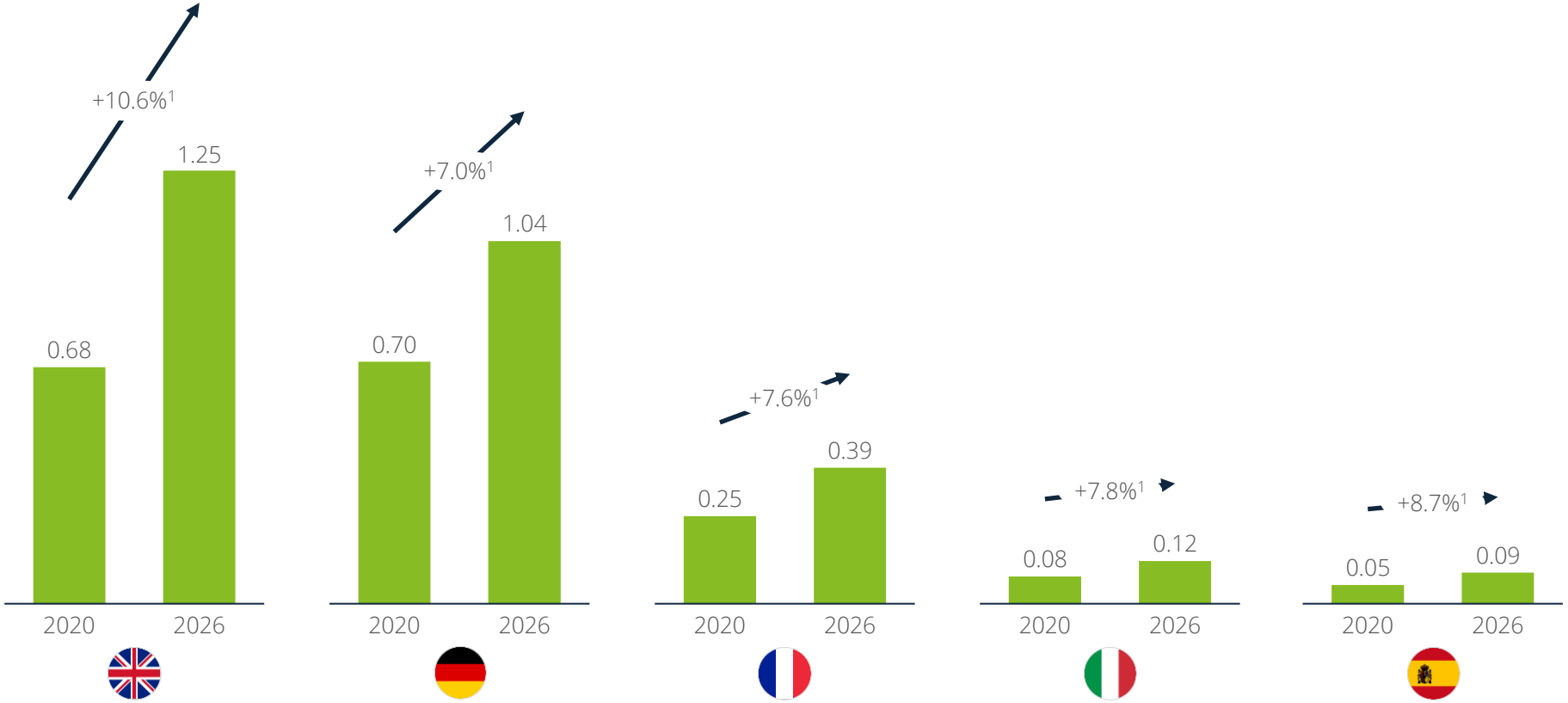


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

The UK and Germany are the leading countries in Europe in terms of revenue

Market sizes: regional comparison (2/2)

Revenue forecast in billion US$

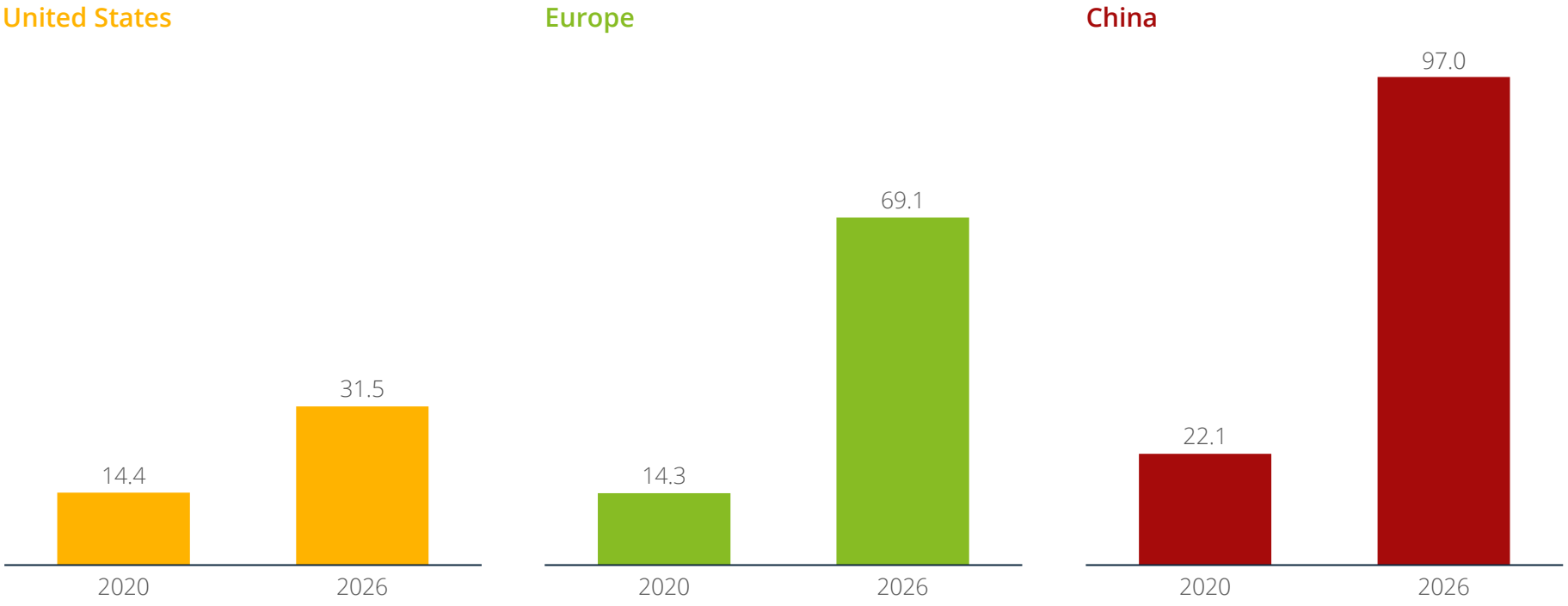


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

China has the largest amount of smart homes with connected Home Entertainment devices

Number of smart homes: regional comparison (1/2)

Number of smart homes forecast in million

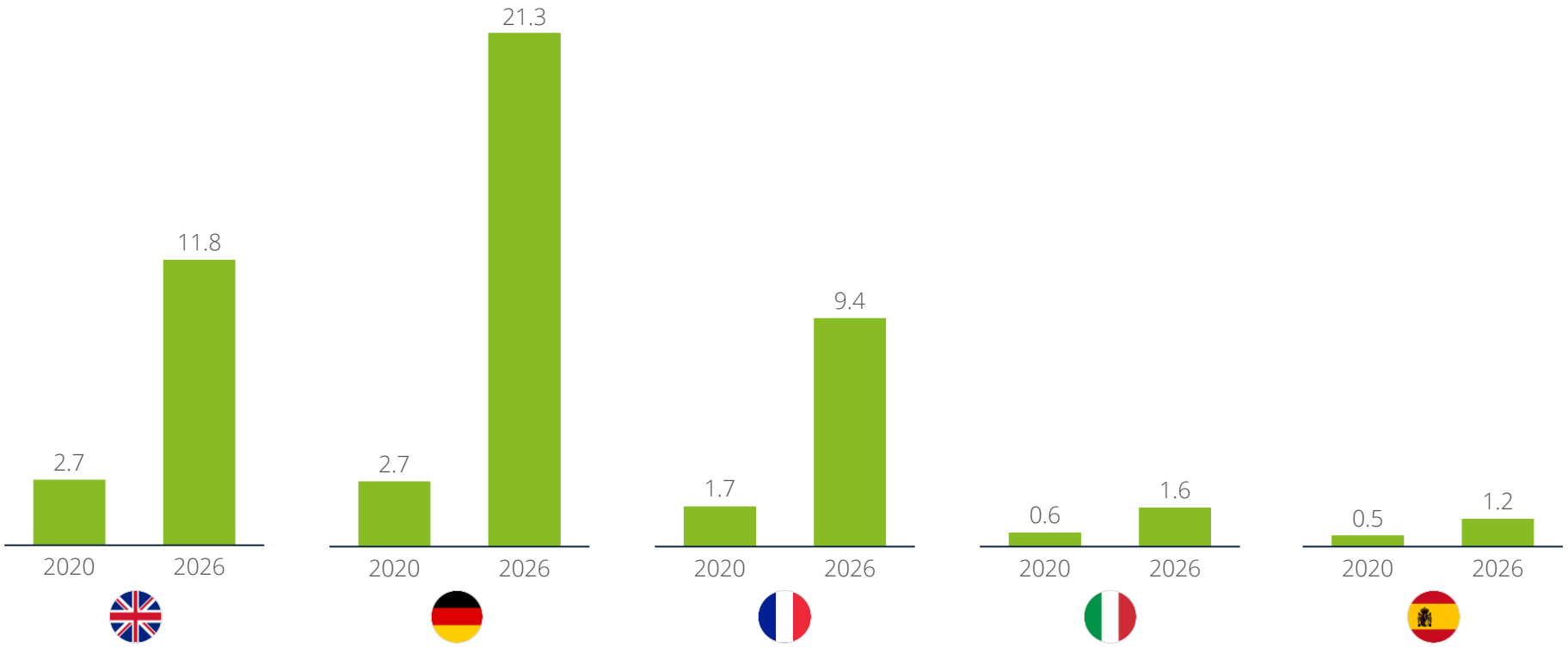


Sources: Statista Digital Market Outlook 2020

Out of the European top 5, the UK and Germany have the largest household base for Home Entertainment

Number of smart homes: regional comparison (2/2)

Number of smart homes forecast in million

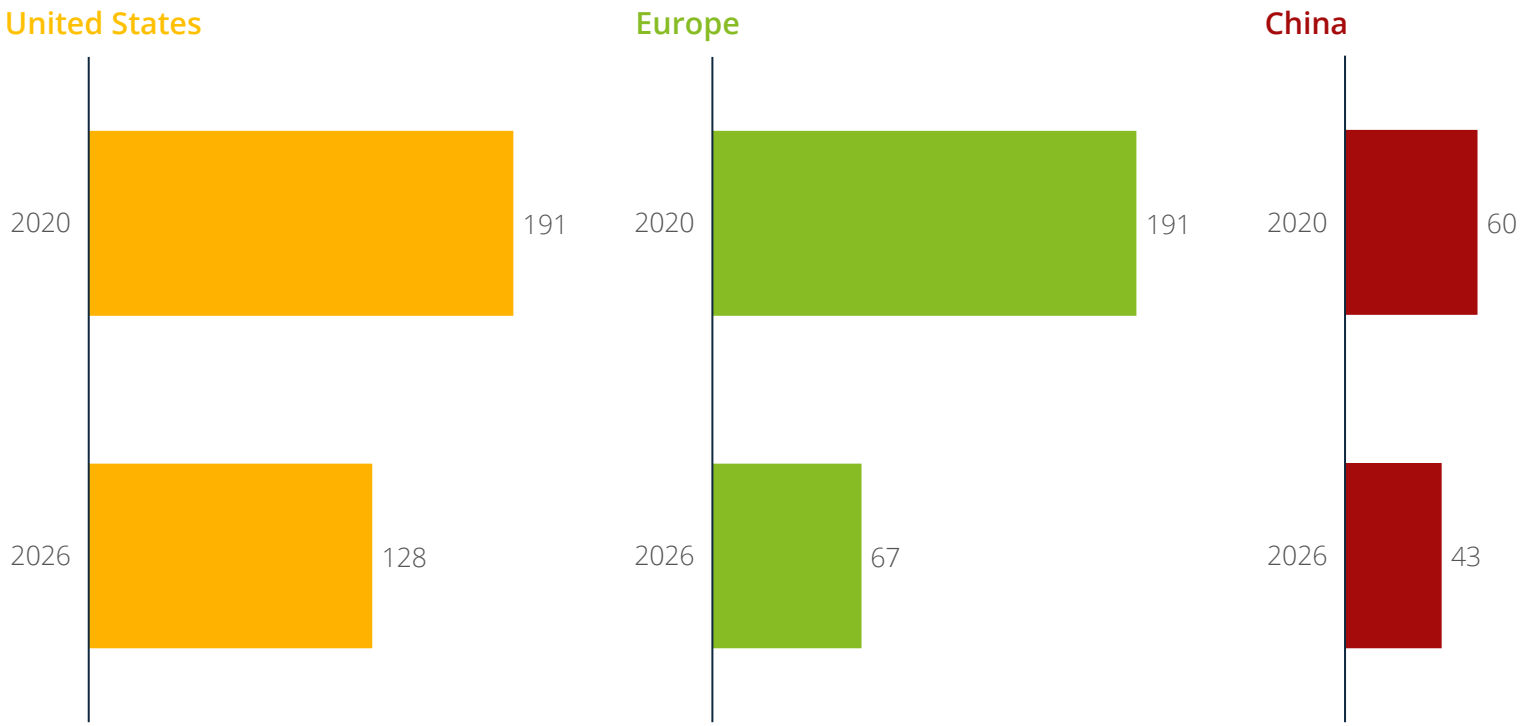


Sources: Statista Digital Market Outlook 2020

For Home Entertainment, the U.S. and Europe have similar revenues per smart home in 2020

Average revenue per smart home: regional comparison (1/2)

Average revenue per smart home forecast in US$

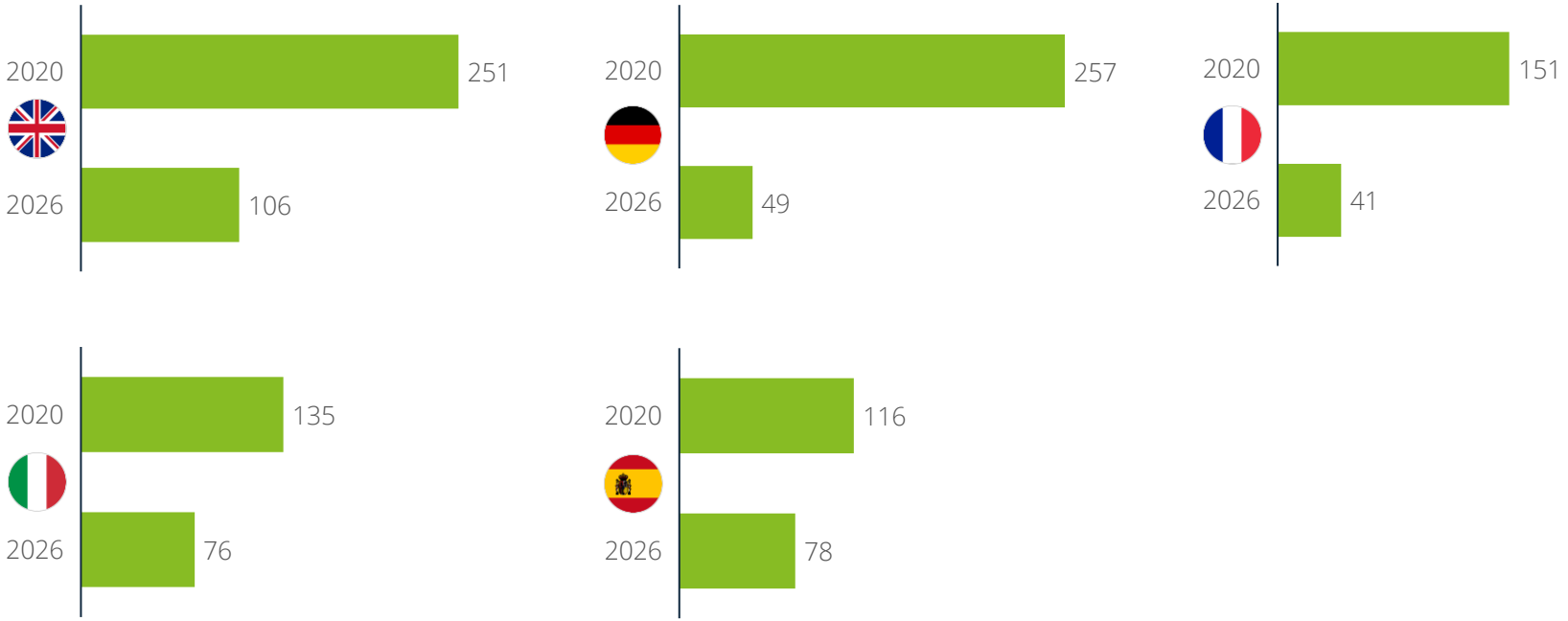


Sources: Statista Digital Market Outlook 2020

Prices of Home Entertainment systems in Europe will likely drop through 2026

Average revenue per smart home: regional comparison (2/2)

Average revenue per smart home forecast in US$

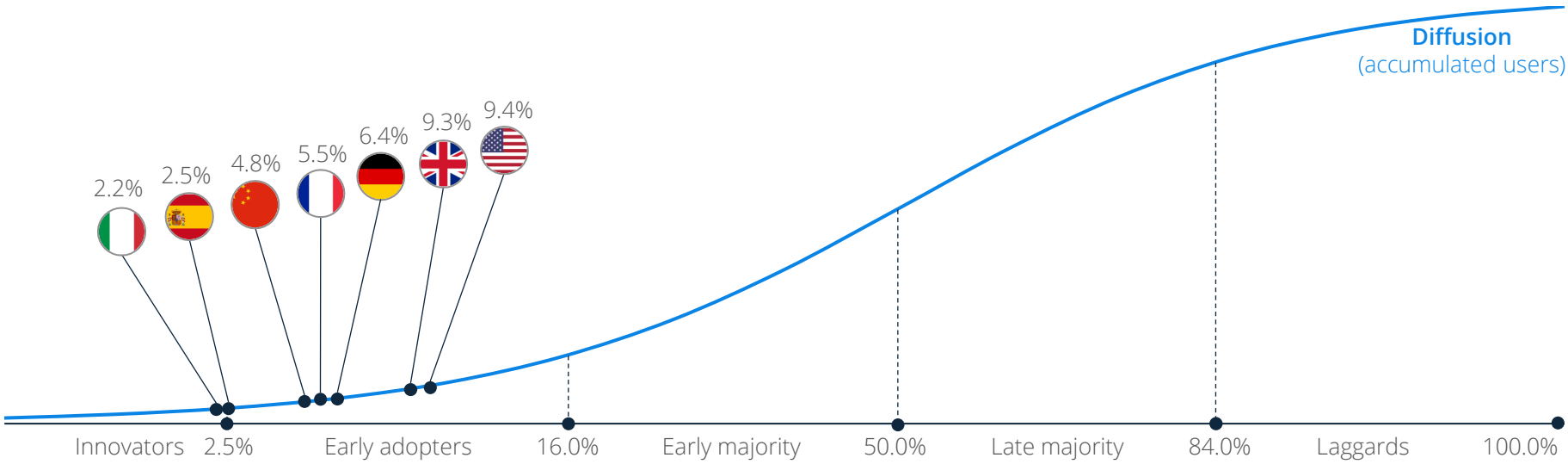


Sources: Statista Digital Market Outlook 2020

Adoption in the U.S. and UK for Home Entertainment is growing but other countries still lag behind

Penetration rates: innovation diffusion

Innovation diffusion curve for 2020



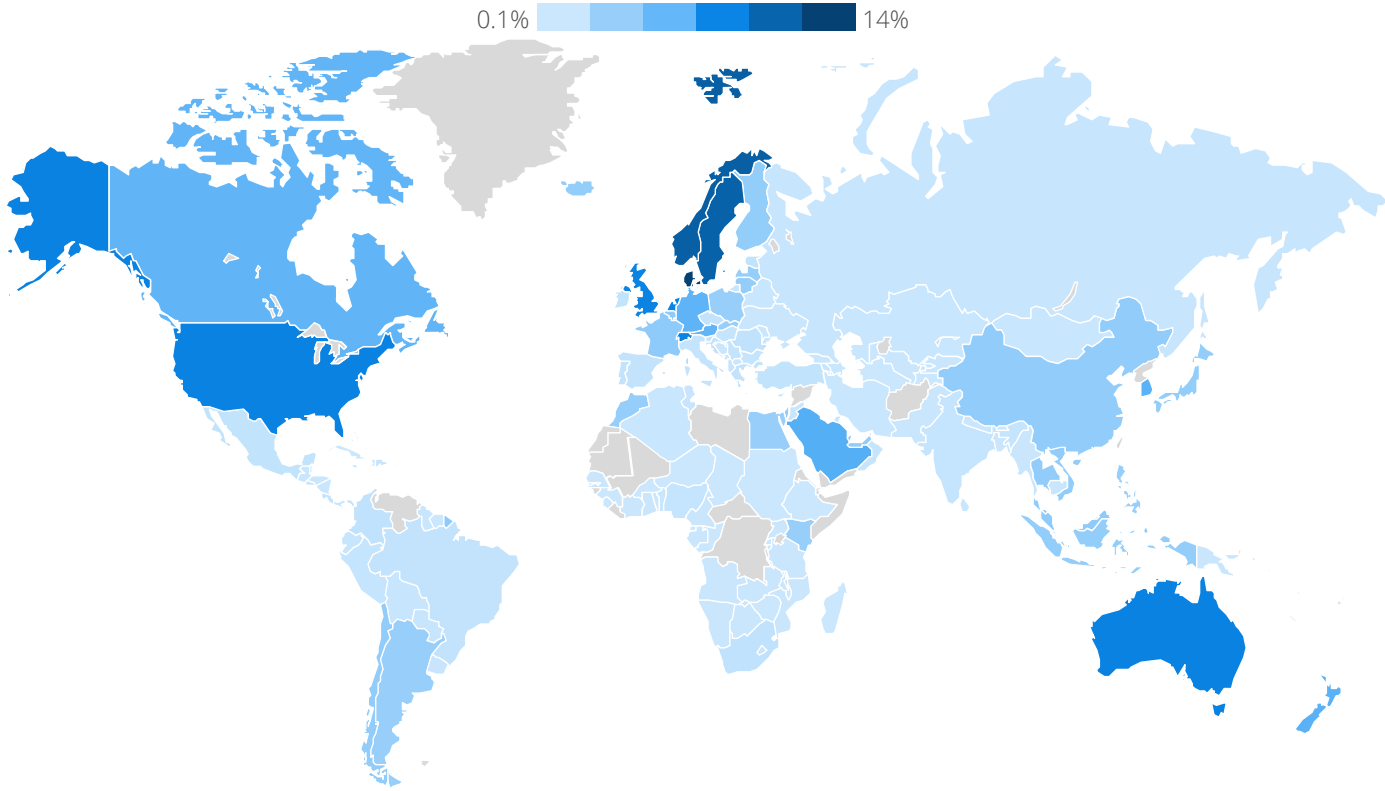
The diffusion of innovations graph shows successive groups of consumers adopting Home Entertainment products (the graph above shows the households penetration rate of selected countries). Innovations in general are not adopted by all individuals at the same time. Instead, they tend to adopt in a time sequence, and can be classified into adopter categories based on how long it takes until they begin using the service. Diffusion is considered to be the rate and volume at which innovations spread among their users (an adoption rate of 100% is theoretically possible but not realistic). The Home Entertainment segment started the connection of devices relatively early. Nevertheless, smart speaker competition is strong.

