



Digital Transformation Monitor

Smart Home: Technologies with a standard battle

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Smart Home: Technologies with a standard battle

The Smart Home market is characterised by the presence of a multitude of players, and new companies keep developing products. In this crowded space, few standards exist, and the interconnection is becoming a tough challenge for consumers, slowing down adoption. Nonetheless, some players are developing on the market not necessarily for their products themselves but largely for their ability to provide the interconnection between their devices, and devices from other brands.

1

A market still in its infancy

The concept of “Smart Home” refers to a set of communication technologies allowing the connection between different appliances and objects present in the home, which can be remotely managed, controlled and automated. This concept is applied on a multitude of products as it encompasses everything in a household that can be connected, including non-native IT devices.

The Smart Home has its roots in the older concept of “home automation”, which never reached mass adoption by consumers. Smart Home mainly differs from home automation by its reliance on wireless networks and the possibility to connect objects to internet, opening new possibilities.

The Smart Home has three major expectations from the occupants' perspective:

1. Improving safety and security.

This was the initial factor driving motivation of implementing smart systems in a home. There is a clear growing trend in the need to secure access control, in order to authenticate authorised persons, detect any irregular intrusion and alert an emergency centre if needed, but also in a monitoring service warning if something abnormal happens such as a fire. More and more, consumers and businesses are ready to pay for more security and peace of mind.

2. Saving Energy

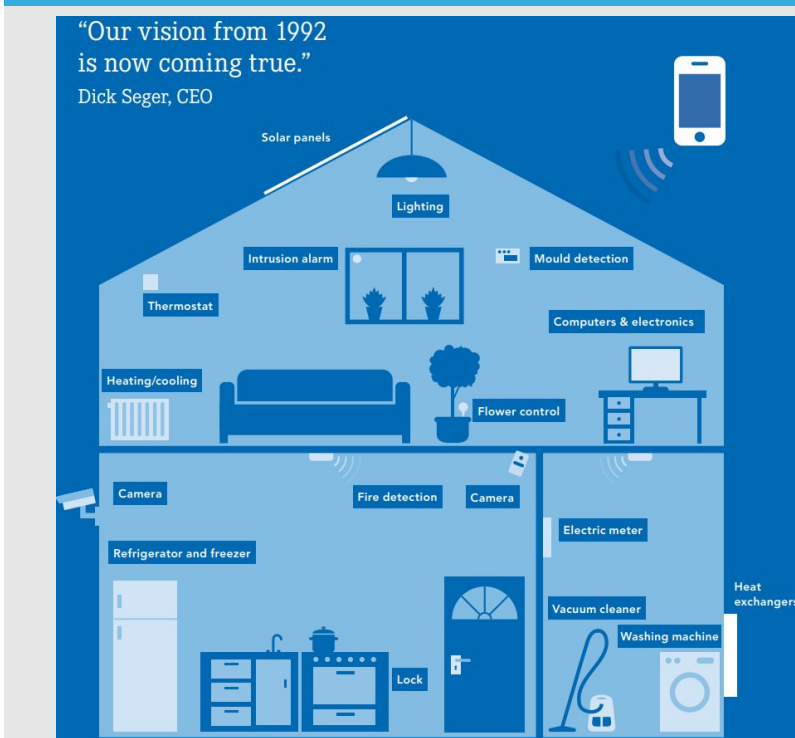
The energy management allowed by new technologies helps in reducing electricity consumption within households. The idea is to control the energy use by activating/deactivating lights, HVAC (heating, ventilation and air conditioning) systems and any appliances based on an occupancy indicator or, if needed, remotely. Actually, the main major motivation from homeowners to implement smart solutions remains the reduction of electricity bills, ahead of any environmental concerns.

According to smarthome.com, up to one third of the 2000 USD energy bill¹ could be cut in atypical household using energy efficient systems.

