

# The Smart Home: A Growing Fifth-Play Opportunity for Operators

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## Executive summary

- **The global smart home market is growing exponentially**, attracting an array of service providers, from technology giants and startups to major media players, device makers, big-box retailers, home improvement companies, utilities and telecom network operator. Government mandates and initiatives, ongoing technology innovation and the intense attention paid to conservation are all contributing to making the smart home a place with a bright future.
- The global focus on **sustainability and growing consumer awareness of energy consumption** are major factors driving smart home adoption, and regulatory mandates on energy conservation are further boosting growth.
- Similarly, **providing security services via smart homes** represent an important vertical that is ripe for expansion and offers operators an opportunity to compete in a potentially lucrative field.
- Needing a different application for every stand-alone device (door locks, thermostats, lights, sensors, etc.) is **a significant obstacle for end users**.
- **The smart home market is currently at a fork in the road**, going either toward an open ecosystem where users have to configure and control multiple, heterogeneous devices, or toward a small number of competing vendors of proprietary platforms that control all access to devices.
- **While adoption is increasing in countries where governments actively support faster broadband** services, especially fiber to the home, the costs associated with new equipment, installation and ongoing maintenance are significant deterrents to home automation.

## Executive summary, continued

- **Most integrated telecom operators and large cable companies in advanced markets today offer some form of smart home system on a subscription basis.**
- **In the competition over smart home customers, network operators have two substantial advantages vis-à-vis almost all retailers and device manufacturers:** 1) their numerous and often far-reaching billing relationships and 2) their direct connections into home environments through phone, wireless and Internet services. They supply the networks (mobile, fixed), platforms and white-label devices vital to smart home connectivity. Operators also possess dedicated subscriber bases, manage customer relationships and have the ability to partner with public or private companies from diverse sectors, such as energy, manufacturing and technology.
- In fact, operators are finding that an **open-platform approach and white-labeling via strategic partnerships** with device and appliance makers offer a means to broaden their smart home subscriber base. These tactics also provide the versatility required to successfully enter new regional markets. Ultimately, the success of these smart home initiatives will hinge on the ability of operators to create a compelling value proposition for homeowners based on accessibility, ease of use, reliability and security.
- Areas where operators can extend their provider roles and create new revenue streams include **platforms, white-label devices and service bundles that include resources such as tech support.**
- Unlocking the smart home market depends on **device-to-device communications and an open ecosystem along with robust security** to create a compelling value proposition. Moreover, operators possess assets that will allow them to structure the smart home ecosystem around their connectivity platforms.
- **Operators should consider the strategic advantages of providing tech support across customer and product lifecycles.** Helping consumers derive more value from their devices – starting with installation and continuing through activation, connectivity and usage – will help telcos become the premier source of support. The result will be satisfied and loyal customers.
- **Operators can improve the value proposition of home automation** by adding an OTT strategy or bundling it with smart home connectivity.

## Executive summary, continued

- This report focuses on **the role of telcos in the smart home value chain** and evaluates the influence of the supplier ecosystem on adoption. It provides an overview of emerging standards and technologies related to home automation and examines the key initiatives operators can carry out to gain a dominant position in this market.
- The report explores **the roles of multiple smart home providers**, including utilities, security firms, appliance and device manufacturers and media companies.
- **This report also examines a number of key challenges** that operators face, including the need for device standardization and interoperability; new approaches to service bundling; network infrastructure improvements (4G/5G, fiber optic, etc.); and the scramble for dominance among multiple proprietary and open platforms and standards. A unified platform standard would help expand smart home adoption worldwide.