Sources: Statista Digital Market Outlook 2020

In terms of household penetration, the Scandinavian countries lead the Home Entertainment market

Penetration rates: global comparison

Home Entertainment household penetration rate in 2020

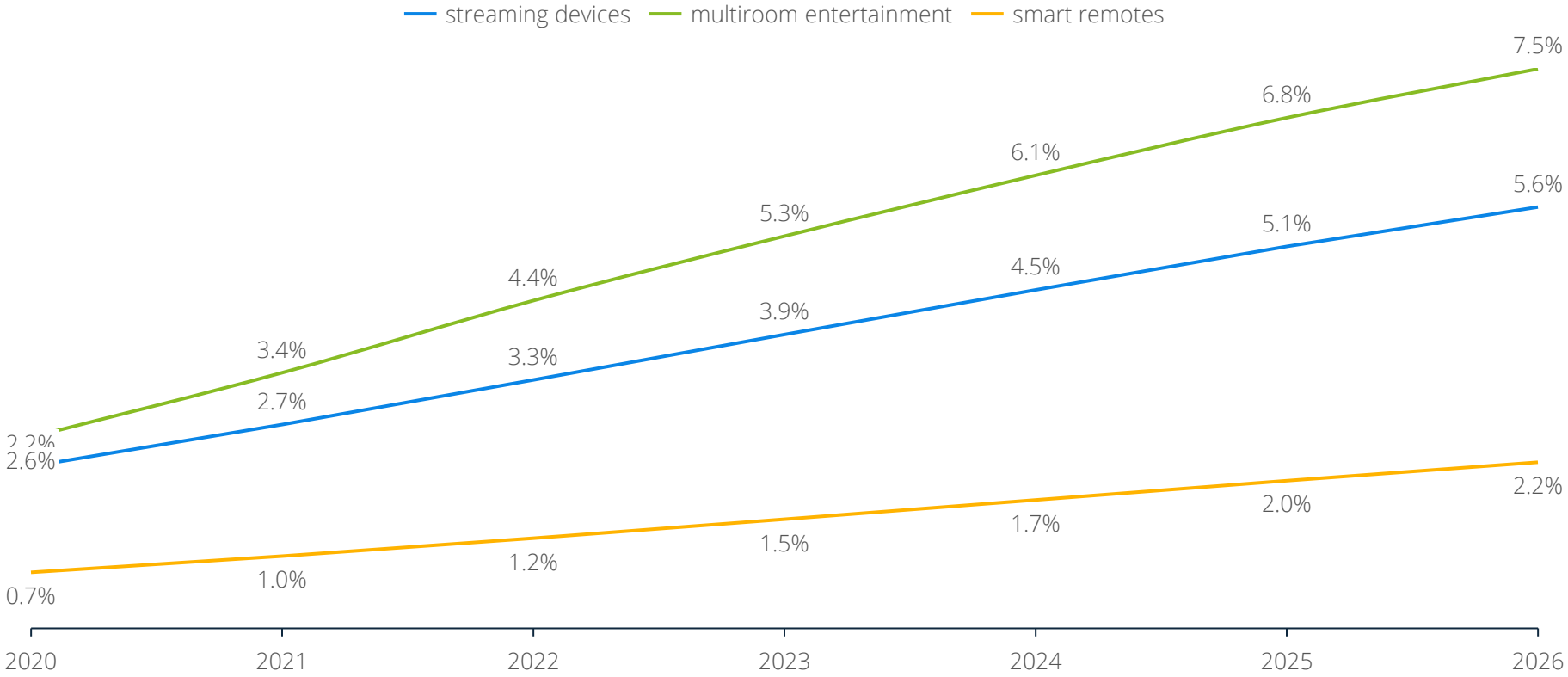


Sources: Statista Digital Market Outlook 2020

The integration of Smart Speakers will spur the growth of multiroom entertainment devices

Penetration rates: products

Global Home Entertainment household product penetration rates



Note: The chart show the share of global Smart Homes with the respective product from the total number of private households of the segment.
Every Smart Home can own more than one product.
Sources: Statista Digital Market Outlook 2020

Sonos successfully transformed the smart speaker threat into a strength in their business

Company profiles: Sonos

SONOS

Key facts

Revenue:	US$1,260 million (2019)[1]
Products sold:	6,132 million (2019)[1]
Gross profit:	US$527 (2019)[1]
Funding:	US$455 million (10 rounds)
Global presence:	60+ countries
Headquarters:	Santa Barbara, California, US
Founded:	2002

Revenue by product categories in thousand US$

Segments	2019	2018	2017
Wireless speakers	518,821	546,649	480,977
Home theater speakers	489,602	418,416	348,899
Components	188,861	150,436	151,965
Other	63,539	21,507	10,685

Products

Sonos develops and manufactures their products in-house. Famous speakers are e.g. the Sonos One, Play:1, Play:5, Beam or different surround sets. By integrating services and cooperating with other smart home companies they ensure compatibility and thus usability for the customer. Now that the smart entertainment market is facing the potentially disruptive rise of smart speakers, Sonos has successfully implemented the Alexa software – a Google Assistant integration is expected. The company's products are mostly sold through vendors, such as Best Buy, Apple, and Target. Retailers such as Amazon.com and Crutchfield also play a big role in the distribution of Sonos products.

Strategy

Sonos is an American consumer electronics company founded in 2002 and based in Santa Barbara, California. As a pioneer in multi-room entertainment, Sonos is still among the market leaders. The strategy follows a multi-pronged approach: In early 2016, the company announced to lay off parts of their workforce in order to successfully adapt to changes like paid streaming services and voice control, which will play an important role in the company's future. In addition, the company partners with audio services like QQ Music, Napster, and Pandora. In 2017, Sonos announced a cooperation with IKEA and in 2018 they presented the Symfonisk smart speaker, which doubles as a shelf.

Sources: Company information, press releases, Crunchbase

Bang & Olufsen – a premium audio company from Denmark sees growing smart home revenue

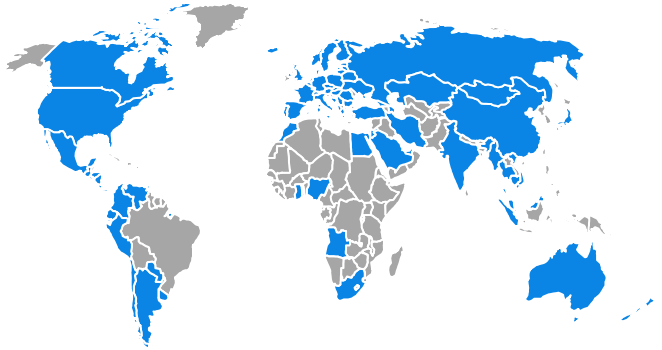
Company profiles: Bang & Olufsen (1/2)

BANG & OLUFSEN

Key facts

Revenue:	US$310.6 million[1] (2020)[2]
CAGR[3]:	-28.4% (19-20)
Net income:	US$87.9million[1] (2020)[2]
Subsidiaries:	4 (ICEpower, Medicom, Telecom, PLAY)
Employees:	915 (2020)
Headquarters:	Struer, DNK
Founded:	1925

Global presence of stores and retailers



Products

The B&O Play product line is a consumer-oriented brand marketing for headphones and wireless speakers with connected audio functions. The product line contains small, portable systems as well as large high quality speakers. Another collection is the Beolink Multiroom, which is a wireless speaker system that connects its speakers within one seamless system controllable with Google Chromecast, AirPlay and DLNA. Different sound sources can be heard in each room or all speakers can play one tune. A dedicated app serves for the controlling and personalizing the WiFi speakers.

Strategy

Bang & Olufsen is a global luxury-lifestyle brand that designs and manufactures audio products, television sets, and telephones. The company was founded in 1925 and focuses on the high-price and premium segment. After facing declines in sales during the economic crisis in 2008, the company has recovered and is now experiencing a growth period, especially in the segments that include smart home devices (audio, speakers, B&O Play) among other things. Bang & Olufsen focuses on developing domestic smart devices and apps with the Beolink SmartHome. The Beolink technology is integral to each product, enabling communication across the entire range of products.

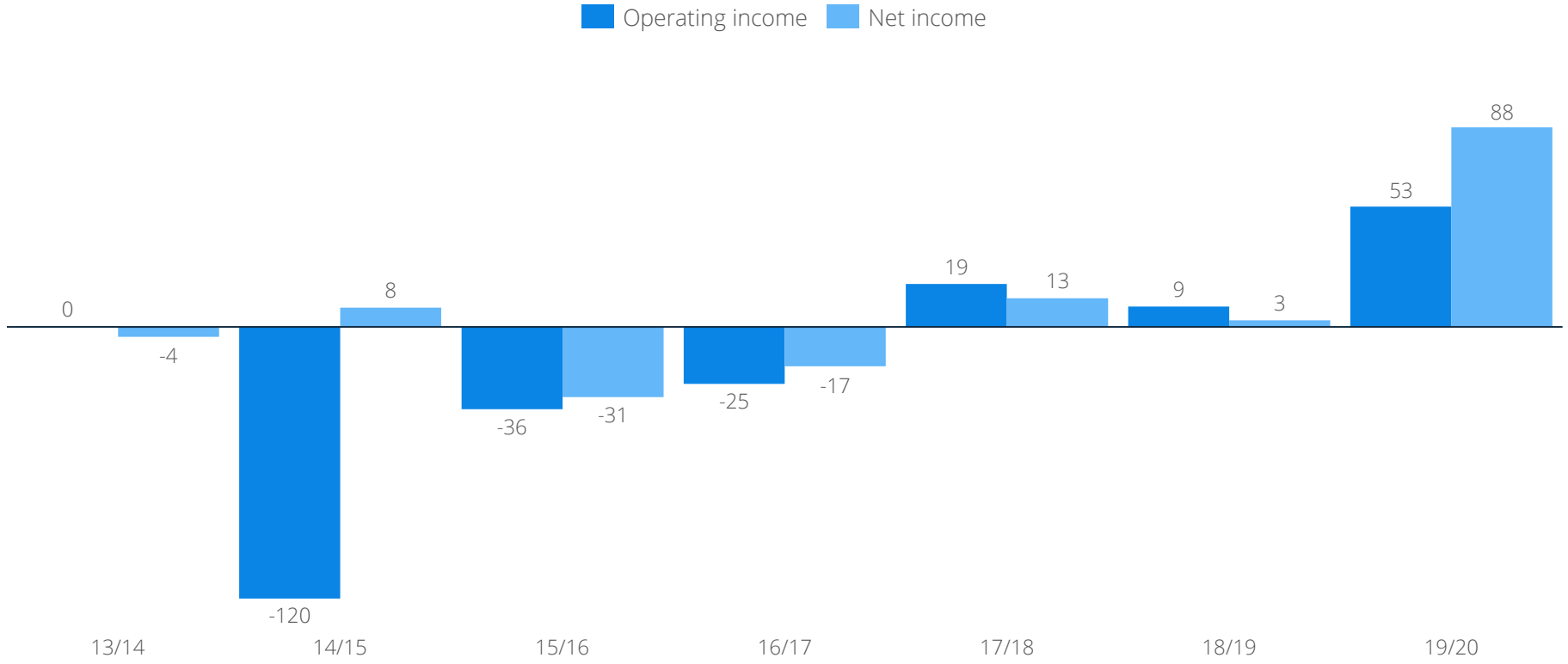
1: Converted DKK/USD = 6.5554 2: Financial year 2019/2020 3: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

After revenue declines in the past years, Bang & Olufsen has sufficiently recovered

Company profiles: Bang & Olufsen (3/3)

BANG & OLUFSEN

Operating and net income in million US$[1]



1: Converted DKK/USD = 6.7395
Sources: Company information

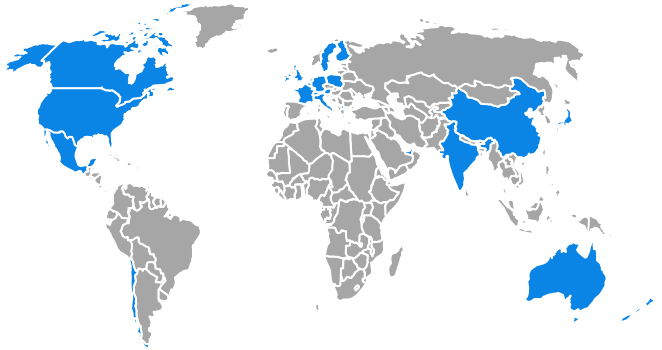
Bose is an audio-only company and well known for its home systems and WiFi speakers

Company profiles: Bose

Key facts

Revenue:	US$3.6 billion (2020)
Largest market:	US
Global operations:	25+ countries
Stores:	130 (2020)
Employees:	8000+ (2020)
Headquarters:	Framingham, Massachusetts, US
Founded:	1964

Global operations



Products

Bose is well known for all kinds of high-quality home audio systems, speakers and headphones. In 2013 the SoundTouch WiFi music system was introduced and users could then stream music wirelessly from the internet. The current SoundTouch line of compact speaker units includes three different models that work together to offer a wireless audio solution for the entire home. Well known are also the home-cinema-systems like the Lifestyle 550 or their Wave SoundTech systems. Bose has recently joined the battle around AI-powered audio systems with the Home Speaker 500, the Sound Bar 500/700 with smart speaker functionality. All Bose speakers work with the Bose Connect App.

Strategy

Bose manufactures music and home theater systems, and loudspeakers for the home, vehicles and professional venues. Bose also makes noise reduction headsets for aviation and consumer use. The company also offers substantial information and support. Research still remains a focus in the company and Bose Corporation conducts basic research in acoustics and other fields. In 2018, Bose was ranked #108 by Forbes' America's Largest Private Companies. In 2020, Bose announced the closure of 119 retail stores around the world in light of the increasing purchases done online.

Sources: Company information

Similar to smart speakers, WiFi connection has also become popular for multiroom audio systems

Deep dives: multiroom audio

Multiroom audio standards

Wireless audio for the smart home is not a new trend. In the past few years there has been a big spike in systems and products using WiFi as an alternative to a Bluetooth mesh network. WiFi allows playback from multiple speakers all over the house, all controlled by a single app. It also promises a higher range and better music quality (audio signals can be conveyed via WiFi using a lossless codec with no loss of audio fidelity), also it doesn't take over the phone's audio channel. Nevertheless, different systems that use WiFi are sometimes incompatible, and setup can be difficult. In the majority of multi-room cases, consumers are tied to a single brand's ecosystem.

Example ecosystems are:

- Sonos
- Bose Soundtouch
- Samsung Multi-Room
- Yamaha MusicCast
- Denon HEOS
- DTS Play-Fi
- Apple AirPlay 2
- Chromecast built-in

Potential layout of an entertainment smart home

Sources: SONOS Marbella, cnet, Statista Digital Market Outlook 2020

COMFORT AND LIGHTING

The Smart Home segment Comfort and Lighting includes devices for the improvement of the living atmosphere. These are devices such as sensors and actuators (e.g. door and window sensors, shutters) as well as connected and remote controllable light sources (smart bulbs).

Smart Home Comfort and Lighting: products and services

Overview: segment

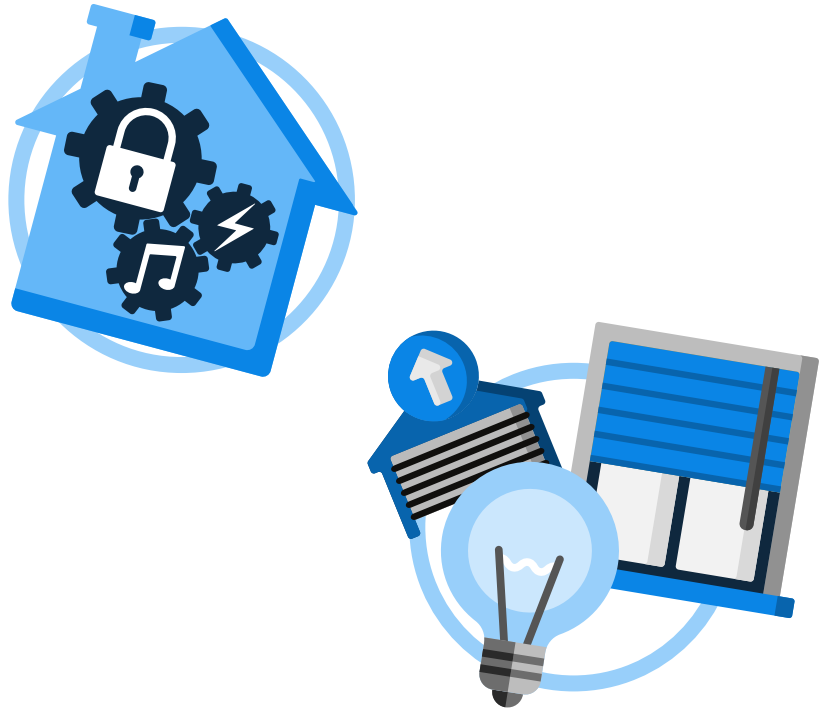
In-Scope

The Smart Home segment Comfort and Lighting includes devices for the improvement of the living atmosphere. This includes:

- Sensors and actuators (e.g. door and window sensors, shutters and shading devices, garage door controls)
- Connected and remote controllable light sources (smart bulbs)

Out-of-Scope

- Control buttons, gateways/hubs, programmable or controllable power sockets (see Control and Connectivity)
- B2B/C2C sales of any kind (e.g. to hotels or office buildings)



Sources: Statista Digital Market Outlook 2020

Smart bulbs are a market entry product for most smart home users – non-users mostly lack awareness

Overview: customer benefit and market development

Customer benefit

The Comfort and Lighting segment comprises devices for the general improvement of the living atmosphere and lighting in a smart home. This includes products like smart bulbs, window- and door-sensors as well as garage door controls.

These devices allow for an orchestration of other IoT (Internet of Things) devices in different home scenarios. Many of these devices can be integrated into use cases from other segments:

- Window- and door-sensors can shut down heating as soon as windows are opened, in order to save energy, or they send a *still-open*-message to the owner's smartphone when he or she leaves the house
- Smart bulbs can be used to simulate presence on longer journeys or they automatically shut off when nobody is at home in order to save energy

Because almost all devices in this segment are relatively cheap and especially smart bulbs are easy to install, the products from this segment are used as a market entry by many customers. According to experts, especially European and Chinese customers purchase lighting solutions as their first smart home products to get familiar with the general technology of IoT devices.

Market size and future development

With global revenues of US$6.6 billion in 2020, Comfort and Lighting is one of the smaller segments within the Smart Home market.

The regional revenue distribution in 2020 is led by the U.S. with revenues of US$2.3 billion, corresponding to a global market share of 35%, followed by Europe with US$2.2 billion (33%) and China with US$0.8 billion (12%).

Depending on the specific product, several companies dominate the market. In the field of smart bulbs, key players to be mentioned are Philips Hue, TP-Link, Lifi Labs or IKEA with Tradfi. For the other product categories, there is no overall dominating company. We would define most of them as order qualifiers with little possibility to differentiate themselves from competitors. A window- or door-sensor simply has to signal whether it is open or closed. There is no room for much more.

The global market size will more than double from 2020 to US$17.8 billion by 2026. While we expect products such as sensors or garage door controllers to show small growth rates, smart bulbs and lighting in general will drive the market. We expect the largest growth to take place in China with a CAGR[1] of 12.8% between 2020 and 2026. Europe and the U.S. will see CAGRs[1] ranging between about 19.3% and 12.8%.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Price drives adoption in the mass market – which makes bulbs a predestined entry-level product

Overview: assumptions and trends

Assumptions

While in the past few years stakeholders in the smart home business were still wondering when mass market adoption would become real, we now believe that when it comes to the Comfort and Lighting segment and especially smart bulbs, Western Europe and North America have already reached this goal.

In the past, prices around US$60 – US$100 were common for a single bulb, we have recently seen prices drop significantly to levels of US$25 – US$55, at least since IKEA's market entry. Thus, we assume that many customers who are skeptical towards smart homes will try products from this segment and at least a few will find their arguments falsified. Experts are confident that many customers are going to purchase smart bulbs in combination with a smart speaker as their first smart home product. Vendors therefore need to focus on use cases and the integration of devices rather than isolated functions and a product-focused marketing.

Moreover, products from the Comfort and Lighting segment will be increasingly popular among people with a lower income, especially in countries with a rather small GDP per capita. In China, we see prices ranging from US$5 – US$25, which will accelerate adoption if this trend continues. Up to this point, the only reason why in the long run the majority of bulbs sold in developed countries might not be connected is the price. In this respect, one has to pay attention to the price for semiconductors as they have a major impact on sensors in this context.

Trends

Next to the general smart home trend of increasing interoperability we see converging functionalities for smart bulbs. Besides the general functions of on/off switches and dimming and color-changing modes, certain products have additional functions, like the BeON bulbs, which have a strong focus on security (smoke detection). Especially in China, the trend goes more towards entertainment: There are several bulbs available with integrated speakers e.g. by Mipow.

For the other products in the segment no major innovations are visible for now. However, in the long run the functionalities they provide will be absorbed by the products they currently only support. This means that just like connected bulbs were the next step to simple light bulbs, we believe that window sensors will be part of a regular window frame, door sensors will already be integrated in a standard door and most garage door engines will be connected by default. To be more specific: We are confident that window and door sensors are a bridging technology, similar to several other smart home products.