3. Providing greater convenience, comfort and wellness.

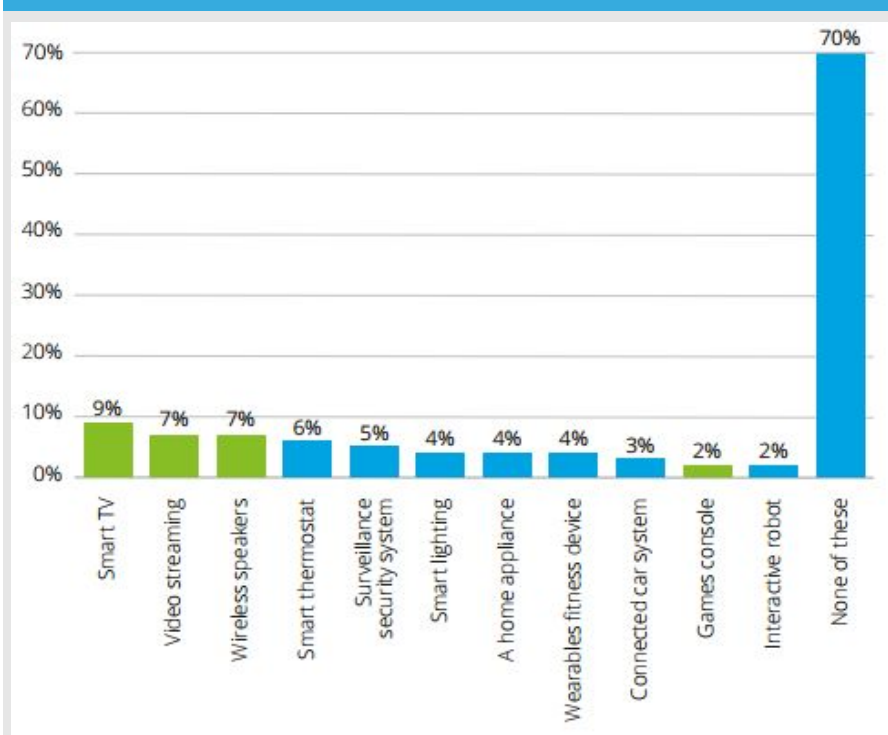
Beyond the energy efficiency allowed by smart solutions, they improve occupants' lives by providing thermal comfort or by monitoring indicators such as air quality or humidity, highly critical in some cases. Also, the Smart Home is starting to gain traction with consumers because of its ability to access and control systems remotely including lights, appliances, multimedia, heating and cooling systems while being away.

Figure 1: Scope of the Smart Home



Source: Verisure

Figure 2 : Intent to purchase within 12 months



Source: Deloitte Switch on to the connected home, July 2016

Consumer adoption

When including the connected consumer electronics segment, the penetration rate of Smart Home devices in households is quite important in mature markets, such as the United Kingdom or the United States. For instance in the UK, 52% of all households surveyed² have at least one connected device in their Smart Home. However, if we consider any specific segment (home appliances, home energy, safety, security), and exclude consumer electronics, the ownership of a connected object remains very low, with penetration rates between 2 % and 3%.

Demand for Smart Home products

Demand for Smart Home products is still limited, with 70% of households surveyed not intending to buy a connected product in the next 12 months. Excluding connected consumer electronics, some segments are expected to fare better than others:

- Thermostats: 6% of purchase intentions in the next 12 months
- Security devices: 5% of purchase intentions in the next 12 months
- Smart lighting: 4% of purchase intentions in the next 12 months

Market forecasts

Not surprisingly, North America and especially the United States will lead the Smart Home market in the world.

Key innovations and products are currently coming from the US and services are firstly deployed in this country.

Smart Home revenue in the US is expected to grow over three-fold between 2016 and 2021, exceeding 32 billion USD.

China is also innovating a lot with its own solutions, and revenue could exceed 13 billion USD in 2021, compared to only 1.2 billion in 2016. More generally, Asia-Pacific will become one of the leading zones in the coming years.