## Section 1: Introduction to smart home services

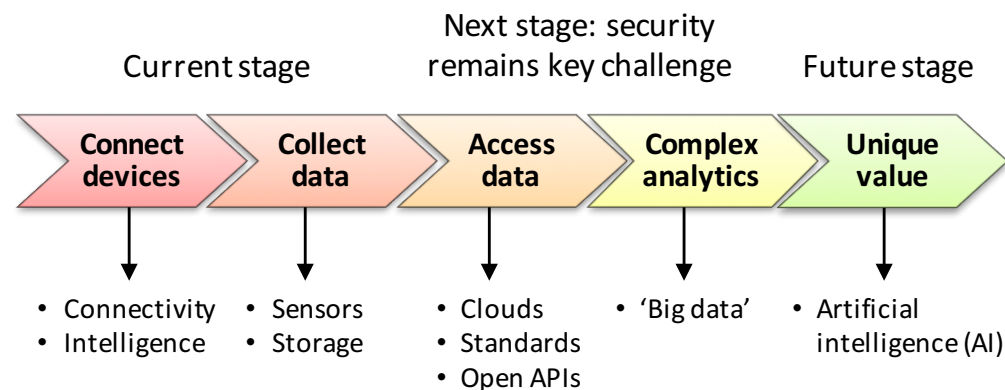
- I. Smart home: Definition and evolution
- II. Smart home market enablers
- III. Types of smart home services
- IV. Smart home market drivers and barriers

## Smart home: Definition and evolution

Today's smart home proposition combines the Internet of Things (IoT) with connected home controls and the ubiquitous smart devices, such as smartphones, tablets and wearables.

- The term 'smart home' refers to a residence where multiple devices and objects are networked so that their functions are programmable and responsive to input from users and other devices. The term is often used to refer to the connected technology in such a home as well.
- Today's smart home is the product of many years of slow progress, not only in fields such as networked security or speaker systems, but also in M2M communications, operational technology and wireless connectivity.
- To telecom operators, the smart home market represents an opportunity to establish an enduring new source of substantial revenue from a value-added service. Whether this will amount to the coveted 'fifth play' – an added business on the level of the quad-plays: fixed voice, broadband, TV and mobile – will depend in part on the operators' ability to keep other parties from gaining control over the crucial parts of the market.
- We have identified three broad stages in the evolution of smart homes (Exhibit 1):
  - The current stage involves platforms that integrate individual devices and services.
  - The next stage will increase reliance on cloud computing and big data analytics.
  - Eventually, AI will truly automate homes.

### EXHIBIT 1: STAGES OF SMART HOME SERVICES



Source: Pyramid Research

## Smart home market enablers

The expansion of mobile data networks and the parallel rise in usage will become increasingly important catalysts for global smart home adoption and the connectivity it requires.

### EXHIBIT 2: INDUSTRY TRENDS FACILITATING SMART HOME MARKET DEVELOPMENT



The **proliferation of mobile device users** as well as their reliance on apps are important components of home automation and the overall IoT.

LTE and 5G will bring further **increases in mobile data speeds**, enabling more efficient and more reliable connections between smart homes and Internet-based services.



**Home energy management is growing more popular in all regions globally.** Smart metering offers operators, in partnership with utilities, a viable opportunity to provide smart home technology services for the mass market.



The **global expansion of the Internet** is dramatically boosting the capacity for connecting smart home devices. Moreover, the **ongoing development of the Internet of Things (IoT)** will have a huge influence on the communication protocols, software standards and platform systems that underpin the smart home market.



**A growing reliance on big-data analytics**, crucial to smart home functionality, supports the proliferation of home automation devices.

**Moreover, a sharp decline** in the costs of broadband connectivity, embedded chipsets and sensors as well as simplified, low-cost home area networking are each helping to expand smart home adoption.



### SMART HOME ENABLERS

Source: Pyramid Research

## Types of smart home services

Bundles that pair energy monitoring with security or other services can now be sold directly to homeowners, along with automation platforms. This is a promising new trend for operators.

### EXHIBIT 3: TYPES OF SMART HOME SERVICES



- **Lighting & appliance control**
- **Security systems, access control**
- **Entertainment systems**

- **Energy management**
- **HVAC controls**
- **Home healthcare**
- **Child safety**
- **Irrigation**
- **Pool & spa**



*Source: Mistral Solutions, Pyramid Research*

## Types of services: Lighting and appliance control, entertainment systems

**Connected entertainment systems have been available for years, gradually growing more capable; now they are being integrated into home automation systems. The Internet refrigerator may still be a solution looking for a problem.**

- **Entertainment systems:** Since wireless LANs took off in the early 2000s, wireless speakers have been among the most popular home devices to be controlled over a network. In December 2014, Denon released APIs for home control systems to integrate its audio system, and market leader Sonos says it will follow suit. These systems will be able to automatically respond to the routines and preferences of residents, for example by turning on Spotify at full volume for a teenager when the parents leave the home.
- **Lights:** Smart lights can do more than save energy and make a house seem inhabited during vacations: they can change color and gradually dim as to prepare residents for sleep, they can be adjusted by voice control, and they can briefly turn red in a teenager's room when parents return home.
- **Appliances:** Adding streamed music to a refrigerator, an app to a saucepan or SMS to an oven may seem gimmicky, but adding intelligence and integrating it with a larger system might actually help: if sensors notice that a resident woke up early, the coffee maker can have a cup of coffee ready; if the oven is on when that person is leaving, it can alert you with an SMS.