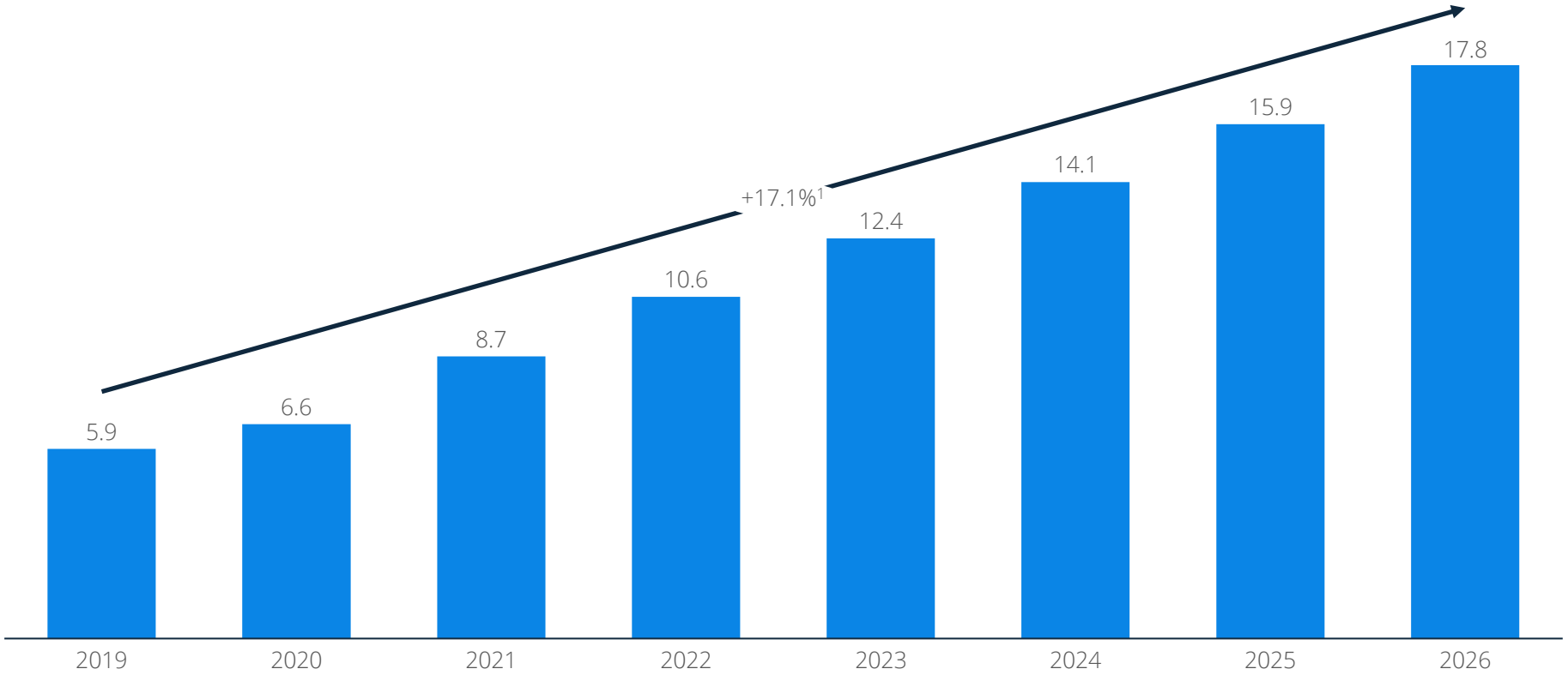
As a consequence, the smart home phenomenon as a distinguishable market will be absorbed by the corresponding traditional consumer markets. This will be a major challenge for manufacturers in the next 15 years. The effect will hit both types of companies: Traditional durables companies will need to successfully implement connected features into their products to compete, and young start-ups will need to find business models and solutions to manage their temporary market.

Sources: Statista Digital Market Outlook 2020

The Comfort and Lighting segment shows a strong growth of more than 17.1% p.a. up to 2026

Market sizes: global

Global revenue forecast in billion US$

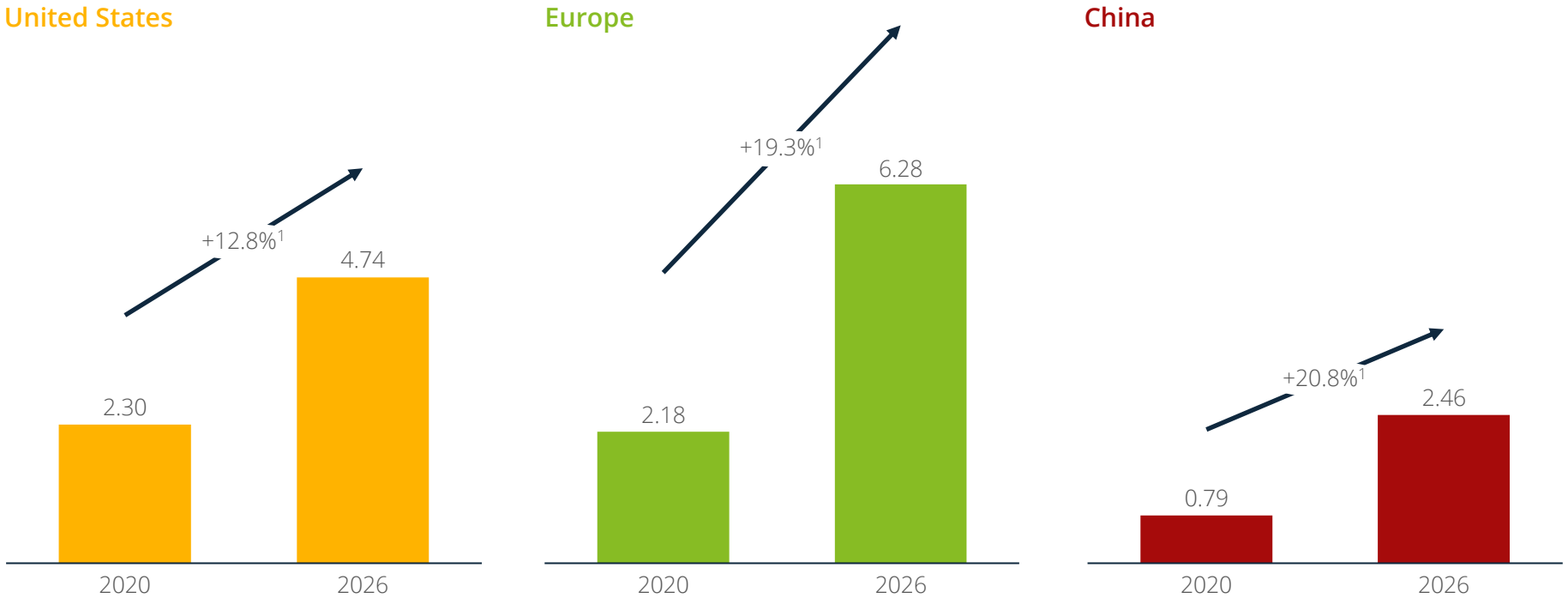


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

With 20.8%, China has the highest CAGR[1] up to 2026 and will reach around US$2.5 billion in revenues

Market sizes: regional comparison (1/2)

Revenue forecast in billion US$

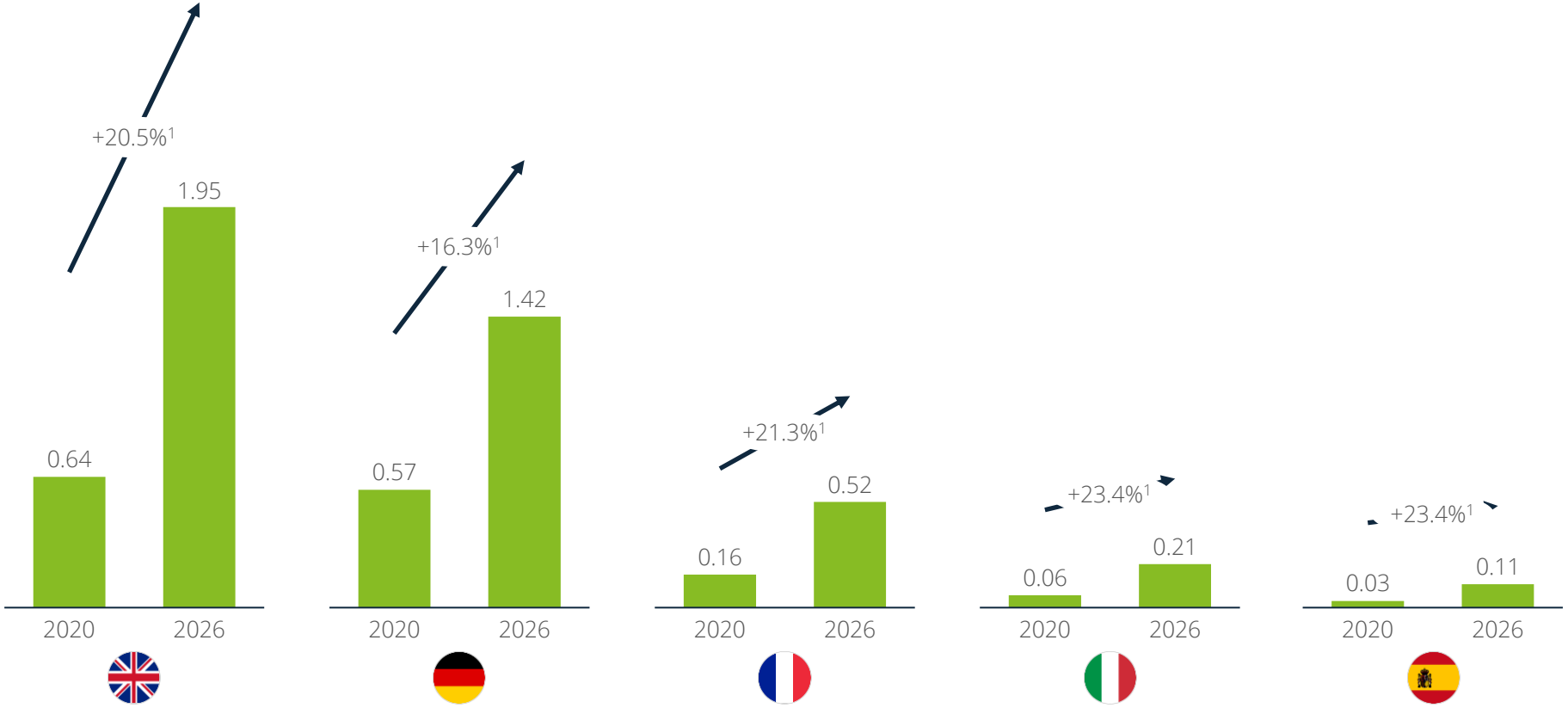


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Out of the European top 5, the UK and Germany show the highest revenues

Market sizes: regional comparison (2/2)

Revenue forecast in billion US$

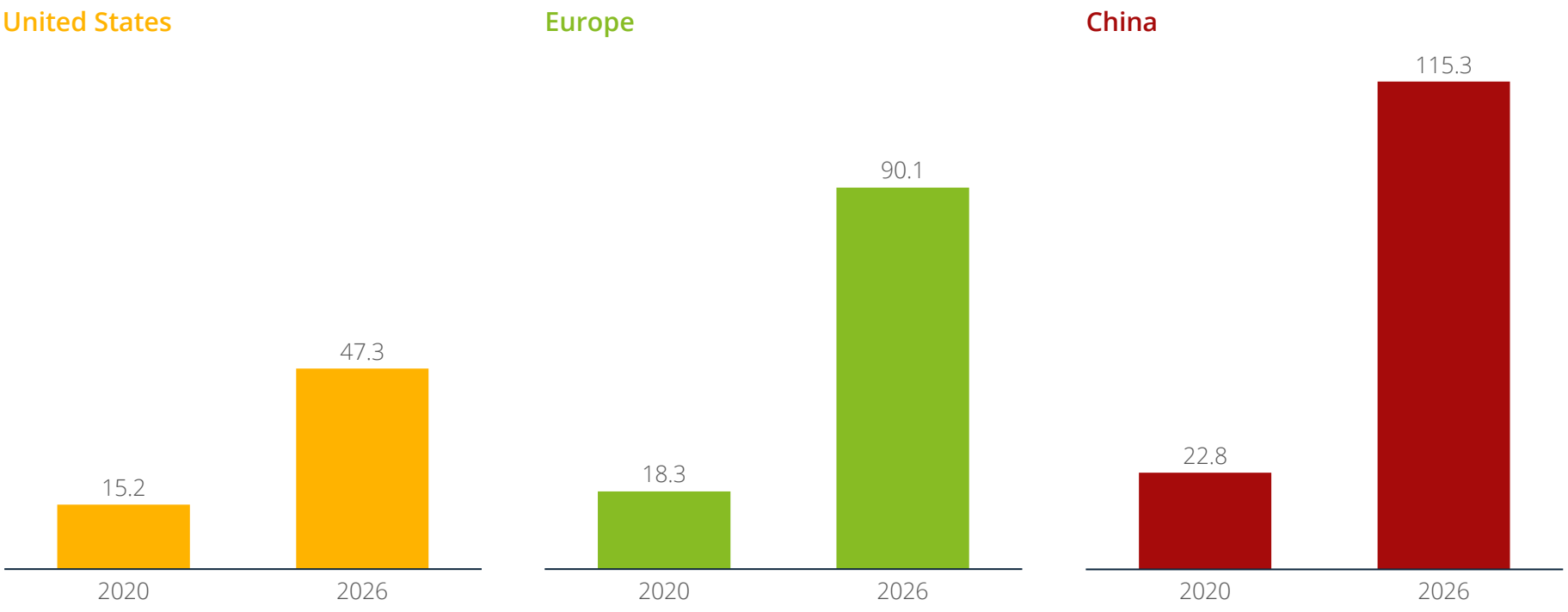


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

China is already in the lead in terms of the number of Comfort and Lighting smart homes

Number of smart homes: regional comparison (1/2)

Number of smart homes forecast in million

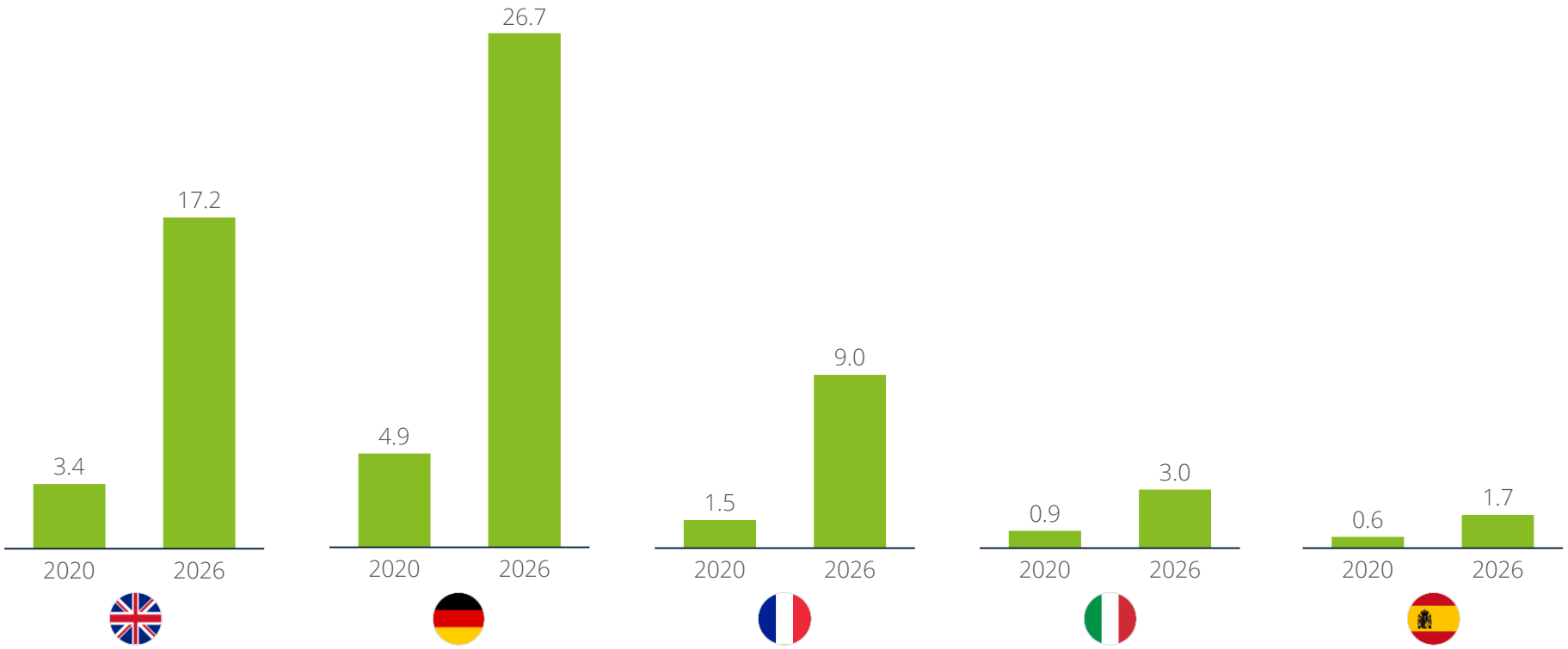


Sources: Statista Digital Market Outlook 2020

Germany has the greatest number of smart homes in the Comfort and Lighting segment

Number of smart homes: regional comparison (2/2)

Number of smart homes forecast in million

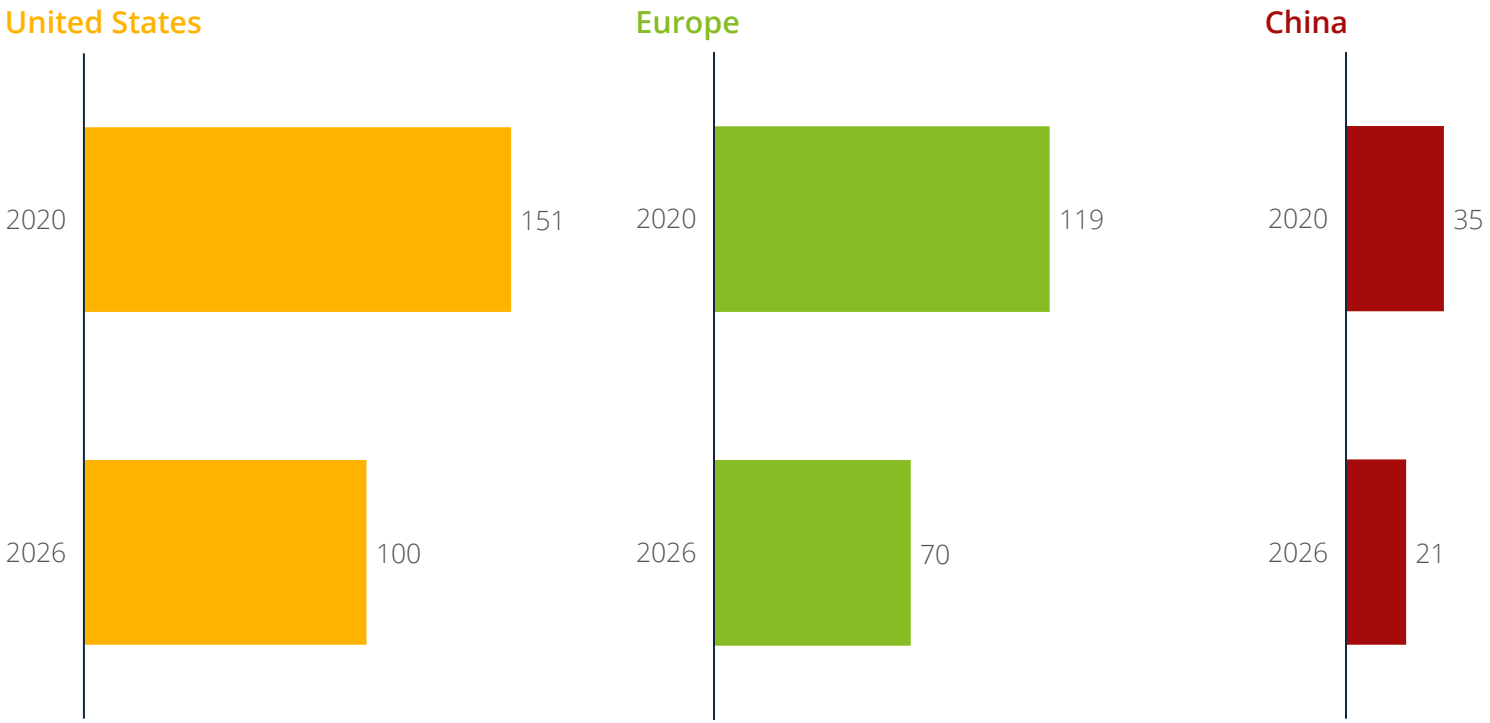


Sources: Statista Digital Market Outlook 2020

Out of the three regions, the U.S. shows the highest average revenue per smart home in the segment

Average revenue per smart home: regional comparison (1/2)

Average revenue per smart home forecast in US$

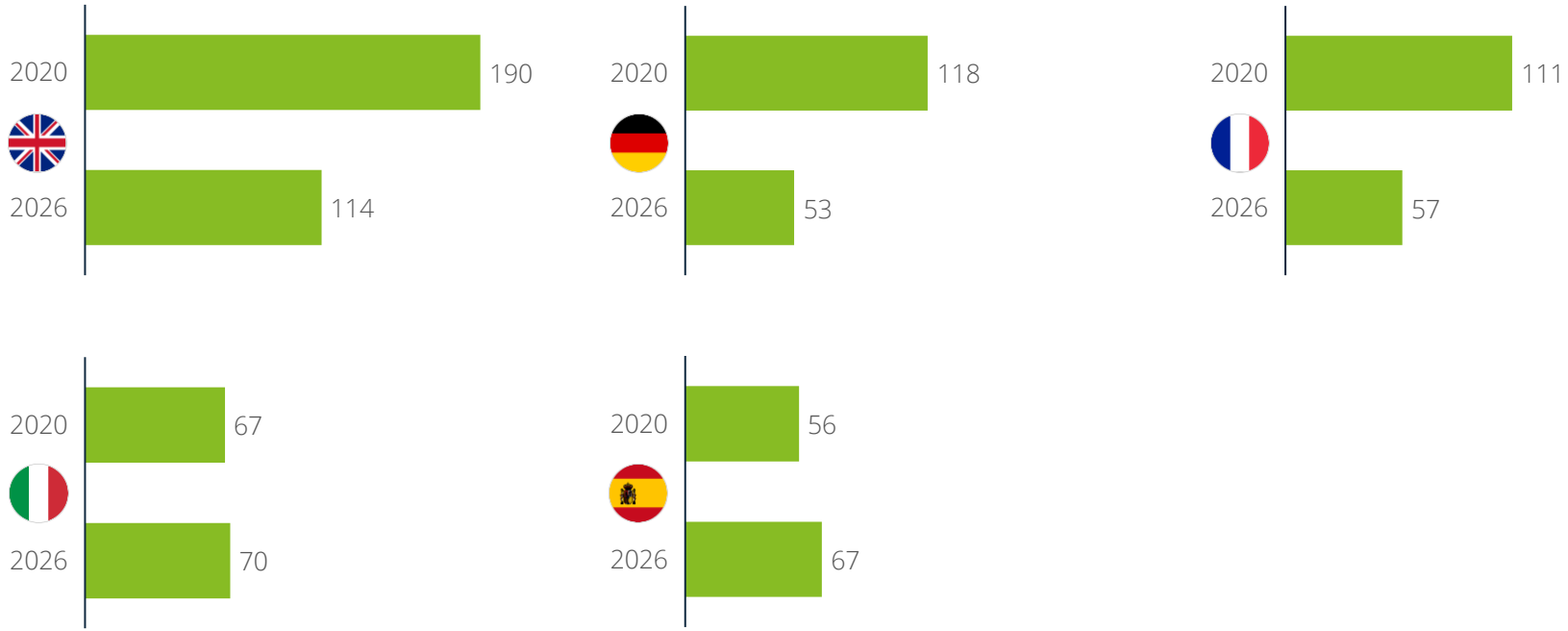


Sources: Statista Digital Market Outlook 2020

Comfort and Lighting product owners in the UK pay the most

Average revenue per smart home: regional comparison (2/2)