Europe is lagging behind, but is expected to represent a 19 billion USD market in 2021, benefiting from massive markets in the United Kingdom and Germany.

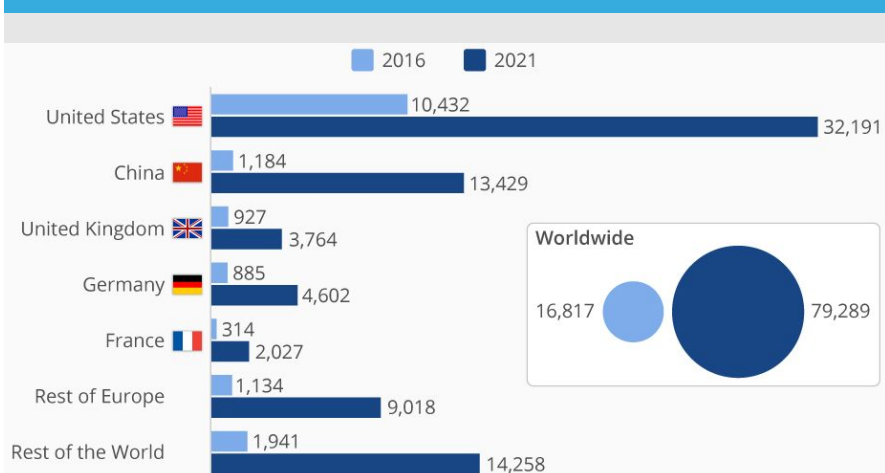
2

Many players, but no clear leaders yet

The Smart Home market is characterised by the presence of a multitude of players due to the variety of companies already in interaction with home occupants.

Indeed, the competition between players remains fierce in the field with the multitude of potential categories involved. Two applications especially keep attracting players: energy management and security.

Figure 3 : Global Smart Home Revenue, by country (million USD)



Source: Statista Digital Market Outlook 2016

Figure 4 : Categories of players involved in Smart Home



Source: IDATE

Traditional home automation providers

Traditional home automation providers have clearly adapted their products to address the current market leveraging smartphone, mobile apps and voice control. Despite a modernisation of their offerings, they suffer from less visibility than Internet giants, which are aggressive, also benefitting from their reputation and brand.

The arrival of Internet giants

Indeed, the Internet giants' war has intensified in recent years with the move from Smart Home platforms (Samsung SmartThings, Apple HomeKit) to the development of voice processing platforms (Amazon Alexa and Google Assistant). In a few months only, Alexa has been a real success as more and more key players already active in the field have increasingly integrated the voice to control their Smart Home products. Contrary to other platforms, no hub is required for the offers of Google and Amazon.

Telcos strategies

Regarding telcos, the approaches of Smart Home differ from one player to

another as part of their digital diversification strategy. For instance, AT&T is trying to implement a convergence between different verticals: connected car, connected home and connected health/wellness. For others like Deutsche Telekom, Smart Home is an additional service ("fifth play").

Other players

Recently, even the furniture retailer Ikea has launched its Smart Home offerings with a Zigbee-based hub and associated bulbs and sensors.

3

Technology fragmentation

This large ecosystem and the multitude of technologies used result in the fragmentation of the communication protocols in the Smart Home, a major barrier for the development of the market. Indeed, numerous systems, devices and equipment compose the

sector, encompassing lighting, water, remote control, HVAC, video surveillance, fire alarm... Within this market, equipment and main stakeholders are coming from different industries, which are dominated by silos. Most of the products are provided with their own technology and work in standalone, with a dedicated application, implying that the different devices cannot work together easily (or not at all).

And yet, the benefit of Smart Home increases when connected devices work together. As a result, a transversal approach is required in the future: the development of the market requires that objects are able to communicate with each other. One of the main issues is the interoperability; the questions of standards' fragmentation need to be solved as lots of initiatives have been launched.

Signs of move to standards consolidation?