### EXHIBIT 4: CONTROLLING THE SMART HOME



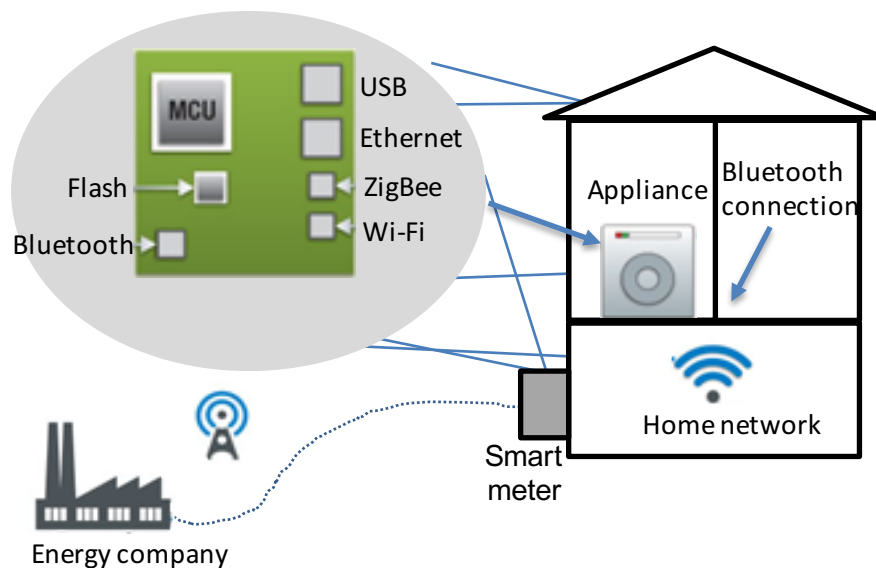
Source: ASID

## Types of services: Energy management, security and access control

Smart meters, energy monitors and controls, water sensors and security controls will all be a part of integrated smart home systems, and all are available with a wide range of functions.

- **Energy management:** Among the measures a smart home system can take to save users money are automatically lowering the temperature when no one is home and time-shifting the use of some appliances to hours when energy is cheaper. Learning and adapting to user behavior, as Google's Nest Thermostat automatically does, takes this a step further, all while making the home more comfortable.
- **Security and access control:** Security services can be sold to users through home automation system installers and new-home developers. Surveillance cameras, locks and garage door openers can be remotely controlled. ADT, FrontPoint Security and Verisure are major security manufacturers for the smart home.