Average revenue per smart home forecast in US$

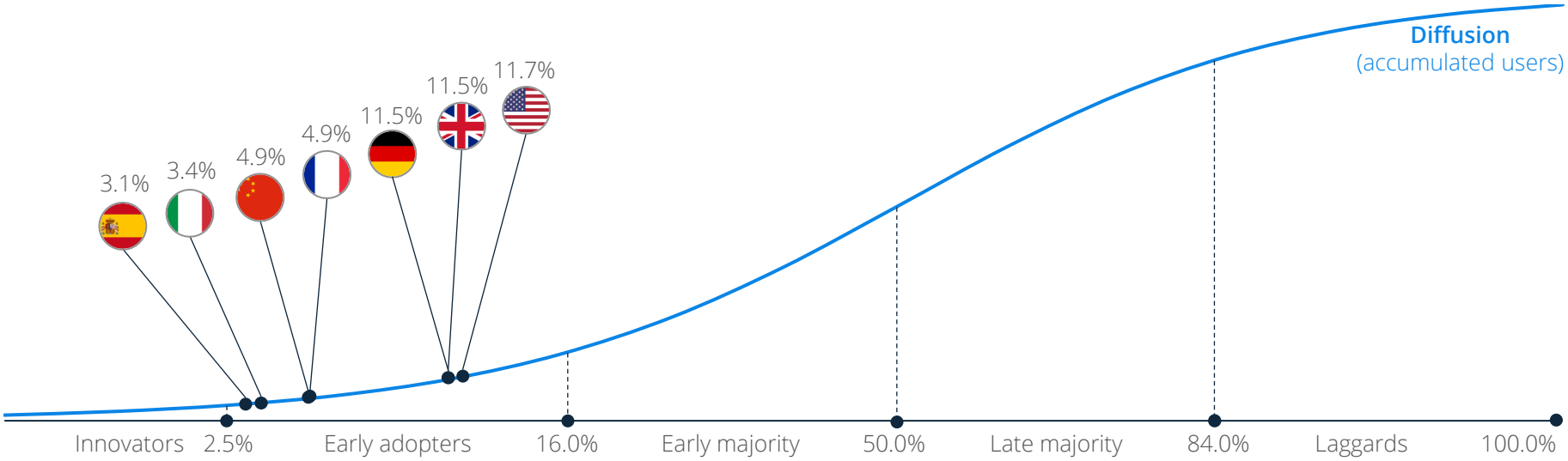


Sources: Statista Digital Market Outlook 2020

Comfort and Lighting is lingering in an early stage and still struggling to lift off in some countries

Penetration rates: innovation diffusion

Innovation diffusion curve for 2020



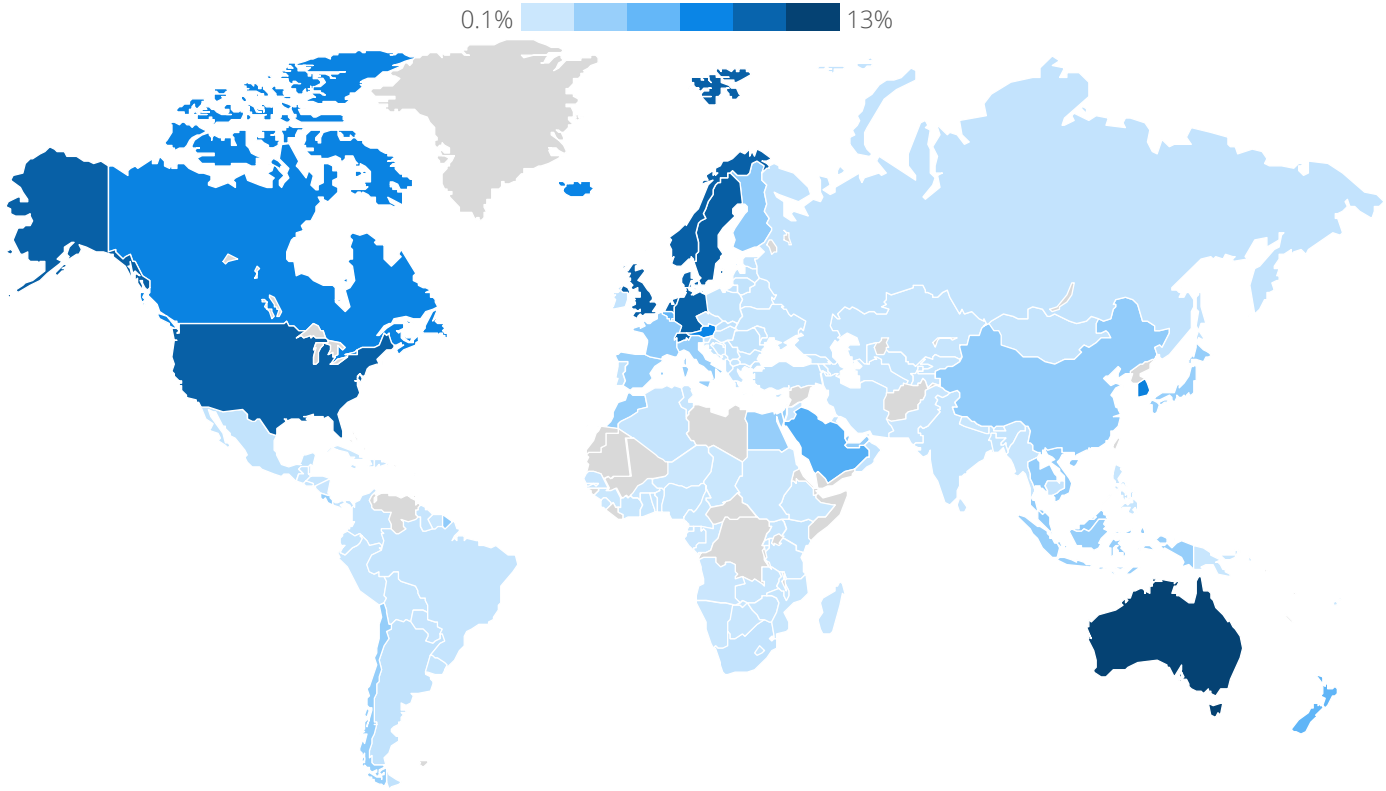
The diffusion of innovations graph shows successive groups of consumers adopting comfort and lighting products (the graph above shows the household penetration rate of selected countries). Innovations in general are not adopted by all individuals at the same time. Instead, they tend to adopt in a time sequence, and can be classified into adopter categories based on how long it takes until they begin using the service. Diffusion is considered to be the rate and volume at which innovations spread among their users (an adoption rate of 100% is theoretically possible but not realistic). The segment is mostly driven by smart bulbs, which could benefit from varied go-to-market approaches to step into mass market.

Sources: Statista Digital Market Outlook 2020

When it comes to household penetration, Australia is in the lead for Comfort and Lighting with 13%

Penetration rates: global comparison

Comfort and Lighting household penetration rate in 2020

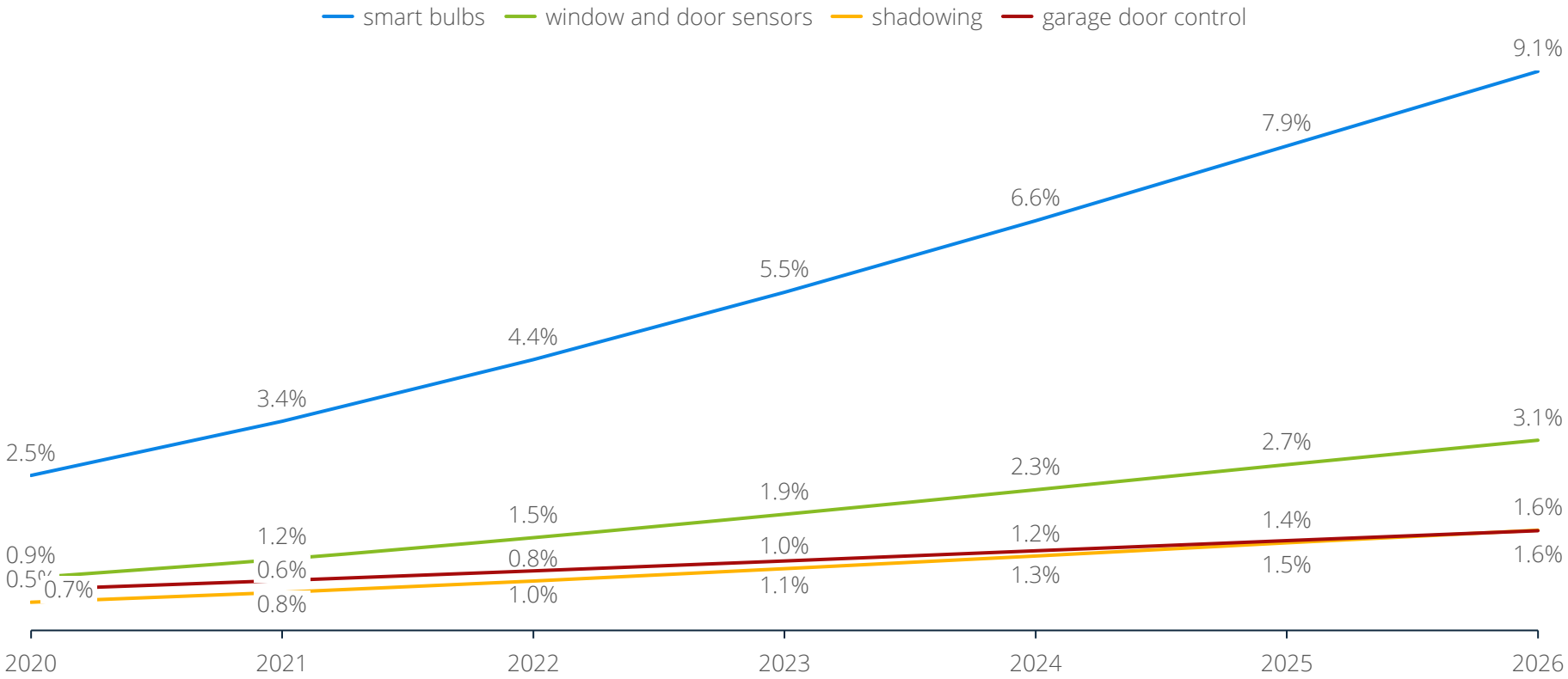


Sources: Statista Digital Market Outlook 2020

Smart bulbs drive adoption rates globally in the Comfort and Lighting segment

Penetration rates: products

Global Comfort and Lighting household product penetration rates



Note: The chart show the share of global Smart Homes with the respective product from the total number of private households of the segment.
Every Smart Home can own more than one product.
Sources: Statista Digital Market Outlook 2020

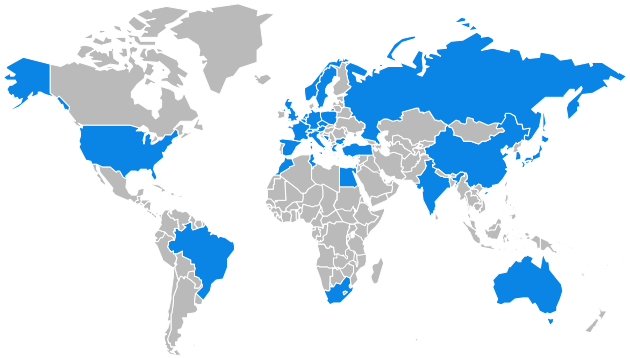
Somfy is an innovation leader in drive and control technology for home automation

Company profiles: Somfy

Key facts

Revenue:	€1.3 billion (2020)
CAGR[1]:	4.7% (19-20)
Group companies:	41 (2019)
Net profit:	€213 million (2020)
Employees:	6,679 (2020)
Headquarters:	Cluses, FRA
Founded:	1969

Global presence of group companies in 2017



Products

Somfy develops and sells drive and control technology for roller shutters, sun blinds, garage doors and yard gates. The Somfy Smart Home integrates front doors, tilt windows, lift and slide doors, swing windows, window handles, heating, lighting, cameras, smoke detectors, sun sensors, energy consumption sensors and temperature sensors. In addition to the complete TaHoma control system, the Somfy Smart Home is divided into three independent apps: Connexoon windows (roller shutters, windows), Connexoon access (garage door, alarm, exterior lighting), Connexoon terrace (awning, lighting).

Strategy

Somfy is a French company, listed on the Paris Stock Exchange and operating internationally. There are 76 subsidiaries and 51 agencies in 60 countries with a total of around 5,269 employees. With 358 employees, the German Somfy GmbH is the largest subsidiary. Somfy is now the world leader in door and window automation, for the home and building industry, with over 100 million motors sold worldwide. Somfy's target groups are end consumers, craftsmen, manufacturers of carrier products as well as architects and planners. 400 Somfy engineers are inventing new ways to experience comfort and safety in the home. As of 2019, Somfy had 2,212 registered patents.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

In 2016, Osram sold its smart home segment – among other things – to a Chinese consortium

Company profiles: Ledvance Osram (1/2)

Key facts

Revenue:	€3 billion (2020)
CAGR[1]:	9.1% (19-20)
Net income:	€271 million (2018)
Smart Home divestment:	LEDVANCE (US$2.2bn revenue 2017)
Employees:	22,042 (2020)
Headquarters:	Munich, DEU
Founded:	1919

Revenue by segments in million €

Segments	2018	2017	Change
Opto Semiconductors	1,725	1,685	2.4%
Specialty Lighting	2,224	2,312	-3.8%
Lighting Solutions & Systems	973	989	-1.7%

Products

The Osram Opto Semiconductors GmbH produces LEDs for car and stage headlights, office or street lighting, tiny LEDs for mobile terminals, semiconductor lasers, detectors and infrared diodes (IRED), e.g. for use in iris scanners or fitness wristbands. The infrared sensors from Osram Opto Semiconductors are used in safety applications in vehicles. There are two major divisions, the Lighting Solutions and the Digital Systems divisions. Digital Systems offers components for intelligent lighting solutions such as LED drivers, LED modules and lighting management systems that form the basis for efficient and networked LED solutions for smart homes.

Strategy

The Osram group is one of the leading lighting manufacturers. It is a globally active German company headquartered in Munich. The company focuses on the areas of automotive and specialty lighting, opto semiconductors, luminaires, lighting systems and solutions. The company's shares were admitted to the MDAX of the Frankfurt Stock Exchange in 2013. In 2016, Osram sold their LED department to a Chinese consortium. This divestment affected most of the smart home products and around 9,000 employees. It also led to a drawback in revenues in 2016. Ledvance will continue selling under the Osram/Sylvania brand.

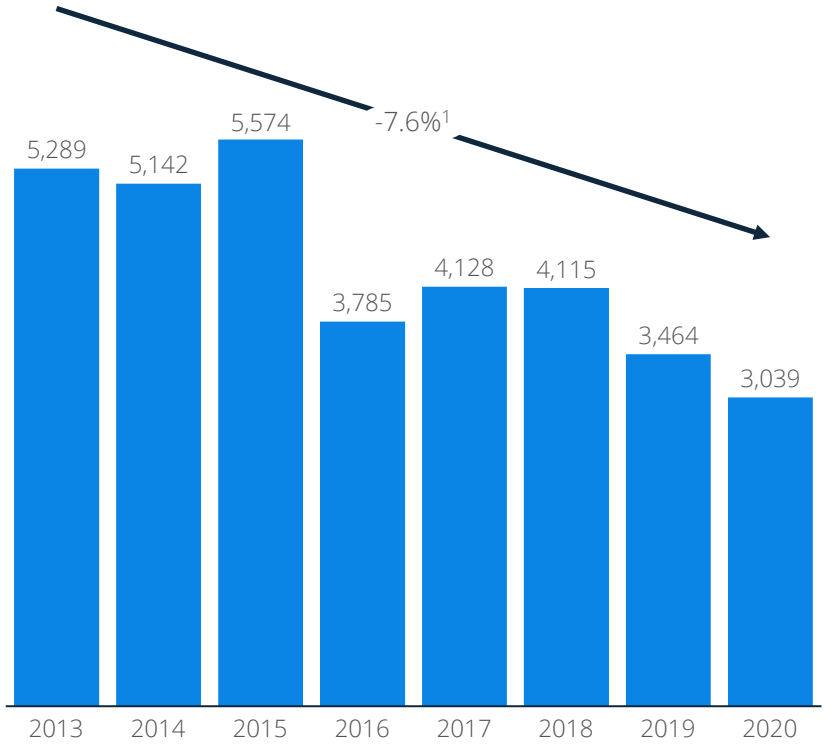
1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

The divestment of Osram led to a general revenue loss from 2013 to 2020

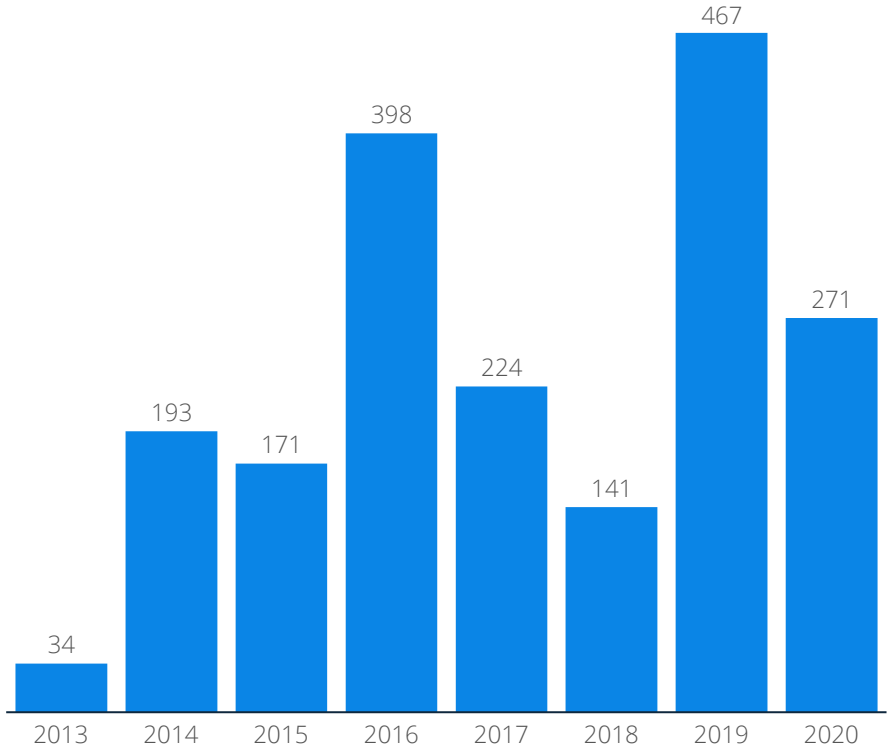
Company profiles: Ledvance Osram (2/2)

LEDVANCE OSRAM

Revenue in million €



Net income in million €



1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

LiFi Labs manufactures the LIFX light bulb line, a hub-free way for smart lighting

Start-up analysis: LIFX (Lifi Labs)

Overview

LIFX was launched in 2012 and is a line of energy-efficient, multi-color, WiFi-enabled smart LED light bulbs from Lifi Labs. LIFX started the first ever multicolored LED WiFi light over kickstarter (the company managed to raise US$1.3 million in public funding, followed by a US$12 million series A investment round in 2014) and now offers 12 products in over 80 countries with 3 offices globally. In 2015, LIFX 2.0 was launched. This included IFTTT integration, remote access, an Android Wear app and support for the Apple watch. Voice control is possible via Apple HomeKit, Amazon Alexa, Google Assistant & Microsoft Cortana. In early 2019, LIFX was acquired by the Australian IoT company Buddy Platform but continues to operate under its original company name.

Analysis

Is the product rare? ✗

For smart bulbs there are plenty of other options from brands like Philips Hue, Flux, TP-Link or GE. The differentiators are price, performance, energy consumption and design. Compared to the Philips Hue line of products, LIFX bulbs also do not require a dedicated hub.

Are there advantages compared to imitations? ✓

There is no other company that can truly show such a broad range of products and third-party support for smart lighting as LIFX. LIFX is one of the biggest brands around and their bulbs in general show good performance results. Also working without a hub is a major advantage.

Can the product withstand possible constraints? ~

The market for smart bulbs is teeming with options, but very few have the same level of quality as LIFX. Nevertheless, competition in the industry is fierce, and LIFX has to compete with the biggest brands, including Philips Hue and cheap alternatives like IKEA Tradfi.

The effects of the acquisition by Buddy Platform have yet to be assessed, whether this continues the standards of quality and innovation previously seen at LIFX. Since its founding, however, LIFX has established itself as a well-known and reputable brand in the smart lighting arena.