Progress in standards consolidation remain very slow. As technologies continue developing in each area, they contribute to reinforcing the silo effect as they are often non-interoperable.

Today, a multitude of initiatives have been developed to make the whole ecosystem interoperable – between the large variety of connected products and across the different product makers.

There were first signs of consolidation in standards and unification of interfaces as described below.

Open Interconnect Foundation (OCF)

OCF is the largest cross-industry consortium in the Smart Home space and is the result of the merger, which occurred in 2016, of two main initiatives for interoperability: OCF itself, sponsor of IoTivity, and Allseen Alliance behind AllJoyn. Actually, OCF being backed by Intel, Samsung and Dell has merged with Allseen, a Linux Foundation supported by 23 consumer electronics and software applications including LG, Panasonic, Sharp and Qualcomm. The merger is the combination of the two open source frameworks as they both decide to mutualise their efforts to promote the interoperability between the technologies used in the IoT. The newly entity is also working on a unified IoT standard supporting OCF specifications. In the meantime, IoTivity and AllJoyn are interoperable and backward compatible.

Zigbee Alliance

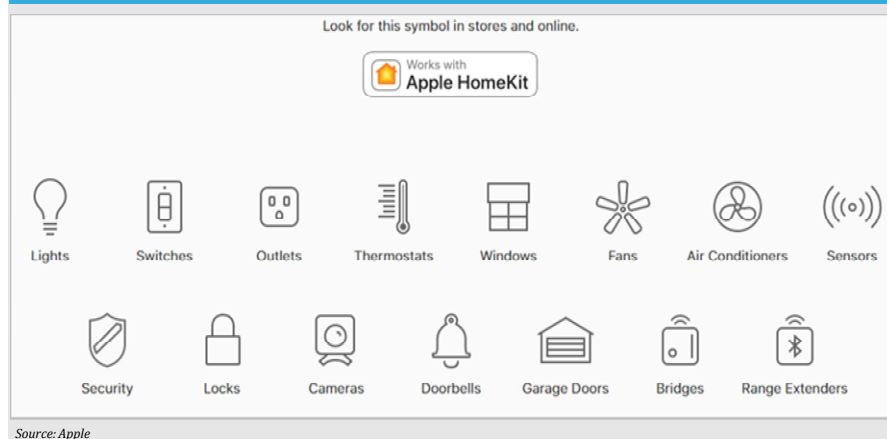
Largely integrated in Smart Home systems, Zigbee technology has been adopted by world-leading service providers, installers and retailers. Backed by over 400 members, Zigbee Alliance has developed the ZigBee Home Automation standard dedicated to the interoperability between the variety of the products regardless of the manufacturer.

During the CES 2017, the alliance has made a significant move towards further interoperability with the announcement of Dotdot, expected to be a universal language for IoT. Dotdot is based on the development of a common applicative upper layer allowing the interconnection between Zigbee products and other products using protocols like WiFi or Bluetooth. Dotdot will work with Thread networks and will be available for end 2017.

The other major initiatives include :

- Wireless IoT Forum founded by Cisco focused on interoperability in an increasingly connected world.
- Thread group, backed by Google and focusing on low-power devices around homes in partnerships with ARM, Samsung and Nest Labs.

Figure 5: Apple HomeKit products' categories



IFTTT

IFTTT that stands for "If This Then That" is a web tool enabling to unite multiple languages and hardware platforms thanks to the use of "recipes" to create conditional scenes. In the Smart Home area, it allows devices to talk to each other directly, not acting as a hub but as a channel. An example of a recipe would be "If thermostat X's temperature reaches 90 degrees, then the system Y should trigger the alarm".

IFTTT has been adopted and used by numerous significant players in the Smart Home. For instance, IFTTT works with Google Home, Samsung's SmartThings, Nest thermostat or LIFX light bulbs.