**EXHIBIT 5: ENERGY MANAGEMENT**



Source: Pyramid Research

**EXHIBIT 6: COMPONENTS OF SECURITY MANAGEMENT**



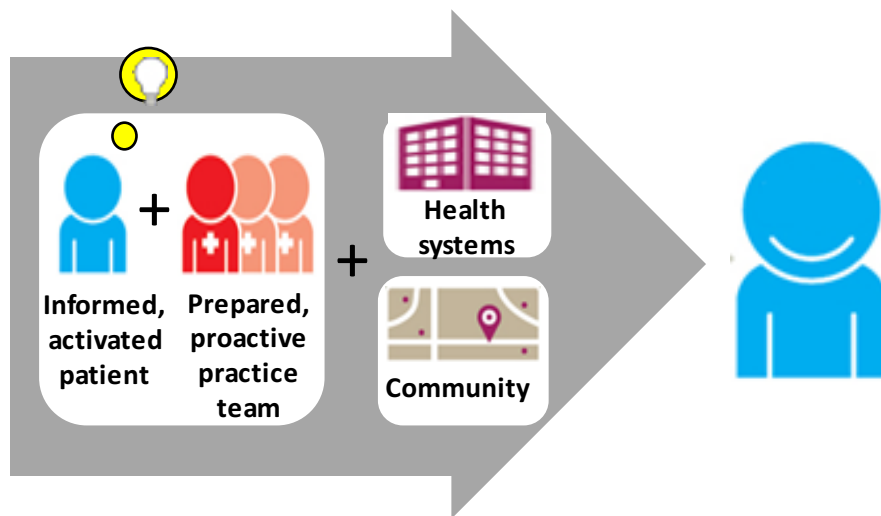
Source: Pyramid Research

## Types of services: Home healthcare and external home controls

The demand-response functionality of smart homes enables a range of remote control actions, from the simple (activating lawn sprinklers) to the complex (patient monitoring).

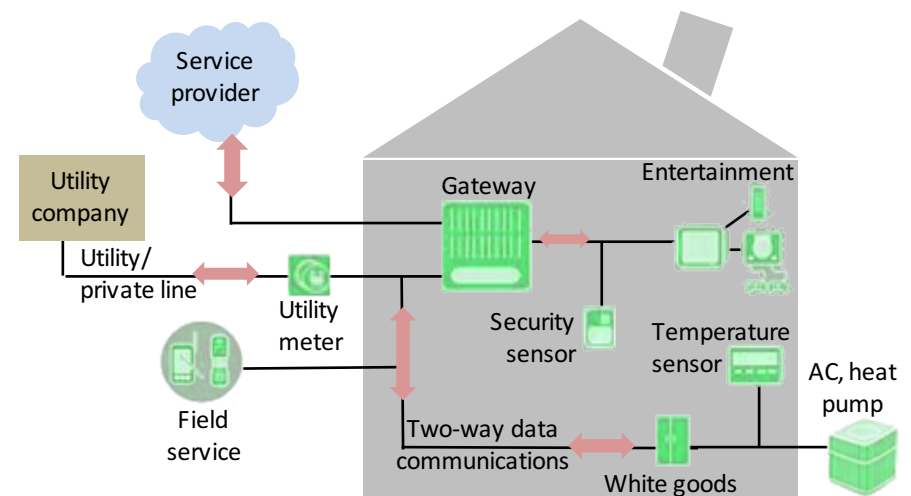
- **Home healthcare:** E-health has the potential to be a key component of smart homes, providing benefits such as aging in place. Old or disabled people can benefit from home automation in ways that often also reduce the need for home care and healthcare facilities. Integrating health monitoring with smart home systems, for example, can make it easier for health professionals to monitor patients' vital signs. Other areas include alerts, automated timers, emergency assistance and security.
- **External home controls:** Sensors, smart meters and automation can provide more efficient use of energy and other resources for outdoor lighting, gate access, garden irrigation, pool maintenance and other areas.