Sources: Company information, Crunchbase

Smart lighting can provide more living comfort and increase home security and energy efficiency

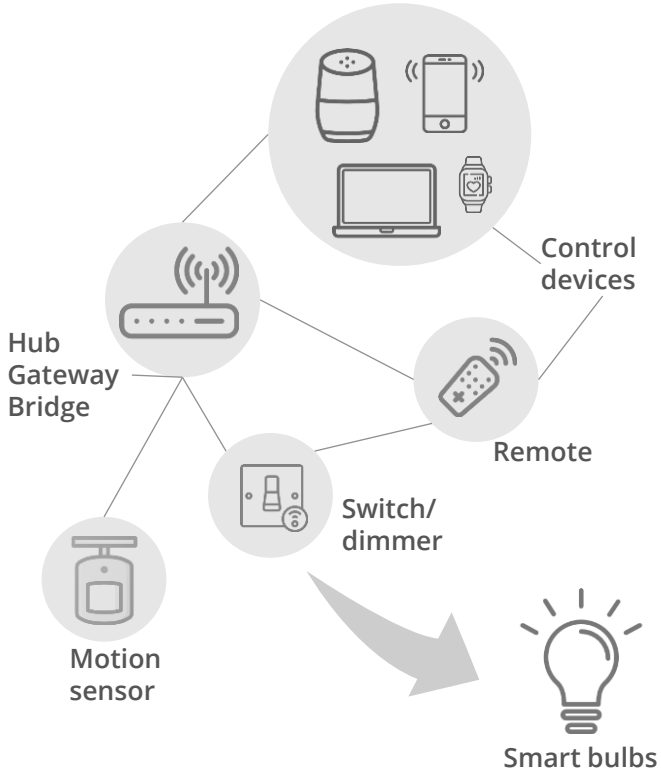
Deep dives: smart lighting ecosystem

Smart lighting advantages

Depending on the situation, smart bulbs and intelligent lighting can provide more living comfort and a better living atmosphere. There are basically three types of lighting: Basic lighting is the general illumination of a room. Square lighting concentrates on a specific area, such as the lamp above the dining table. Mood lighting can be used to set accents and highlights with spotlights. All these elements can be controlled in a networked home in such a way that they provide the desired lighting situation for every occasion.

Smart lighting also has effects on home security and energy management. Motion detectors can automatically switch the light on or the lighting system can simulate presence for example during the holiday season. Accidents are also easier to avoid if the lights always switch on automatically as soon as someone enters a dark room. With rising electricity prices, energy efficiency is also becoming increasingly important. The triumph of LED lamps is largely due to the fact that they are almost 90% more economical than conventional light bulbs. In a smart home, the energy consumption induced by lighting can be managed even more efficiently. Automatic switching off or dimming at certain times of the day prevents energy from being wasted if enough free daylight is available. With the help of sensors, lamps can even dynamically generate only as much light as necessary to supplement natural solar radiation.

Smart lighting ecosystem



Sources: Statista Digital Market Outlook 2020

ENERGY MANAGEMENT

The Smart Home segment Energy Management covers the sale of products and services for the control and reduction of energy consumption (e.g. automated heating control and timers) as well as connected sensors (e.g. temperature, sunlight, and precipitation sensors).

Photo: tado° press kit 2018

Smart Home Energy Management: products and services

Overview: segment

In-Scope

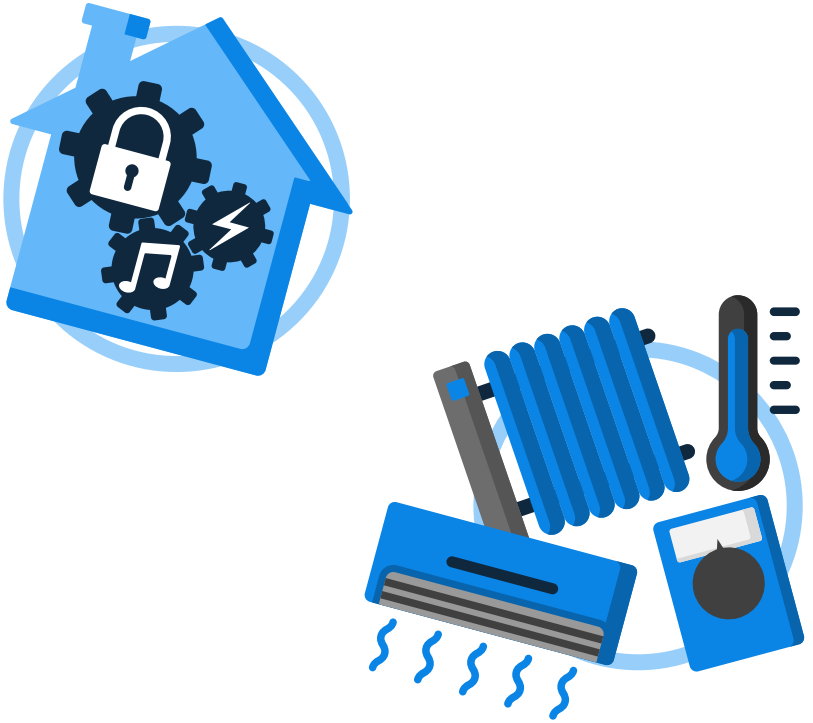
The Smart Home segment Energy Management covers the sale of products and services for the control and reduction of energy consumption. This includes:

- Thermostats, radiator controls, air condition controls
- Weather forecast services with connection to a broader smart home
- Temperature/wind/humidity sensors

Out-of-Scope

- Smart meters
- Connected household appliances (see Smart Appliances)
- B2B/C2C sales of any kind (e.g. to hotels or office buildings)

Networked light bulbs (see Comfort and Lighting) and smart sockets/plugs (see Control and Connectivity) are not included.



Sources: Statista Digital Market Outlook 2020

A major purchasing reason for Energy Management solutions are energy and cost savings

Overview: customer benefit and market development

Customer benefit

We believe that there are two major reasons for customers to purchase smart energy management solutions:

- Energy and cost savings
- Additional comfort

The energy savings aspect is mostly addressed by automated heater controls. In the U.S. and the UK we mostly see wall-mounted thermostats, while e.g. in Germany and Austria controllers are often directly mounted to the radiator. This is due to traditionally different heating systems. Such systems are capable of automatically adapting to outside and indoor temperature (e.g. when combined with sensors or external services).

This also partly tackles the need for additional comfort. Since the heating system adjusts to manual settings and individual preferences, the level of comfort is increased. Additionally, the residents are able to remotely turn off (e.g. when forgotten) or turn on the heating when returning from a longer absence.

Of course, the above-mentioned cases also apply to AC-controllers in the cooling case.

Market size and future development

The global Smart Home Energy Management market has a size of US$6.2 billion in 2020 and is still emerging. Growth has been driven by tech companies like Nest, Google Home or Samsung SmartThings.

In the U.S. Energy Management solutions generated revenues of about US$2.02 billion in 2020. As the market in the U.S. is driven by expensive thermostats (e.g. Nest) and AC-controls, we see growth rates shrinking to an overall CAGR[1] of 0.17% up to 2026, reaching a total market volume of US$5.2 billion.

In Europe, the share of Energy Management solutions in the Smart Home market is significant. With US$1.98 billion in 2020, the European market is nearly as big as its U.S. counterpart. Within Europe, Germany is the leading force pulling the whole region to an average annual growth rate of more than 14.9% and a total market size of US$1.4 billion by 2026. This development is due to high trust in solutions by utility companies entering the segment.

Revenues in China are by far the smallest with US$0.8 billion in 2020. In China, the segment itself is still quite small but due to strong growth, it is a driver of the whole Smart Home market. The market will face the strongest average growth rate of 18.8% p.a. and will reach US$2.4 billion by 2026.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Energy Management products are used for measuring and controlling temperature and air conditioning

Overview: product examples

Smart energy management solutions

The main market driver in this segment are smart thermostats in combination with AC and radiator controls, which enable digital temperature measurement and control. Temperature adjustments can be made from anywhere, room-by-room, via internet-enabled devices. Some models, like the Nest thermostat (third generation) can even learn routines, like when people leave the house in the morning and when they go to sleep at night. The thermostat then adjusts the temperature to different day and night activities. Over time the heating system can adapt to suit these needs, without the owner's interaction. The systems also include location-based features that can track a phone's position and turn the heating on or off depending on the GPS location. Also built-in sensors enable to detect whether a person is at home or not.

Some devices also measure different air conditions, like the Netatmo Air Quality Monitor. It measures the indoor air pollution, the noise level for sound sleeping or the humidity level, which is especially interesting for people with special diseases like asthma.

Another product which is included in the Energy Management segment are weather services specialized for smart home use cases. These services and devices use home coordinates to calculate precise forecasts taking surrounding weather stations into account. The information about the local weather conditions can then be used in home-automation schemes, for example with the Bloomsky Sky2 or the Loxone Weather Service.

Photo: Netatmo (left: Smart Thermostat; right: Indoor Module) 2018

Photo: tado° (Smart Radiator Thermostat) 2018

Photo: Nest (3rd gen thermostat) 2018

Sources: Company information, press kits / press releases (Nest, Netatmo, tado°)

Future smart Energy Management solutions will be part of a broader integrated system

Overview: assumptions and trends

Assumptions

Our forecasts are based on fairly moderate rises in energy prices. If unforeseeable events like the oil crises repeat themselves, we will see a rise in product sales in the Energy Management segment. Currently, we do not see indications for such a rise. Moderately rising energy prices and a decentralized energy provision are still the main global drivers.

The situation in the Chinese market is fairly uncertain. According to recent surveys by GFK, customers are highly interested in smart home solutions. However, since household income is spread heterogeneously, average device prices are low. There is a strong gap in prosperity between the citizens in central and peripheral areas. With the Chinese government pushing environmental initiatives as a consequence of pollution disasters, there will be a relevant interest in energy solutions, leading to one of the highest average growth rates.

The revenue share of services in the overall Energy Management market is significantly lower than the contribution of hardware sales. Although there are some paid services (cloud services, weather forecasting solutions), we believe that vendors will soon have to include these solutions into their broader integrated systems, making software services the order winner rather than an additional revenue stream.

While the first smart homes were high-value mansions, new plug-and-play solutions drive prices down and thus open the market for middle class households. Many stand-alone solutions will only exist for a short time as they will soon be part of a patchwork integrated system.

Trends

While the eye of early adopters was set on newly invented smart speakers, we can now see the main part of the market shifting from tech companies to traditional players in the energy management sector. In order to prepare for the mass market, traditional companies either build up products and business units or they acquire innovative tech companies (e.g. British Gas' acquisition of AlertMe).

With more and more households using energy management solutions, the barrier to equip one's house with more complicated systems is lowered. While smart homes now focus on preserving energy we can expect a shift towards energy storage and production. This is also due to the fact that renewable energies will become inevitable in the long run as fossil resources are limited.

Energy production and storage is especially interesting where traditional distribution channels have to cover long distances and where conditions are favorable (many hours of sunlight, thermal springs, etc.).

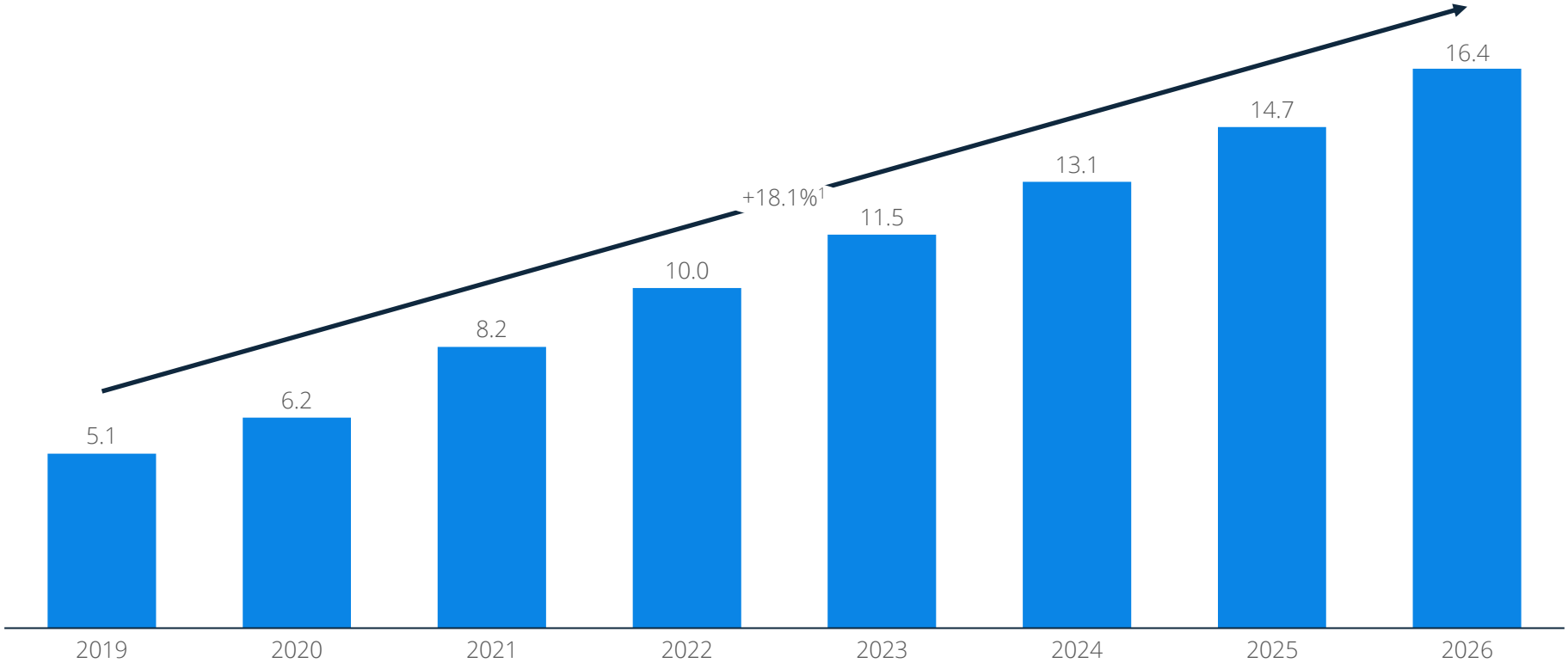
We also see high potential for the integration of electric vehicles into a smart home, because they serve the grid as a power storage medium, e.g. at night. Such solutions are already available, offered by companies such as the German start-up sonnen.

Sources: Statista Digital Market Outlook 2020

The Smart Home Energy Management segment shows global revenues of US$6.2 billion in 2020

Market sizes: global

Global revenue forecast in billion US$

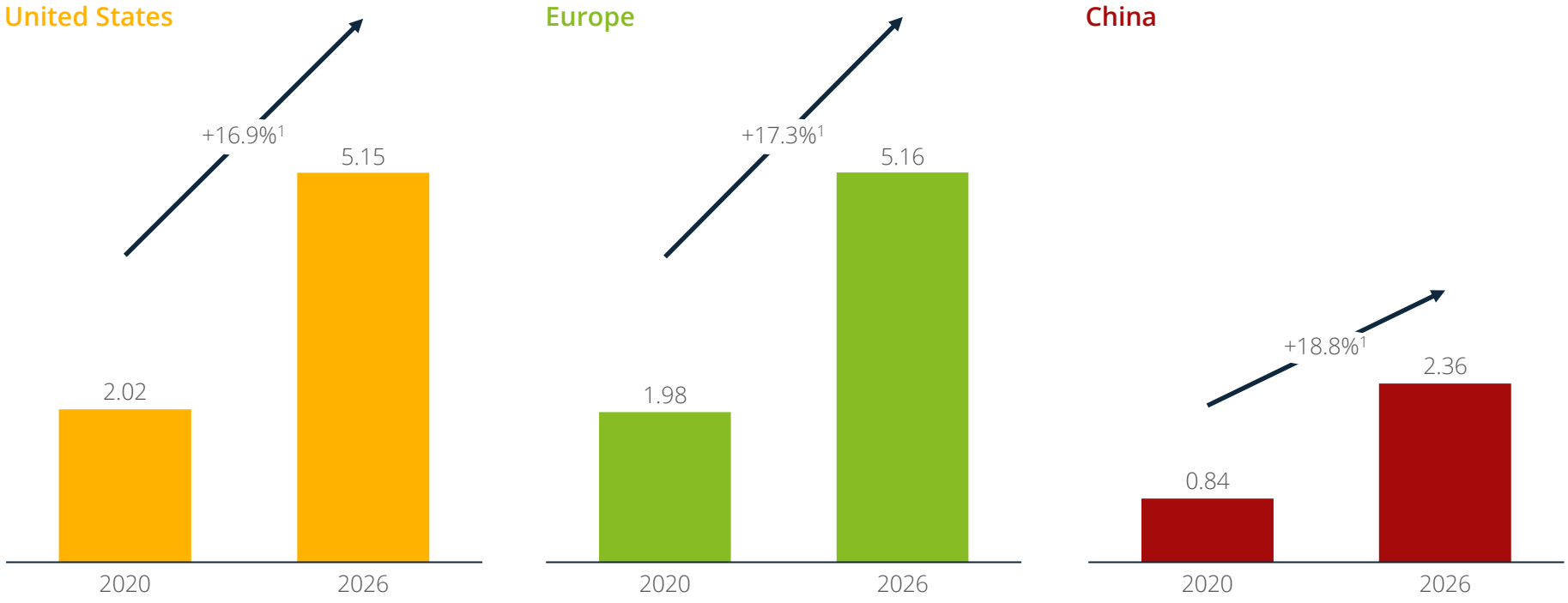


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

The U.S. and Europe have similarly sized markets for Energy Management in 2020

Market sizes: regional comparison (1/2)

Revenue forecast in billion US$

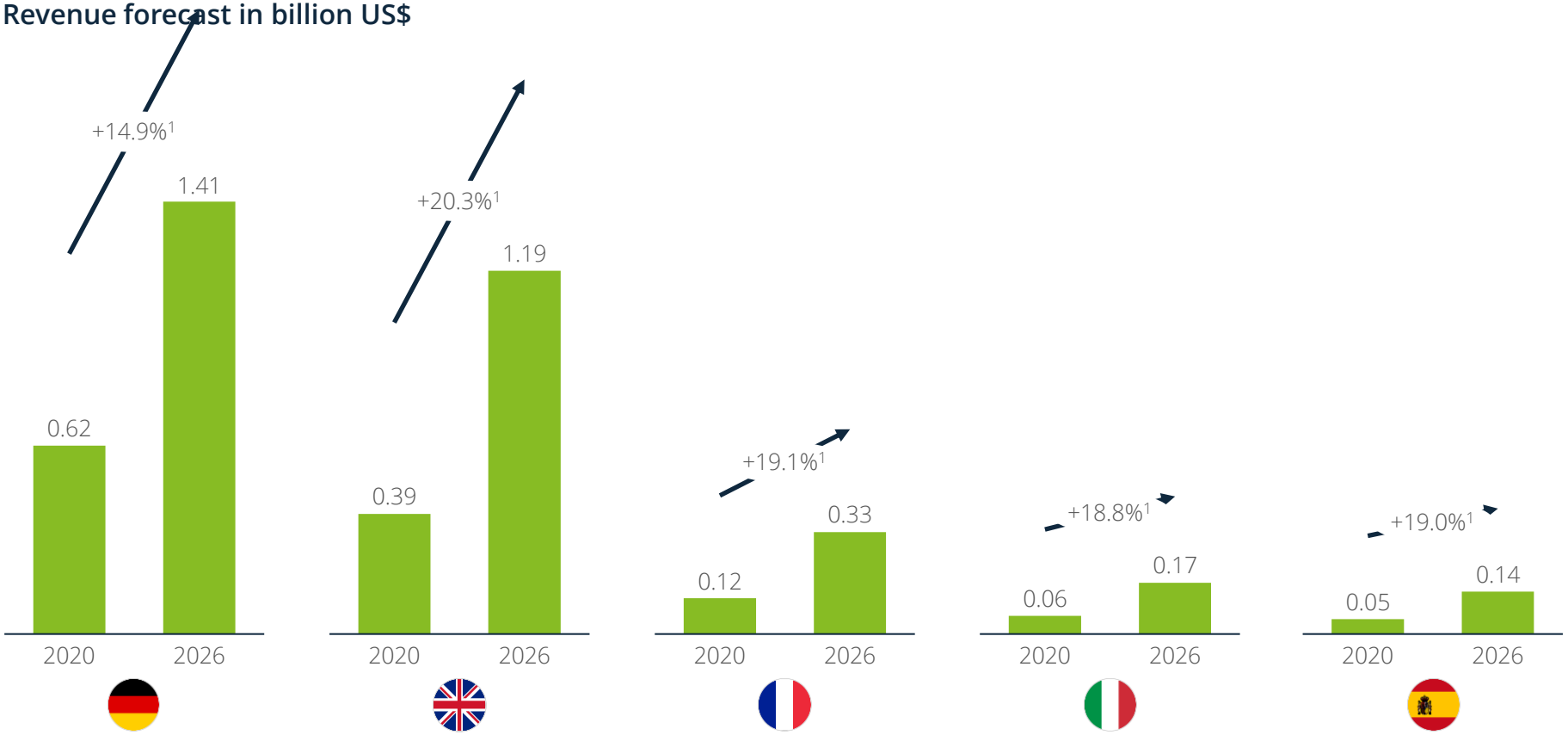


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

Within Europe, Germany is the leading force in terms of Energy Management revenues

Market sizes: regional comparison (2/2)

Revenue forecast in billion US$

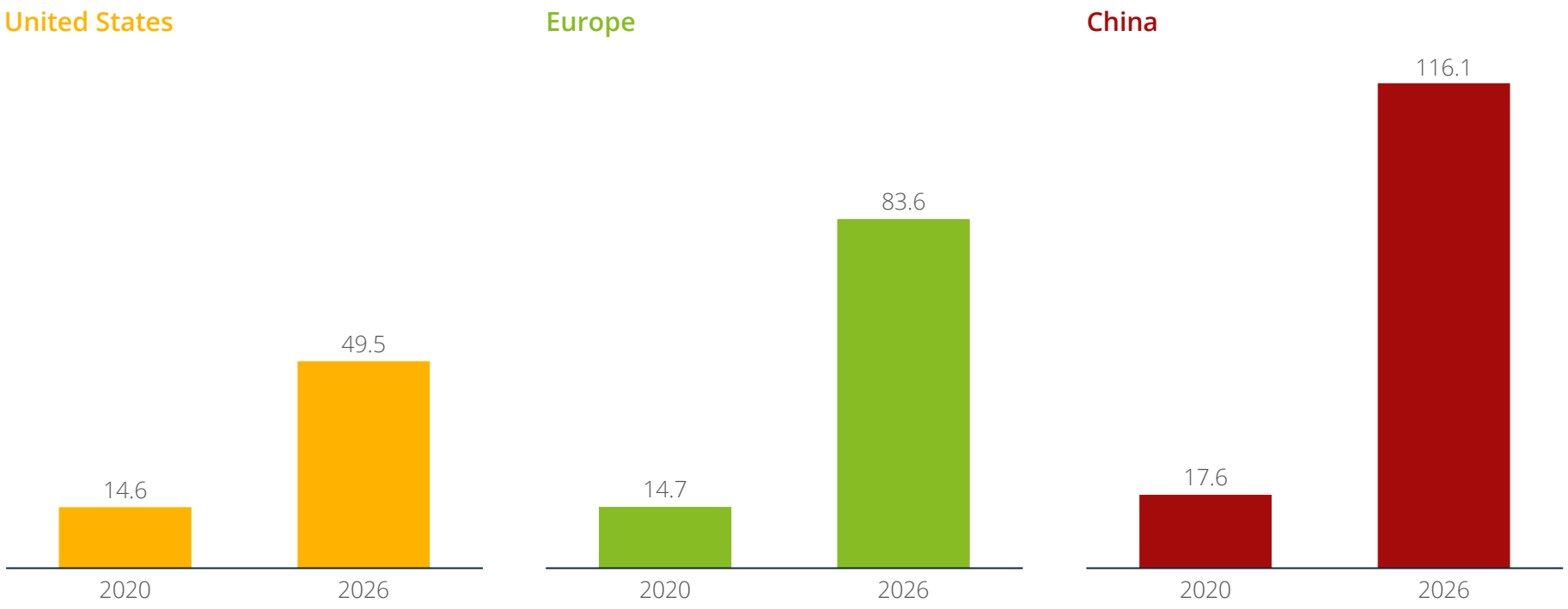


1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Statista Digital Market Outlook 2020