Open APIs

Some companies have developed platforms to make devices interact with each other like Apple's HomeKit or

Samsung's SmartThings. As a result, developers of connected products can implement Homekit and/or SmartThings compatibility, with a software, or in some cases a hardware, development. The latest challenger is Amazon with its intelligent voice assistant Alexa (Echo device), which offers a new, simple way to make products interact. The company has released the Smart Home Skill API as part of Alexa Skills Kit (ASK) that enables developers to add capabilities, or skills, to Alexa and make Alexa communicate with their connected products.

In the end, these platforms could become de facto standards, as device makers benefit from an increased visibility while consumers can both connect and use them easily.

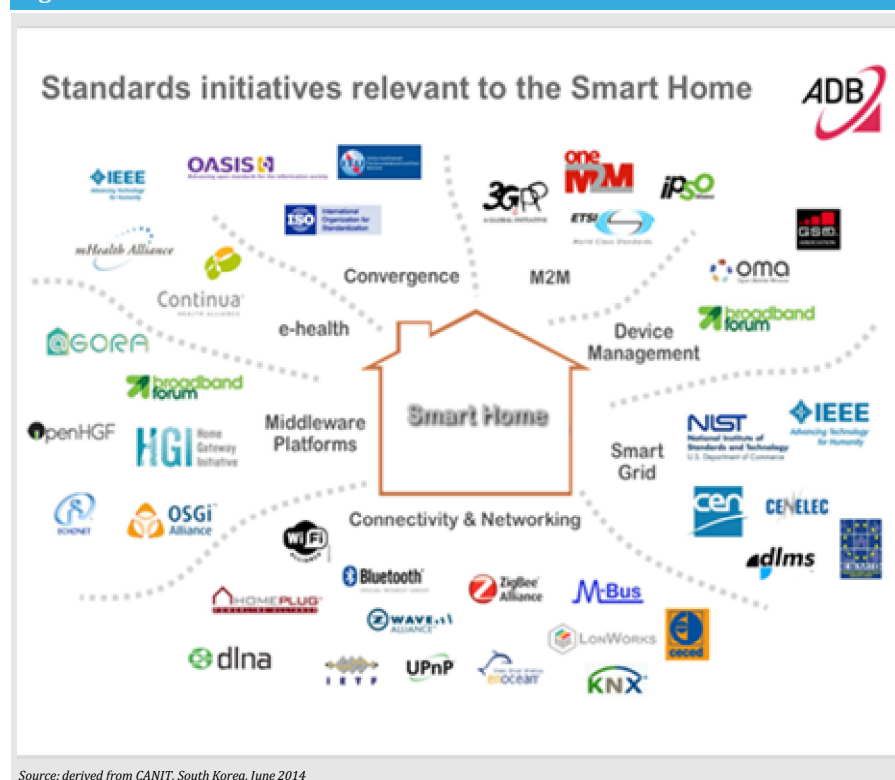
\$179.99
Price of an Amazon Echo³

18.8 million
Number of Echo devices sold⁴

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- ² Deloitte, 2016, Switch on to the connected home, Available At: <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/consumer-business/deloitte-uk-consumer-review-16.pdf>
- ³ Amazon website, Available At : <https://www.amazon.com/Amazon-Echo-Bluetooth-Speaker-with-WiFi-Alexa/dp/B00X4WHP5E>
- ⁴ Morning Consult, 2017, Available at : https://morningconsult.com/wp-content/uploads/2017/06/170603_crosstabs_Brands_v3_TB-1.pdf

Figure 6: Standards initiatives relevant to the Smart Home



About the Digital Transformation Monitor

The Digital Transformation Monitor aims to foster the knowledge base on the state of play and evolution of digital transformation in Europe. The site provides a monitoring mechanism to examine key trends in digital transformation. It offers a unique insight into statistics and initiatives to support digital transformation, as well as reports on key industrial and technological opportunities, challenges and policy initiatives related to digital transformation.

Web page: <https://ec.europa.eu/growth/tools-databases/dem/>

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