EXHIBIT 7: THE GROWING TREND OF E-HEALTH



Source: Pyramid Research

EXHIBIT 8: RANGE OF EXTERNAL HOME CONTROLS

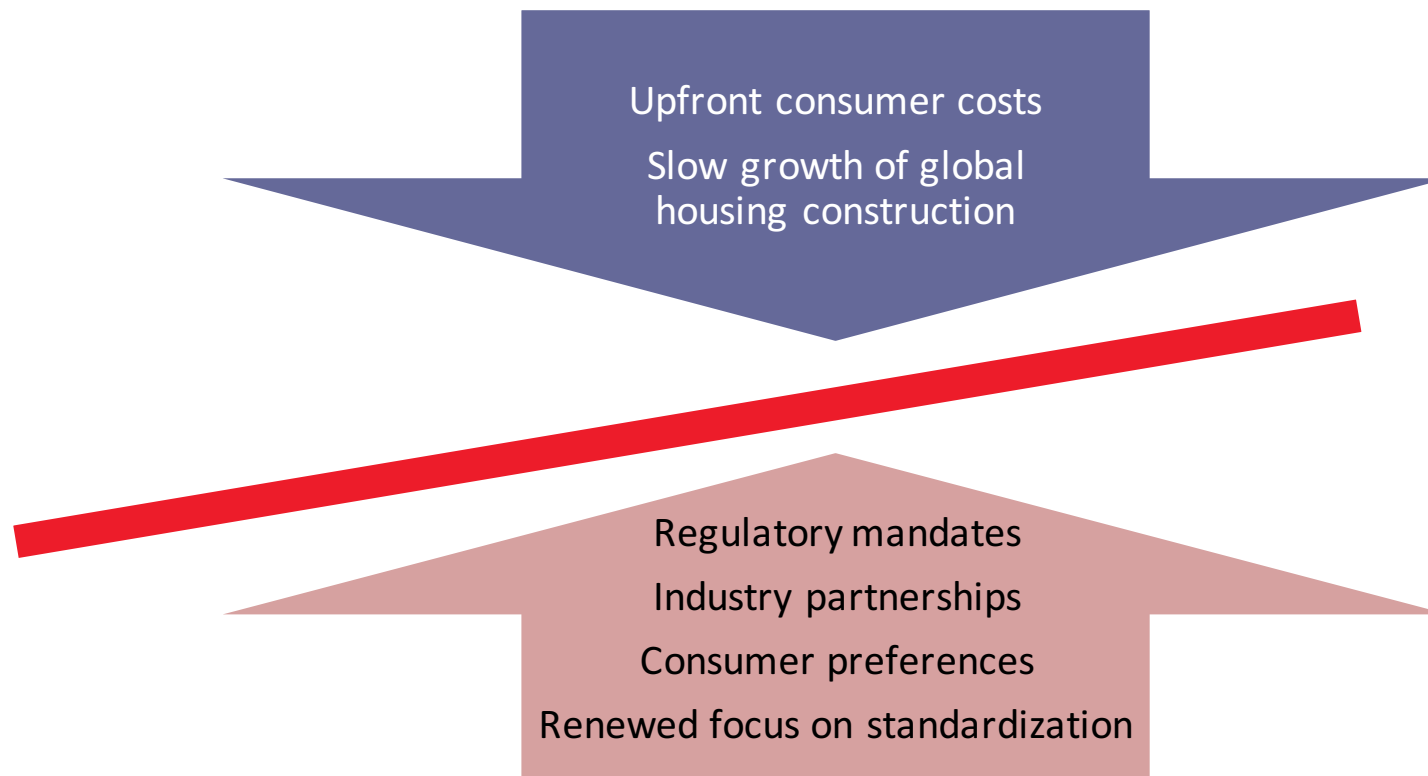


Source: Pyramid Research

## Smart home market drivers and barriers

A key impediment to growth is the multitude of network, platform and software standards used by devices. For smart homes to reach mainstream adoption, a single platform standard for controlling products must become the norm.

### EXHIBIT 9: ISSUES AFFECTING SMART HOME ADOPTION



Source: Pyramid Research



## Changing market drivers

Besides established demand drivers like the need for security, a number of new factors are propelling global smart home adoption, from broad technology initiatives to changes relating specifically to telecom operators.

### Government initiatives

- Government mandates for more efficient energy usage are giving smart metering strong momentum.
- Smart city services improve sustainability and conservation; many major cities are moving toward adoption.
- Smart home adoption increases in countries where governments are actively promoting faster broadband services. Singapore, Hong Kong and the UAE have all promoted fiber rollouts.

### Industry partnerships

- Opportunities exist for partnerships between media companies, OEMs, telcos, utilities, home improvement dealers and technology startups.
- Governmental mandates and energy regulations have prompted utilities to partner with telcos for smart metering.
- Telefónica and CGI are rolling out smart meters across the UK.
- AT&T is partnering with General Electric to merge GE's smart meters with AT&T's secure cellular communications.

### Consumer preferences

- Advances in technology and the move toward sustainability have spurred global trends such as electric cars, alternative energy, smart cities and smart homes.
- Wider adoption of home electricity generation (solar, wind, etc.) is boosting consumer demand for smarter electric systems.
- Besides the convenience of controlling devices in the home remotely, smart homes provide a better quality of life, energy efficiency and financial savings.