In this segment, there is currently an almost equal number of smart homes in the U.S. and Europe

Number of smart homes: regional comparison (1/2)

Number of smart homes forecast in million

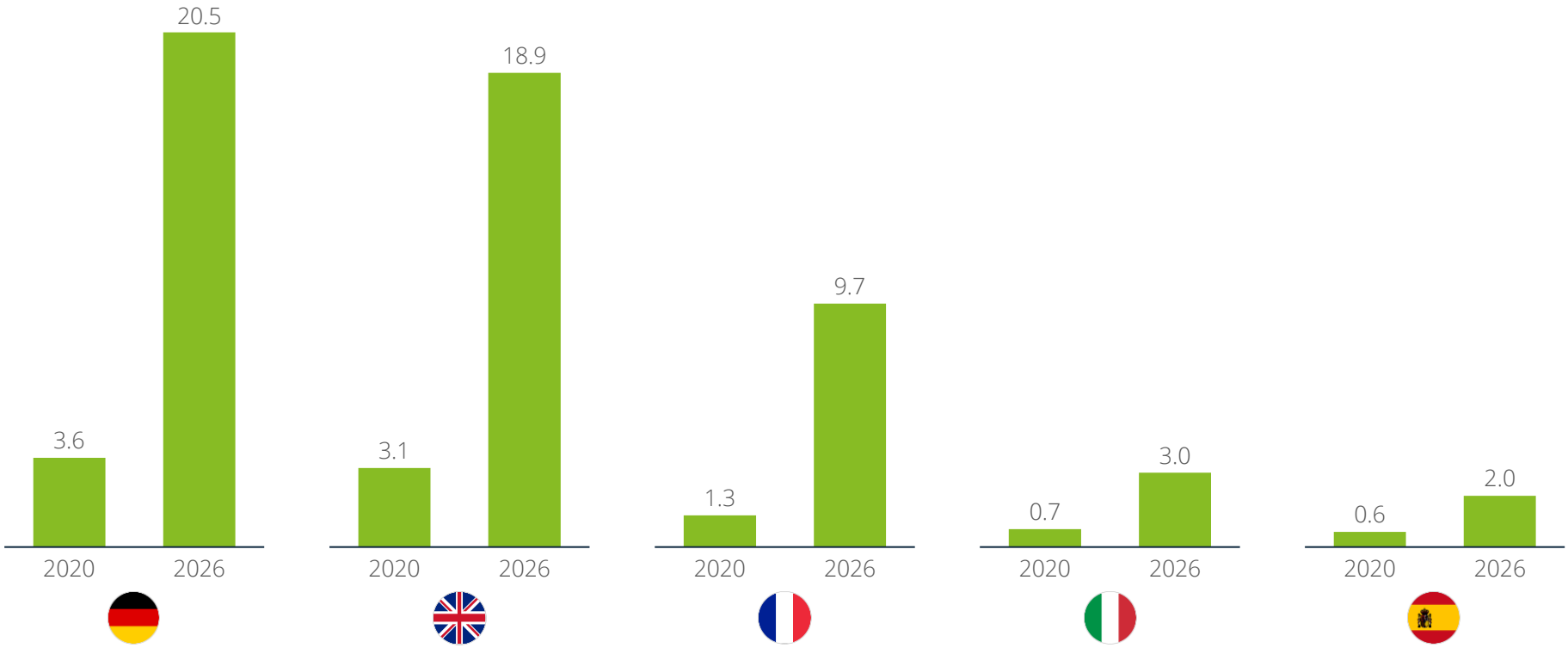


Sources: Statista Digital Market Outlook 2020

Sustainable Energy Management is particularly relevant in Germany and the UK

Number of smart homes: regional comparison (2/2)

Number of smart homes forecast in million

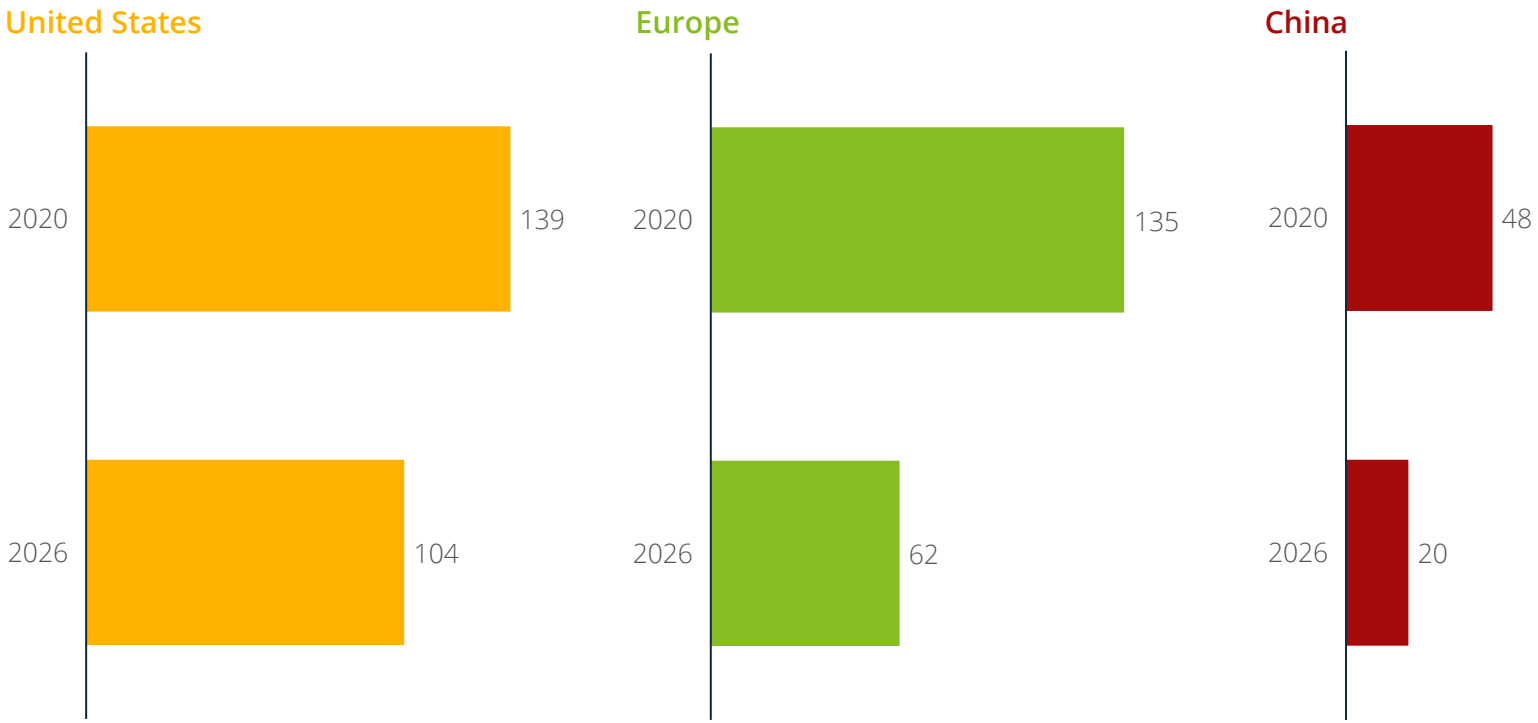


Sources: Statista Digital Market Outlook 2020

Out of the three regions, Europe shows the highest average revenue per smart home in 2020

Average revenue per smart home: regional comparison (1/2)

Average revenue per smart home forecast in US$

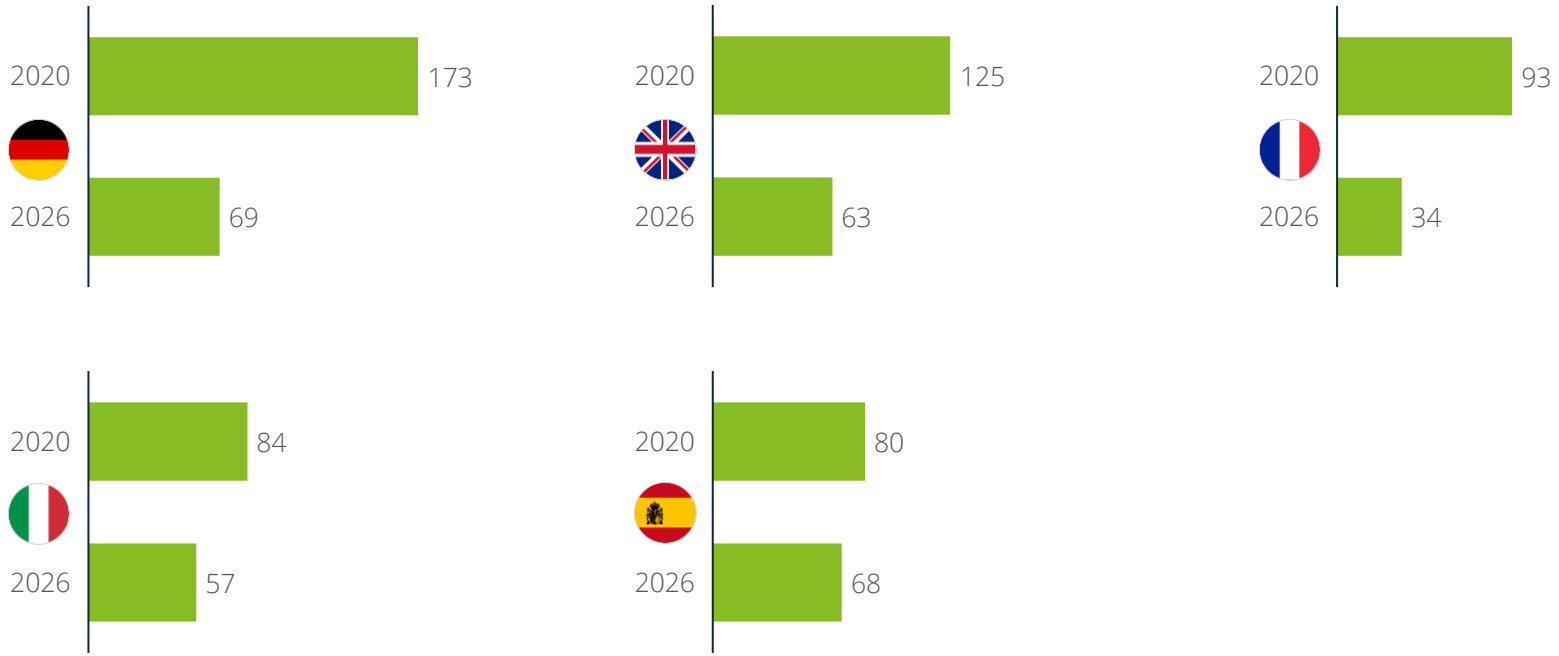


Sources: Statista Digital Market Outlook 2020

Germany will have the highest average revenue per smart home by 2026

Average revenue per smart home: regional comparison (2/2)

Average revenue per smart home forecast in US$

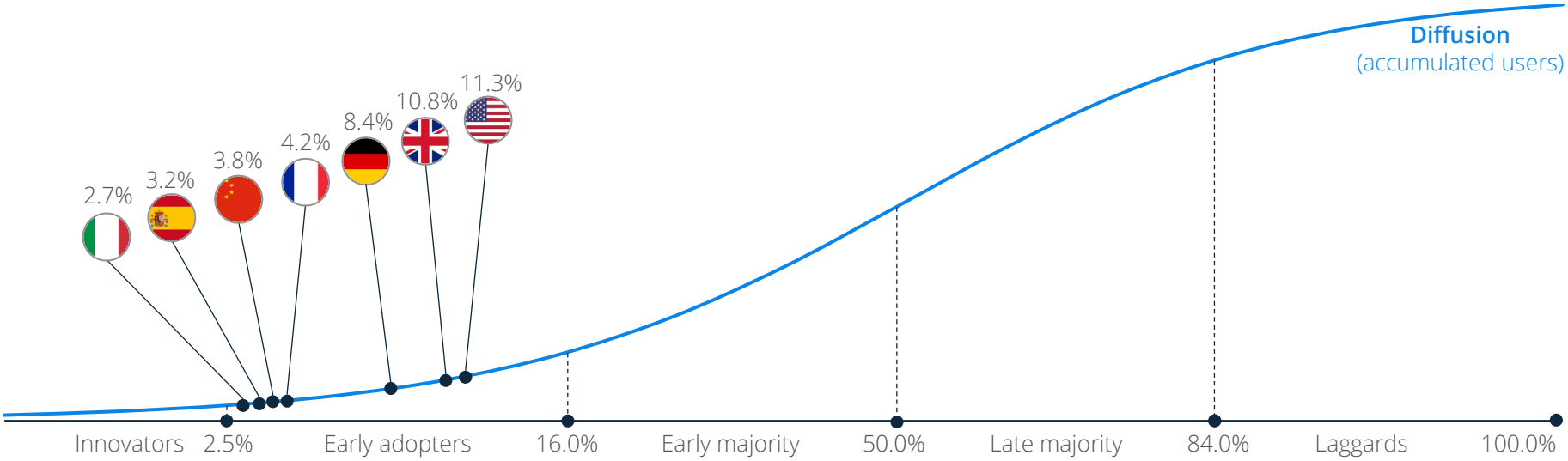


Sources: Statista Digital Market Outlook 2020

Smart Energy Management devices promise great saving potential but still lack mass adoption

Penetration rates: innovation diffusion

Innovation diffusion curve for 2020



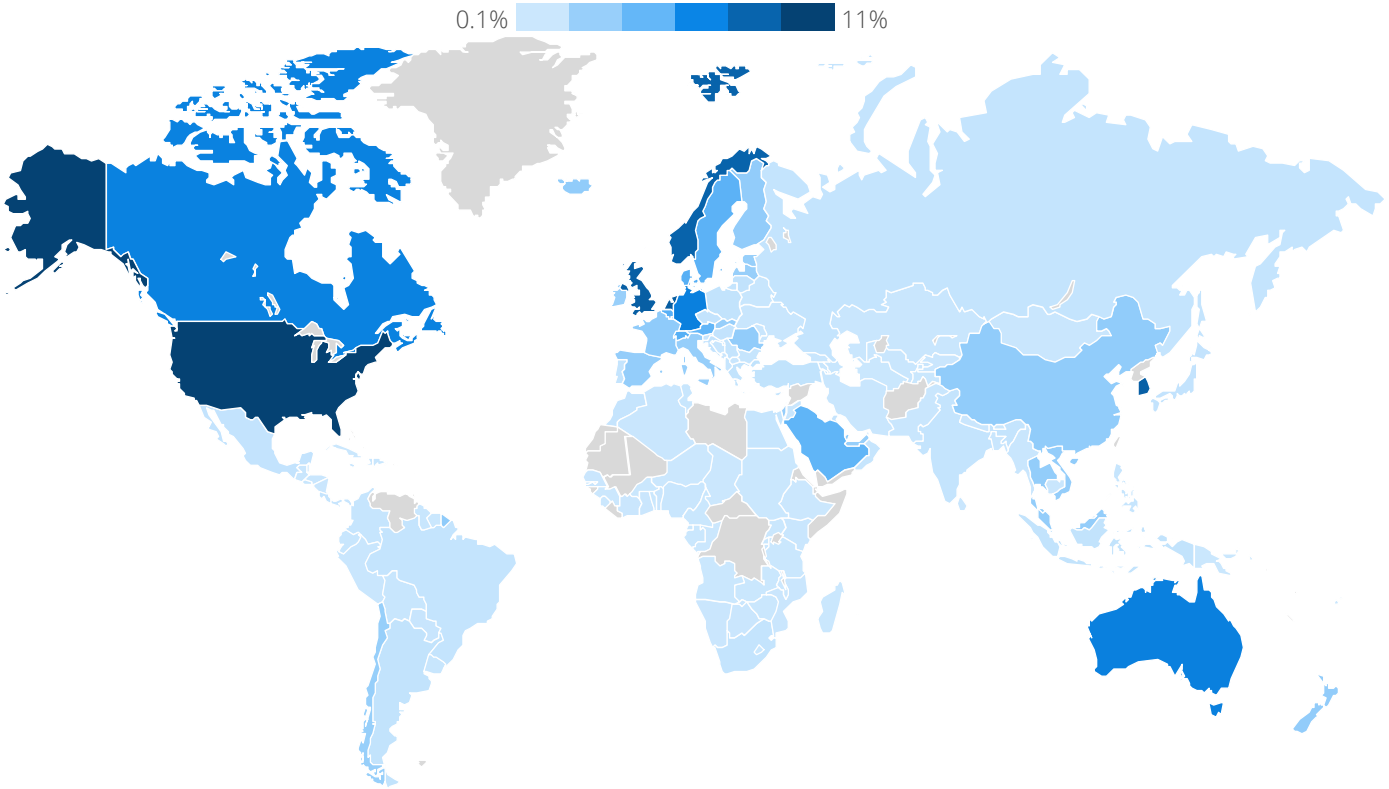
The diffusion of innovations graph shows successive groups of consumers adopting energy management devices (the graph above shows the household penetration rate of selected countries). Innovations in general are not adopted by all individuals at the same time. Instead, they tend to adopt in a time sequence, and can be classified into adopter categories based on how long it takes until they begin using the service. Diffusion is considered to be the rate and volume at which innovations spread among their users (an adoption rate of 100% is theoretically possible but not realistic). Manufacturers and service providers have to decide which features will drive differentiation and revenues to foster growth in the segment.

Sources: Statista Digital Market Outlook 2020

In terms of household penetration, the U.S. and the Netherlands lead the Energy Management market

Penetration rates: global comparison

Energy Management household penetration rate in 2020

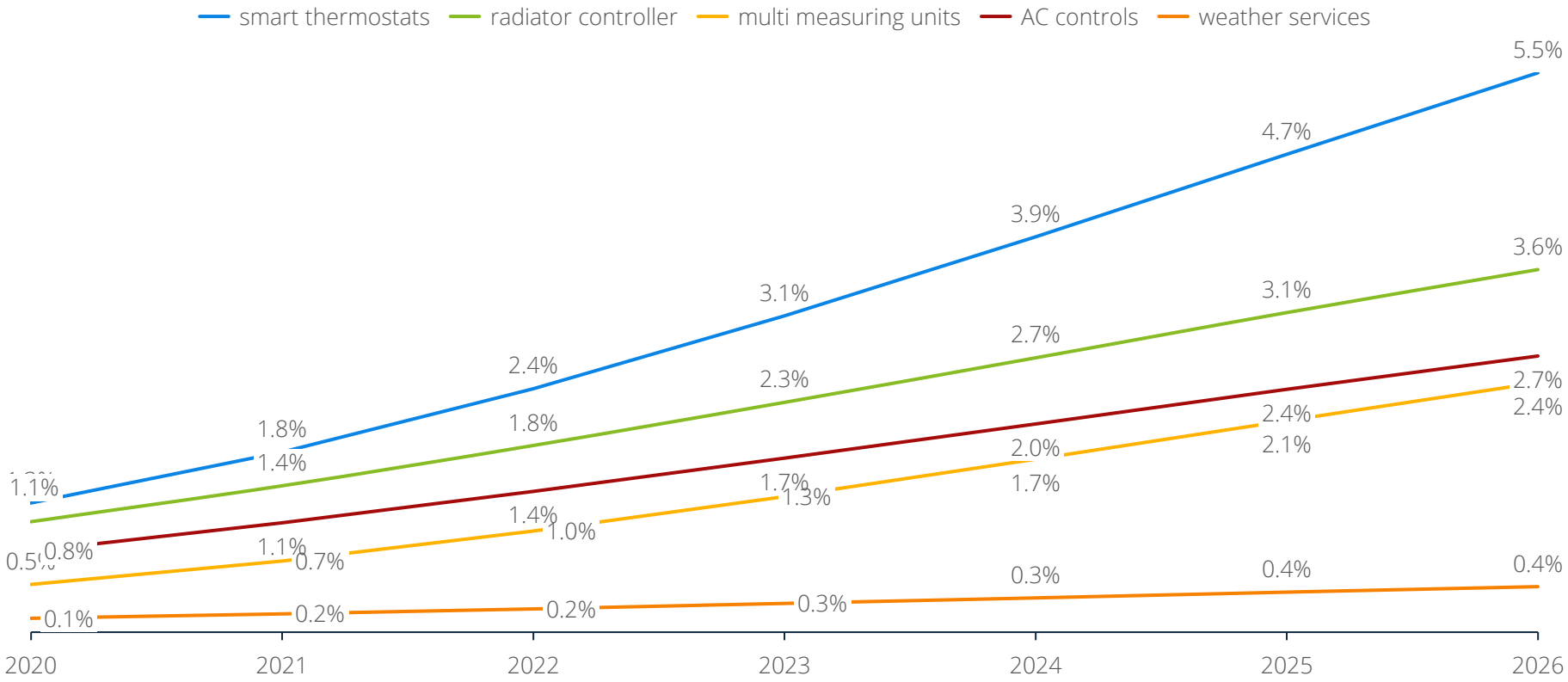


Sources: Statista Digital Market Outlook 2020

Smart thermostats drive adoption rates globally in the Energy Management segment

Penetration rates: products

Global Energy Management household product penetration rates



Note: The chart show the share of global Smart Homes with the respective product from the total number of private households of the segment.
Every Smart Home can own more than one product.
Sources: Statista Digital Market Outlook 2020

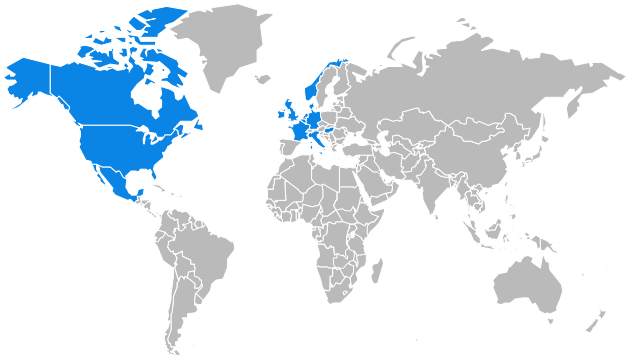
Hive is one of the largest smart home providers in the UK, owned by multinational energy group Centrica

Company profiles: Hive (Centrica)

Key facts

Group revenue:	£24.4 billion (2020)
Group CAGR[1]:	-9% (19-20)
Home Solutions revenue:	£74 million (2019)
Home Solutions CAGR[1]:	10% (18-19)
Employees:	26,825 (2020)
Headquarters:	Windsor, UK (Hive in London)
Founded:	1997 (Hive in 2013)

Global presence (Company offices)



Hive products

The main devices offered by Hive include a smart thermostat, lightbulbs, motion sensors, and smart plugs, all of which operate on an interconnected system that links to a central hub. The smart thermostat allows customers to control heating and hot water in their homes via the company's website or app. It is possible to set up to 6 time slots for heating and hot water to fit with daily routines. With the help of geolocation, the Hive thermostat knows if the customer has gone out and left the heating on. It can then send a reminder to turn it off. Hive is the only UK-based connected homes company that provides an end-to-end service, including the creation and installation of devices.