### Renewed focus on standardization

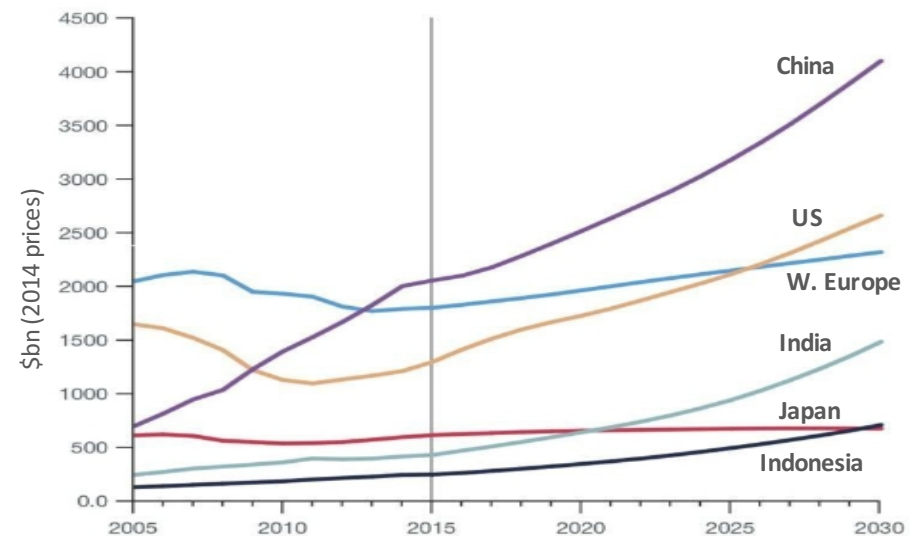
- The lack of device interoperability is often blamed on platforms being proprietary rather than 'open.'
- A proprietary framework ensures interoperability for select devices, but homeowners are limited to using certain brands.
- An open environment means that sensor data is shared and the control structures are available for all developers and manufacturers to use.
- The TR-69 protocol will play a key role in telcos' smart home strategies.

## Barrier to smart home adoption: Global home construction

**A major factor in the long-term growth of the smart home market is the complexity of retro-fitting existing housing stock compared with installing systems during new home construction.**

- **The best time to install a home automation system** is during new home construction. However, global housing construction has been recovering only gradually since the 2008 recession. According to industry sources, the market is expected to return to faster growth thanks to an improving macroeconomic environment, waves of urbanization and population growth in emerging markets, particularly across ASEAN nations, as well as the recovery of the US market.
- **The revival of residential construction activity in North America** is expected to support smart home market growth across the region and reinforce its position as the largest home automation market.
- **So far, smart home adoption worldwide** has depended heavily on the luxury home segment, but for long-term growth, adoption in the mainstream housing market will be crucial.
- **Collaboration between companies from different sectors**, including home improvement retailers, will be required to bring smart home services to the mass market.
- **Substantial investments in building infrastructure** and the need to reduce energy consumption will further drive the global smart home market, especially in Asia-Pacific and Western Europe.

**EXHIBIT 10: SIZE OF TOP GLOBAL CONSTRUCTION MARKETS**



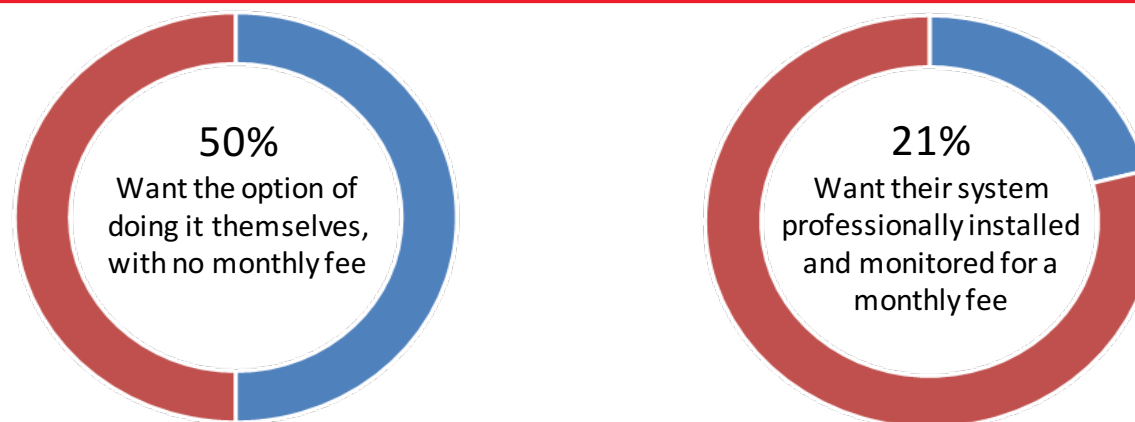
Source: "Global Construction 2030: A global forecast for the construction industry to 2030," *Global Construction Perspectives and Oxford Economics for the ENR Global Construction Summit, New York, September 2015*