Strategy

Centrica is a British multinational energy and services company and supplies consumers and businesses in the UK, Ireland and North America with electricity and gas. Centrica owns British Gas and is therefore the largest supplier of gas to domestic customers. In 2013, Centrica established Hive as part of its Home Solutions offering, building on its remote heating control service provided through British Gas. In 2015, Centrica also acquired AlertMe, another UK-based home tech company. AlertMe provided the platform for connected homes. The acquisition gave British Gas ownership and control over a tech platform, development capability, data analytics and a patent portfolio.

1: CAGR: Compound Annual Growth Rate / average growth rate per year
Sources: Company information

Agenda

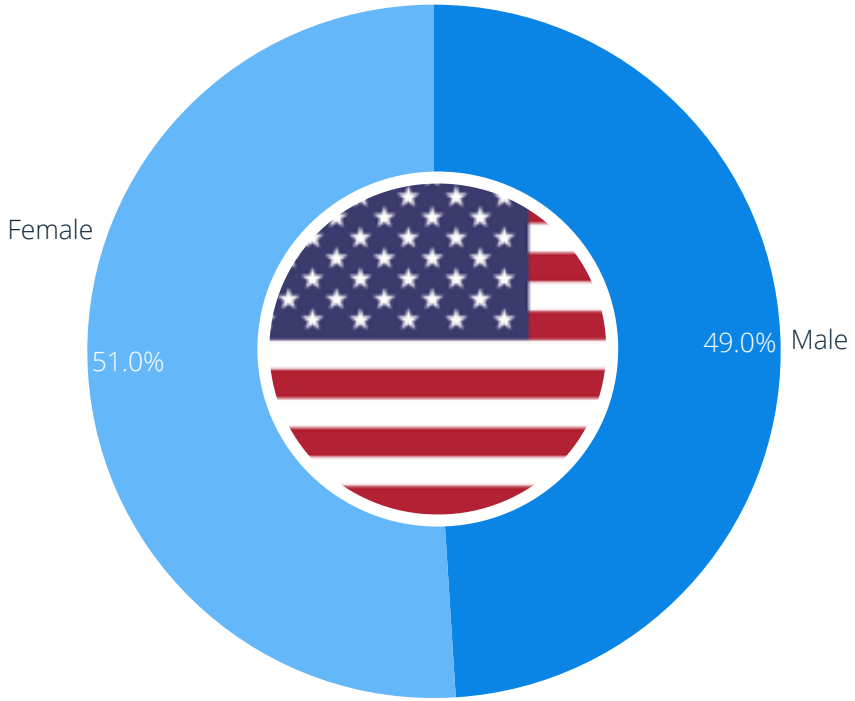
APPENDIX

Detailed consumer information is one key factor for describing market developments precisely. In this appendix, we give detailed information on three different user characteristics: the age, income, and gender distribution of users. The data is based on Statista's Global Consumer Survey. Furthermore, we provide an overview of the market structure presented in this report.

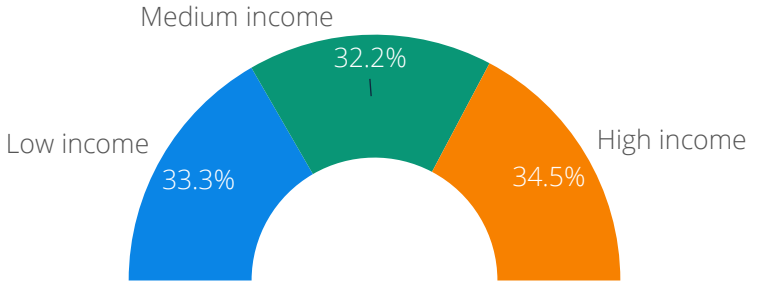
Smart Home user demographics US

Statista Global Consumer Survey

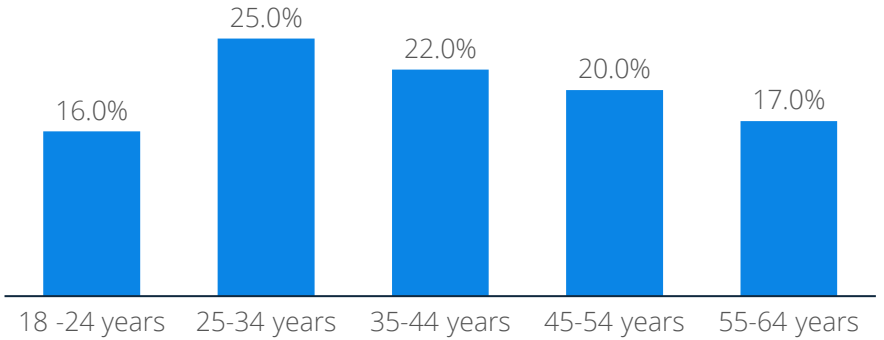
Users by gender



Users by income



Users by age

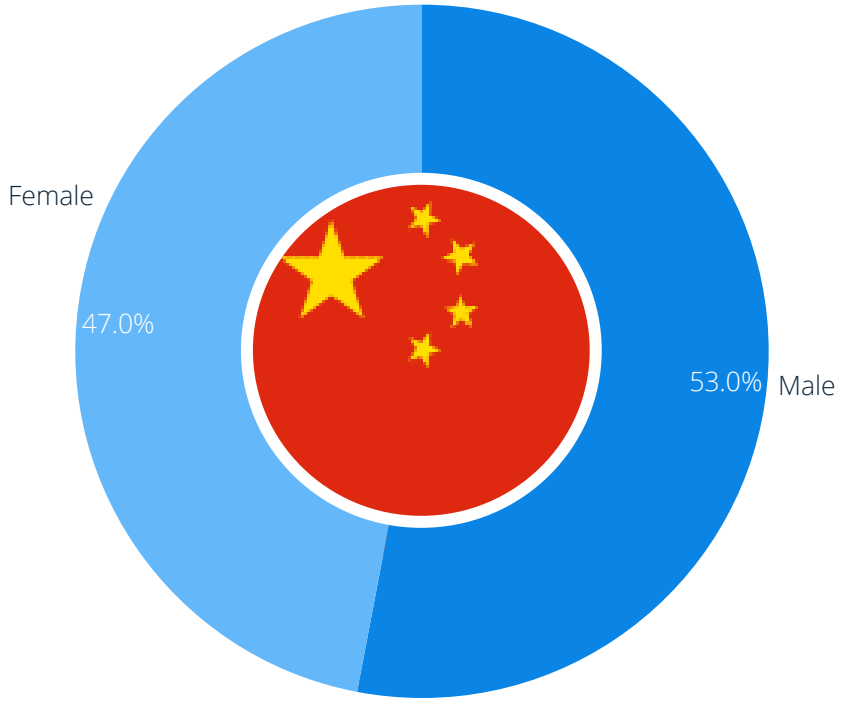


Sources: Statista Global Consumer Survey as of October 2020

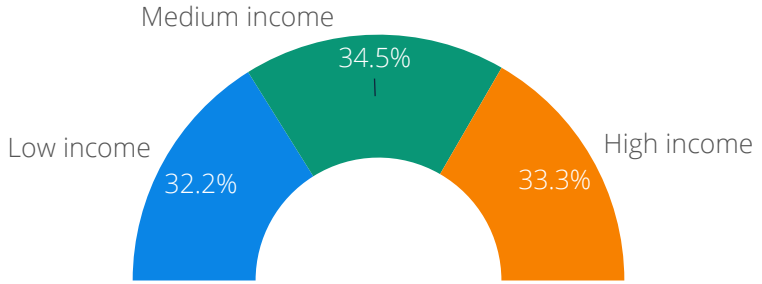
Smart Home user demographics China

Statista Global Consumer Survey

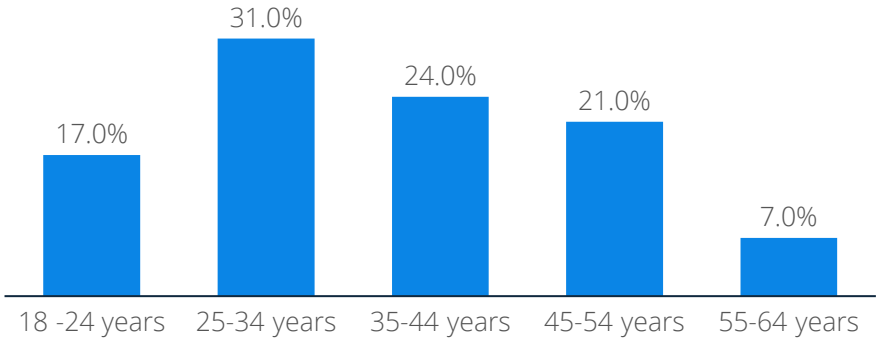
Users by gender



Users by income



Users by age

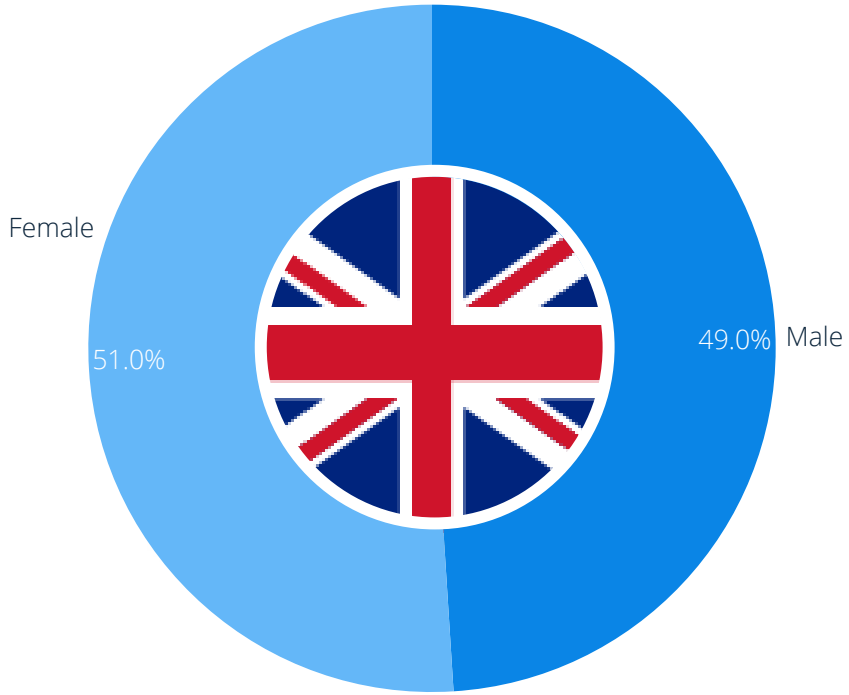


Sources: Statista Global Consumer Survey as of October 2020

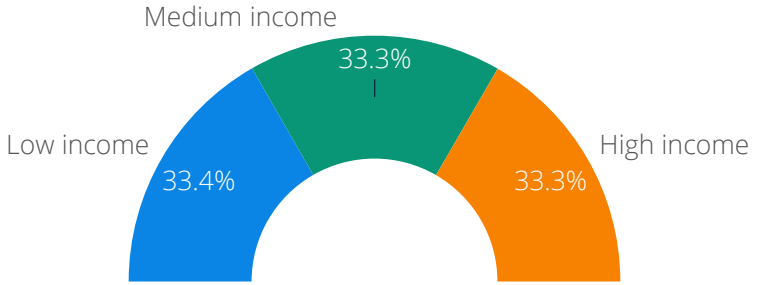
Smart Home user demographics UK

Statista Global Consumer Survey

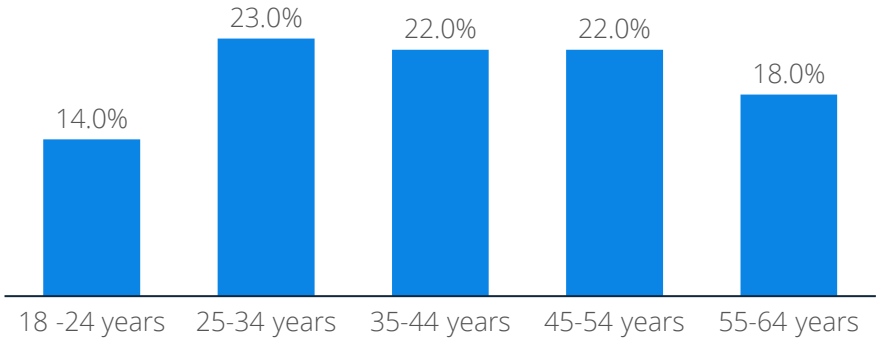
Users by gender



Users by income



Users by age

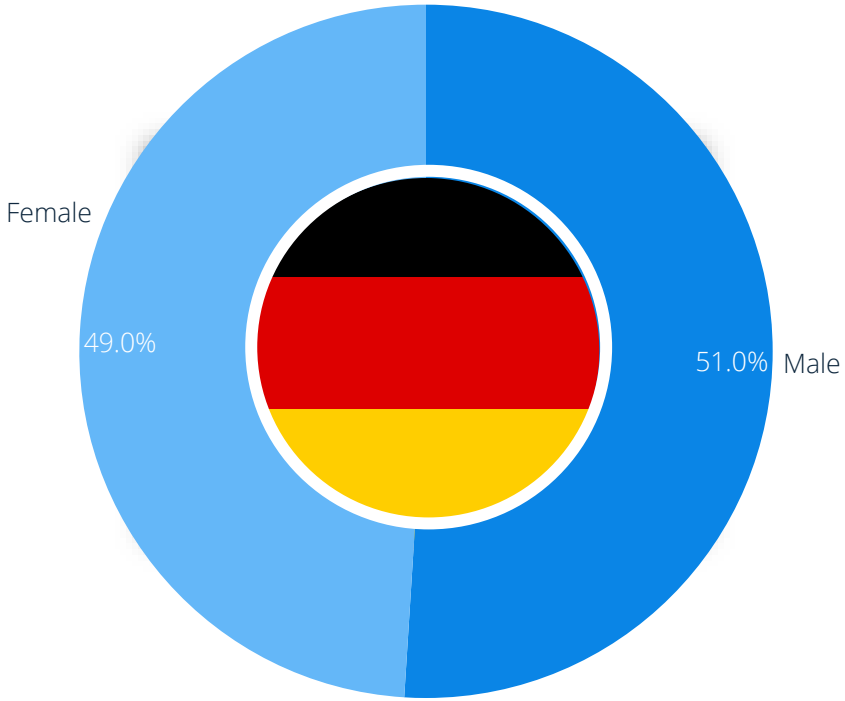


Sources: Statista Global Consumer Survey as of October 2020

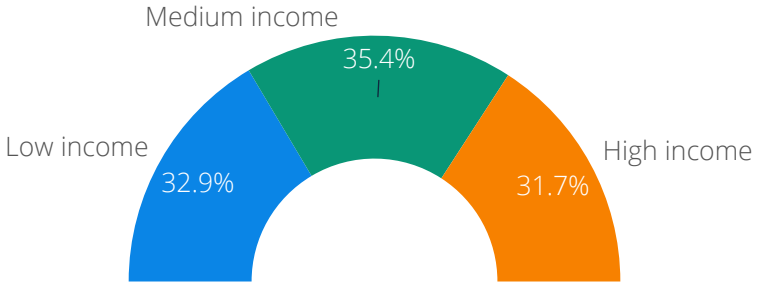
Smart Home user demographics Germany

Statista Global Consumer Survey

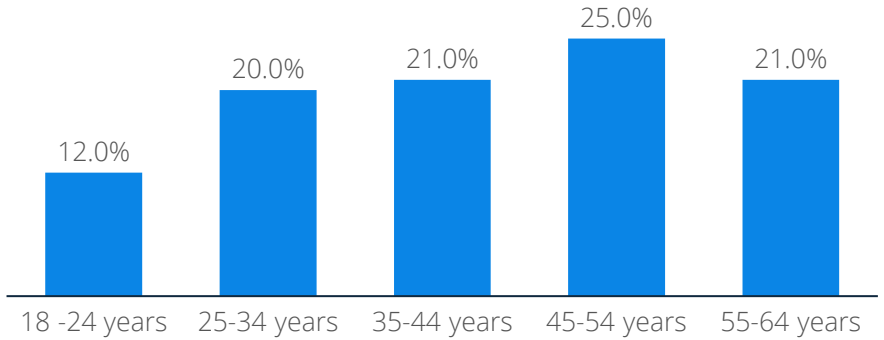
Users by gender



Users by income



Users by age

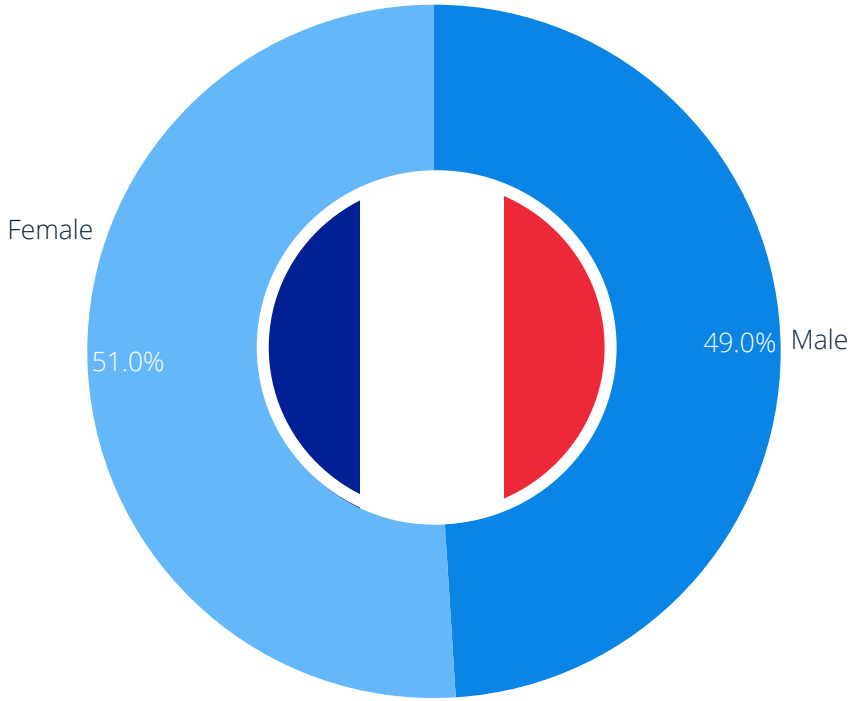


Sources: Statista Global Consumer Survey as of October 2020

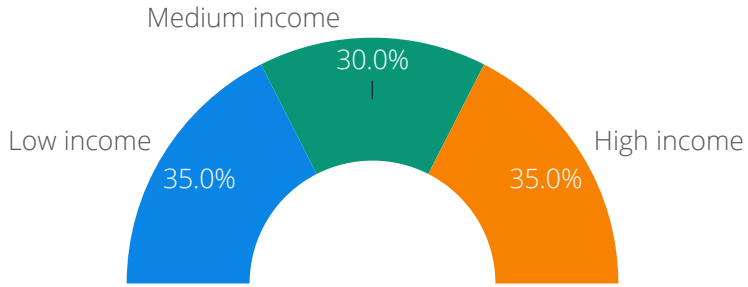
Smart Home user demographics France

Statista Global Consumer Survey

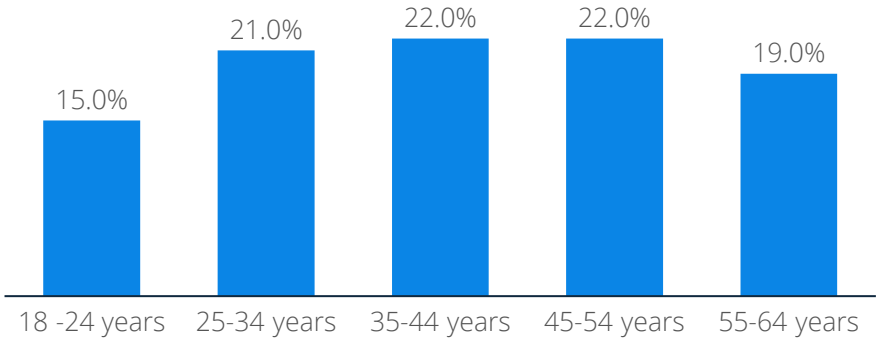
Users by gender



Users by income



Users by age

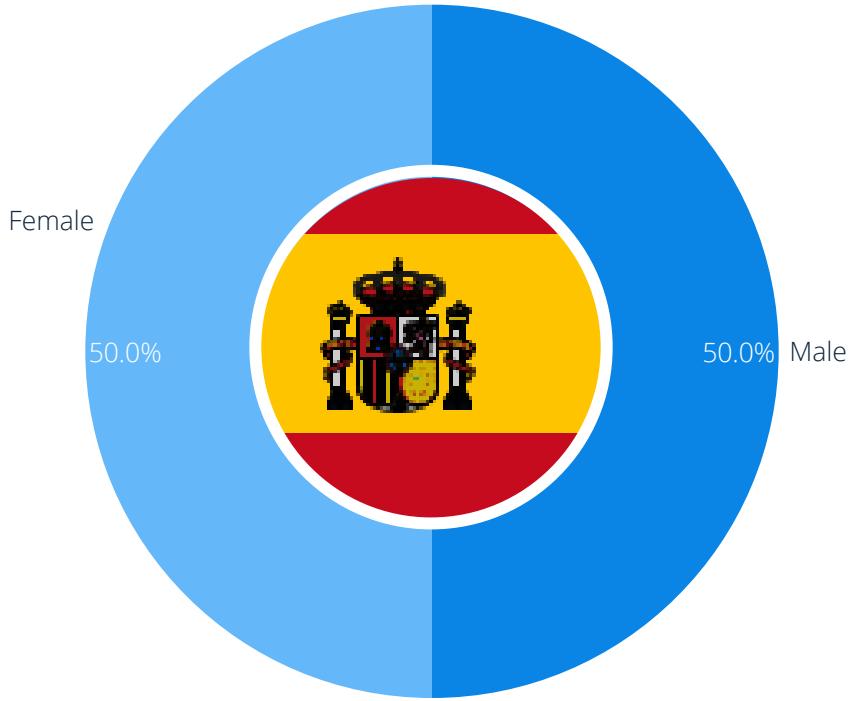


Sources: Statista Global Consumer Survey as of October 2020

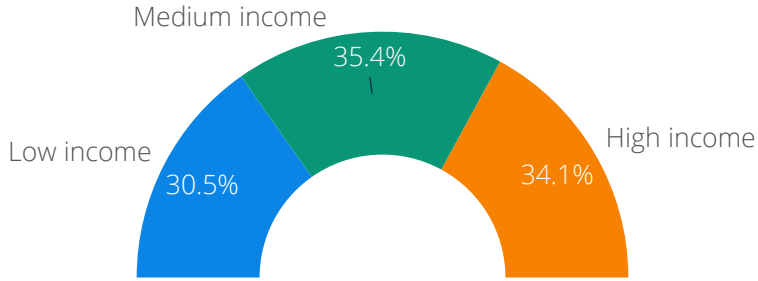
Smart Home user demographics Spain

Statista Global Consumer Survey

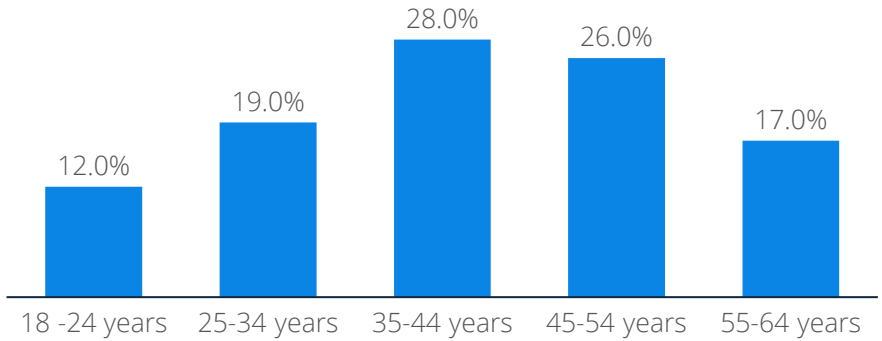
Users by gender



Users by income



Users by age

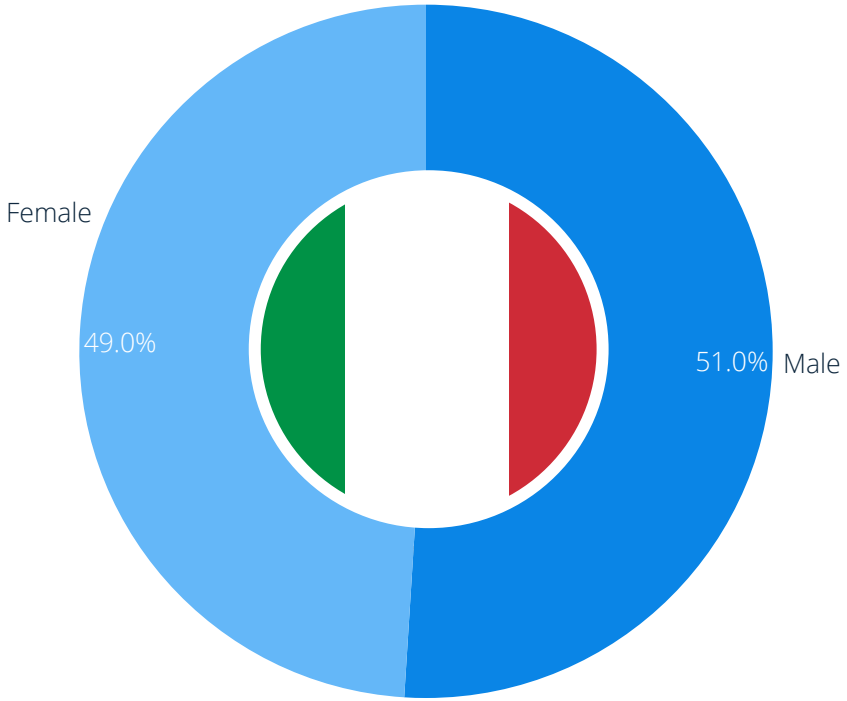


Sources: Statista Global Consumer Survey as of October 2020

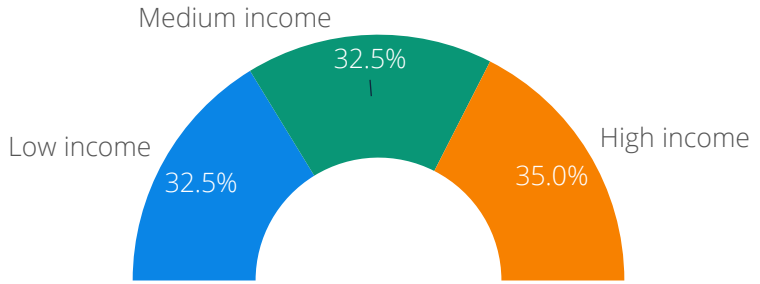
Smart Home user demographics Italy

Statista Global Consumer Survey

Users by gender



Users by income



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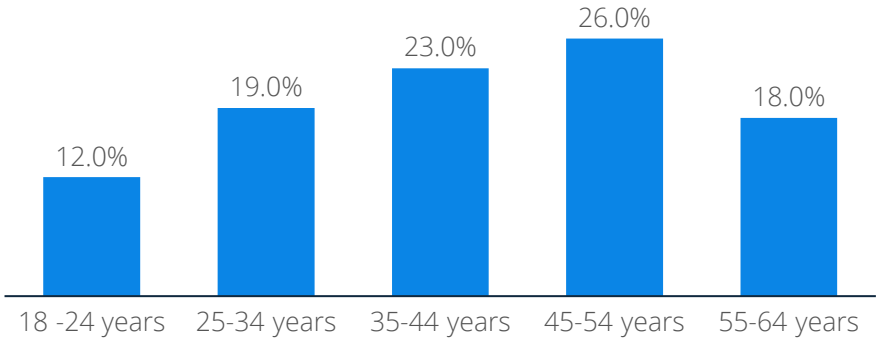


Sources: Statista Global Consumer Survey as of October 2020

Control and Connectivity market structure

Segment		Out of scope
Control and Connectivity	Gateways/hubs that are capable of controlling devices of all segments Smart speakers with a primary focus on control, and digital assistants Control buttons and smart plugs/sockets	Connected home appliances (see Smart Appliances) Multiroom speaker systems with a primary focus on entertainment (see Home Entertainment) Smartphones and tablets B2B/C2C sales of any kind (e.g. to hotels or office buildings)

Smart Appliances market structure

Segment		Out of scope
Smart Appliances	Large appliances such as fridges, washing machines, dish washers, ovens Small appliances such as coffee machines, vacuum and mowing robots, microwaves	Any other smart home device (partially also referred to as “appliances”) Any non-connected household appliances B2B/C2C sales of any kind (e.g. to hotels or office buildings)

Security market structure

Segment		Out of scope
Security	Digitally connected and controlled devices for burglar prevention and other security issues Motion sensors, door locks, security cameras, Hazard prevention devices like water or smoke sensors	Remote surveillance and emergency services from specialized security firms Classical security devices without smart home connection B2B/C2C sales of any kind (e.g. to hotels or office buildings)

Home Entertainment market structure

Segment		Out of scope
Home Entertainment	Various multiroom entertainment systems (audio and/or video) with a primary focus on entertainment (e.g. Sonos)	Classical entertainment devices without smart home connection
	Streaming devices (e.g. Amazon Fire TV stick, Google Chromecast)	Smart TVs and receivers without smart home integration
	Entertainment remotes	Smart speakers with a primary focus on control and connectivity (Amazon Echo, Google Home etc.)
		B2B/C2C sales of any kind (e.g. to hotels or office buildings)

Comfort and Lighting market structure

Segment		Out of scope
Comfort and Lighting	Sensors and actuators (e.g. door and window sensors, shutters and shading devices, garage door controls) Connected and remote controllable light sources (smart bulbs)	Control buttons, gateways/hubs, programmable or controllable power sockets (see Control and Connectivity) B2B/C2C sales of any kind (e.g. to hotels or office buildings)

Energy Management market structure

Segment		Out of scope
Energy Management	Thermostats, radiator controls, air condition controls Weather forecast services with connection to a broader smart home Multi measuring units with temperature/wind/humidity sensors	Smart meters Connected household appliances (see Smart Appliances) B2B/C2C sales of any kind (e.g. to hotels or office buildings) Networked light bulbs (see Comfort and Lighting) and smart sockets/plugs (see Control and Connectivity)

About the Statista Digital Market Outlook

Included in the Corporate Account

80+ markets

150+ locations

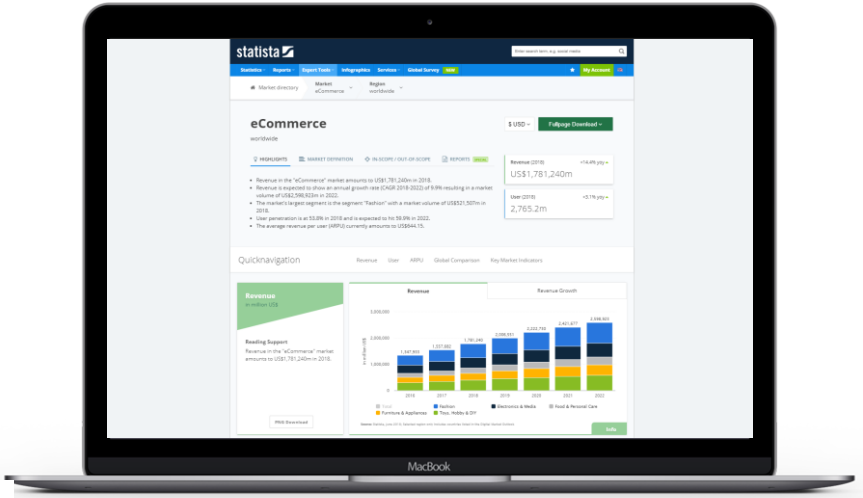
9 years (2017–2026)

30,000+ interactive statistics

The **Digital Market Outlook** presents up-to-date figures on markets of the digital economy. The comparable key figures are based on extensive analyses of relevant indicators from the areas of society, economy, and technology.

What is the size of the eCommerce fashion market in Spain?
How much is spent on social media advertising in India?

The answers to these and many more questions can be found in the Statista Digital Market Outlook. It provides forecasts, detailed market insights, and key indicators for the digital economy.



- Seven digital verticals: eCommerce, Smart Home, Digital Media, eServices, FinTech, Digital Advertising, eHealth
- Direct access & downloads, fully integrated into the Statista database
- Market insights, forecasts, and key performance indicators
- Outlook reports with segment-specific topics (top companies, trends, deep dives)

Find out more on www.statista.com/outlook/digital-markets

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About the Statista Advertising & Media Market Outlook

Included in the Corporate Account

13+ markets

46+ locations

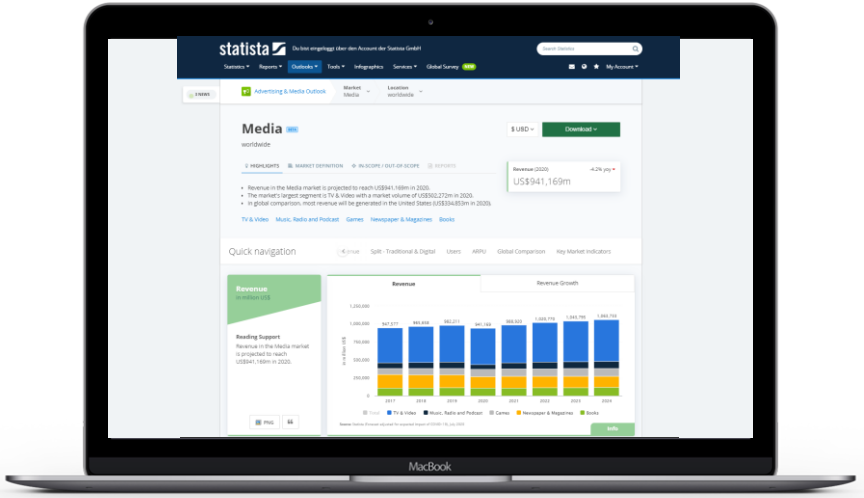
9 years (2017–2026)

15,000+ interactive statistics

The **Advertising & Media Outlook** presents up-to-date figures on digital and traditional advertising & media markets. The comparable key figures are based on analyses of indicators from the society, economy, and technology.

What is the size of the Traditional TV Advertising Market in Europe?
How much is spent on Digital Music in China?

The outlook answers these and many more questions with detailed forecasts, market insights, and key indicators.



- Eight advertising segments: TV & Video Advertising, Search, Social Media, Out-of-Home, Digital Banner, Print, Audio, Digital Classifieds
- Five media segments: TV & Video, Music, Radio and Podcast, Games, Newspaper & Magazines, Books
- Direct access & downloads, fully integrated into the Statista database
- Market insights, forecasts, and key performance indicators

Advertising

Media

Find out more on www.statista.com/outlook/advertising-media

statista

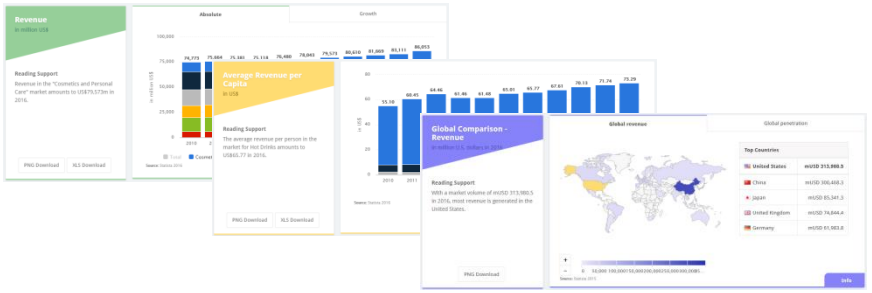
About the Statista Consumer Market Outlook

Included in the Corporate Account

200+ markets | **150** countries | **14** years (2012–2026) | **50,000+** interactive statistics

The **Consumer Market Outlook** presents the key performance indicators sales, revenues, and prices of the most important consumer markets worldwide. Our specialized analysts' market calculations are based on data from validated sources.

- Revenues, volume sales, prices, and forecasts
- More than 200 product categories in up to 150 countries
- Covering the period 2012 to 2026



- Accessories
- Alcoholic Drinks
- Apparel
- Consumer Electronics
- Beauty & Personal Care
- Eyewear
- Food
- Footwear
- Furniture
- Home & Laundry Care
- Hot Drinks
- Household Appliances
- Non-Alcoholic Drinks
- OTC Pharmaceuticals
- Luxury Goods
- Tissue & Hygiene Paper
- Tobacco Products
- Toys & Hobby

Find out more on www.statista.com/outlook/consumer-markets

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About the Statista Mobility Market Outlook

Included in the Corporate Account

Everything you need to know about the future of mobility!

The **Mobility Market Outlook** combines key mobility topics and provides relevant figures and forecasts of both the automotive market and mobility services on a global scale. We understand, measure, and predict market behavior and share the results with you.

Passenger Cars:

- Over 140 relevant car makes (brands)
- 12 international car classes

Motorcycles:

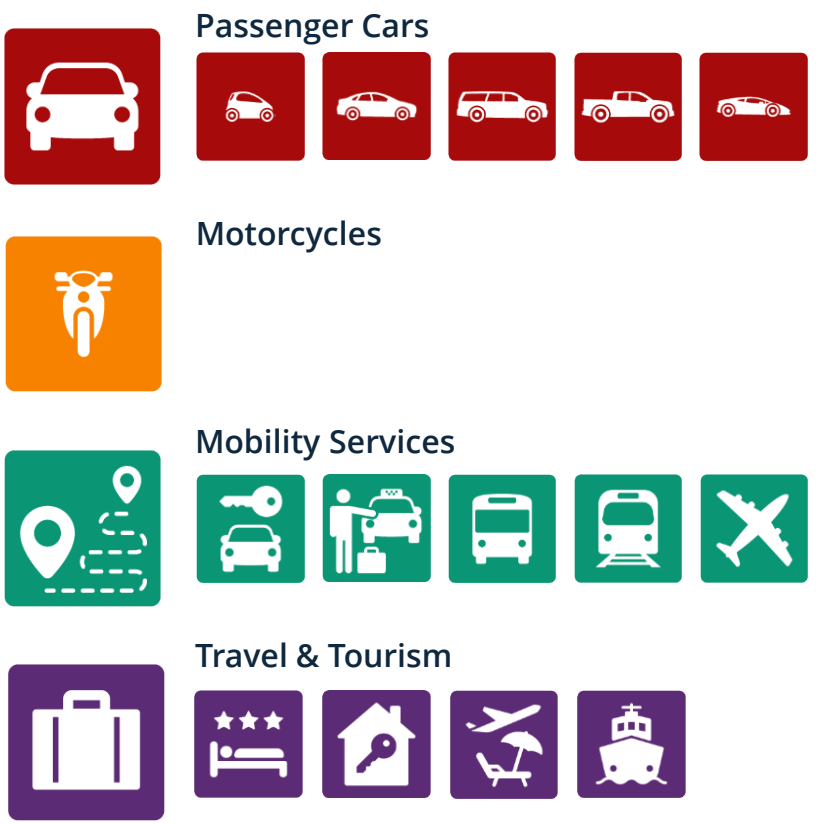
- Over 30 leading motorcycle makes (brands)

Mobility Services:

- Car rentals, ride-hailing & taxi, car- and bike-sharing
- Bus, train, and plane tickets

Travel & Tourism:

- Hotels and vacation rentals
- Cruises and package holidays



Find out more on https://www.statista.com/outlook/mobility-markets

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About the Statista Technology Market Outlook

Included in the Corporate Account

Get actionable data now

The **Technology Market Outlook** constitutes an intuitive tool and provides you with valid and comparable information about different technology markets, which can be processed immediately.

The Technology Market Outlook gives a clear, structured, and transparent overview of the key performance indicators, e.g., revenues and market shares, of the most important technology markets.

- 150 countries and 24 regions worldwide
- 50+ of the most relevant technology markets
- The most important KPIs
- Market developments and forecasts up to 2026

- Hardware
- Public Cloud
- Software
- IT Services
- Communication Services (COMING SOON)
- New Tech (COMING SOON)
- Cybersecurity (COMING SOON)
- Internet of Things (COMING SOON)

Find out more on www.statista.com/outlook/technology-outlook

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About the Statista Global Consumer Survey 2021

Included in the Enterprise Account

50+ topics & industries

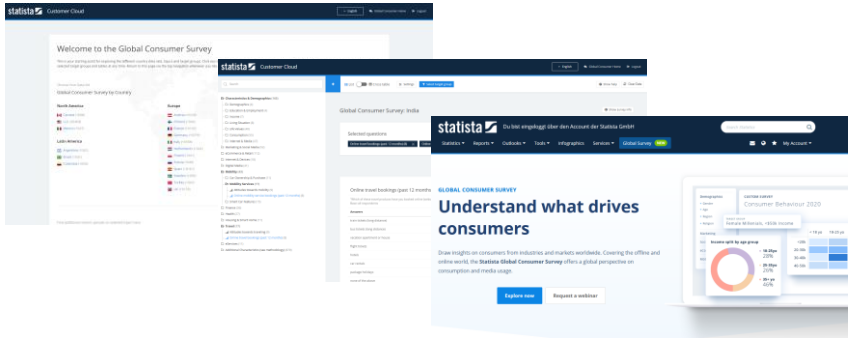
56 countries

11,500+ int. brands

1,000,000+ interviews

The **Statista Global Consumer Survey** offers a global perspective on consumption and media usage, covering the offline and online world of the consumer. It is designed to help marketers, planners, and product managers understand consumer behavior and consumer interactions with brands.

- Cross-tabulation
- Customized target groups
- Trend and country comparisons
- Export in Excel (CSV) or PowerPoint format



- Marketing & social media
- Finance & insurance
- eCommerce & retail
- Health
- Food & nutrition
- Housing & household equipment
- Internet & devices
- Travel
- Media & digital media
- Services & eServices
- Mobility
- Characteristics & demographics

Find out more on www.statista.com/global-consumer-survey

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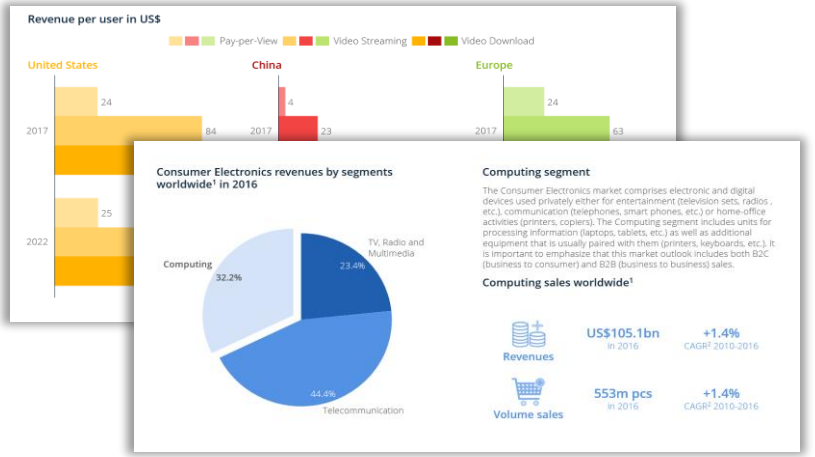
About Statista Research & Analysis

Market research – Market analysis – Data modeling

Statista Research & Analysis is a provider of comprehensive services in the fields of market intelligence. Building upon our experience as one of the world's leading statistics portals, our analyst team can support you in the collection and evaluation of market, client, and competitive information – tailored to your individual needs. Our team consists of former top-tier management consultants, accomplished market researchers, and business analysts.

- Consumer surveys and expert interviews
- Market and competitive intelligence
- Market sizing and forecasts



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