## Barrier to smart home adoption: Consumer cost

While smart home platforms can be bundled or purchased as stand-alone services, upfront costs for hardware and devices are still relatively high, putting a floor under the cost of the installation even for do-it-yourself homeowners.

- **Some smart home features** may require structural changes in the home, adding expenses over and above the price of the equipment itself.
- **Custom-built, fully integrated smart home systems** can be expensive undertakings. On the other hand, new technologies such as energy monitoring can help reduce household expenditures over the long term.
- **The costs of a smart home installation** can average well outside what is affordable for typical homeowners even in developed markets in Asia-Pacific, Australia, North America and Western Europe. Moreover, installation fees for smart home systems often do not include the costs of subsequent maintenance and repair.
- **Operators can capitalize on the growing trend** toward all-inclusive subscription-based models as a way to expand their smart home service footprint. Affordable installation may offer the leverage needed in order to boost adoption.

### EXHIBIT 11: ADDITIONAL COSTS OFTEN DETERMINE ADOPTION OF SMART HOME TECHNOLOGY



Source: Lowe's

## Section 2: The smart home ecosystem

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- IV. The role of appliance and device manufacturers
- V. The role of utilities
- VI. The role of home security platform providers and dealers

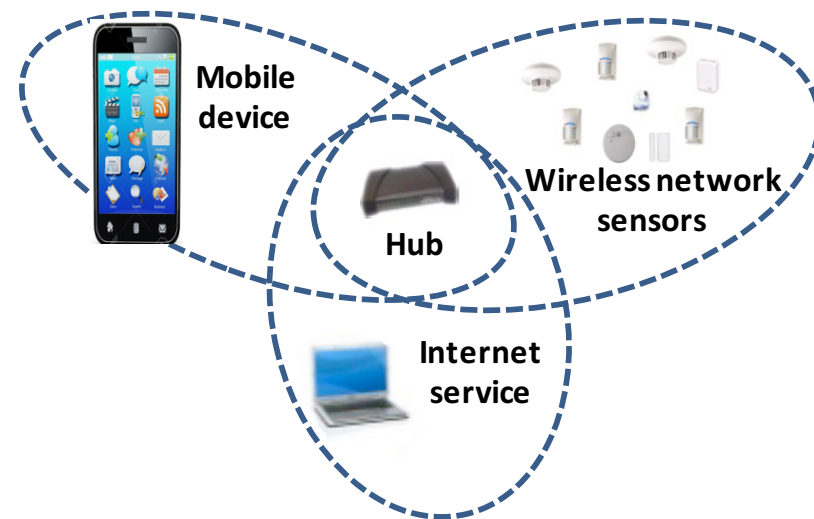
## Defining the smart home ecosystem

Device manufacturers, major IT companies such as Google, Samsung and Apple, home improvement retailers, utilities and telecom operators are all competing for a piece of the smart home market.

- **While still embryonic, the global smart home market** is propelled by a convergence of business interests as well as competition between multiple platforms, open and proprietary.
  - **An open system** lets all developers access published and clearly defined standards and protocols that are independent of particular suppliers and that offer all components full interoperability.
  - **Proprietary systems** such as those by Samsung and LG limit competition to companies and components approved by the system owner, which has complete control over access to the system.
- **As the market moves toward standardization** and interoperability, open systems offer developers and OEMs much-needed flexibility.
- **The next stage** in smart home evolution might consist of a purpose-built wireless router or gateway with control and features residing in the cloud. Essentially, it would move control to the application layer, making it easier to create behavior-based, context-aware features.

*True device interoperability will enable smart home adoption to reach the mass market. The AllSeen Alliance and the Open InterConnect Consortium are non-profit organizations promoting standardization, with major home automation players as members.*

### EXHIBIT 12: KEY ELEMENTS OF SMART HOME CONTROL

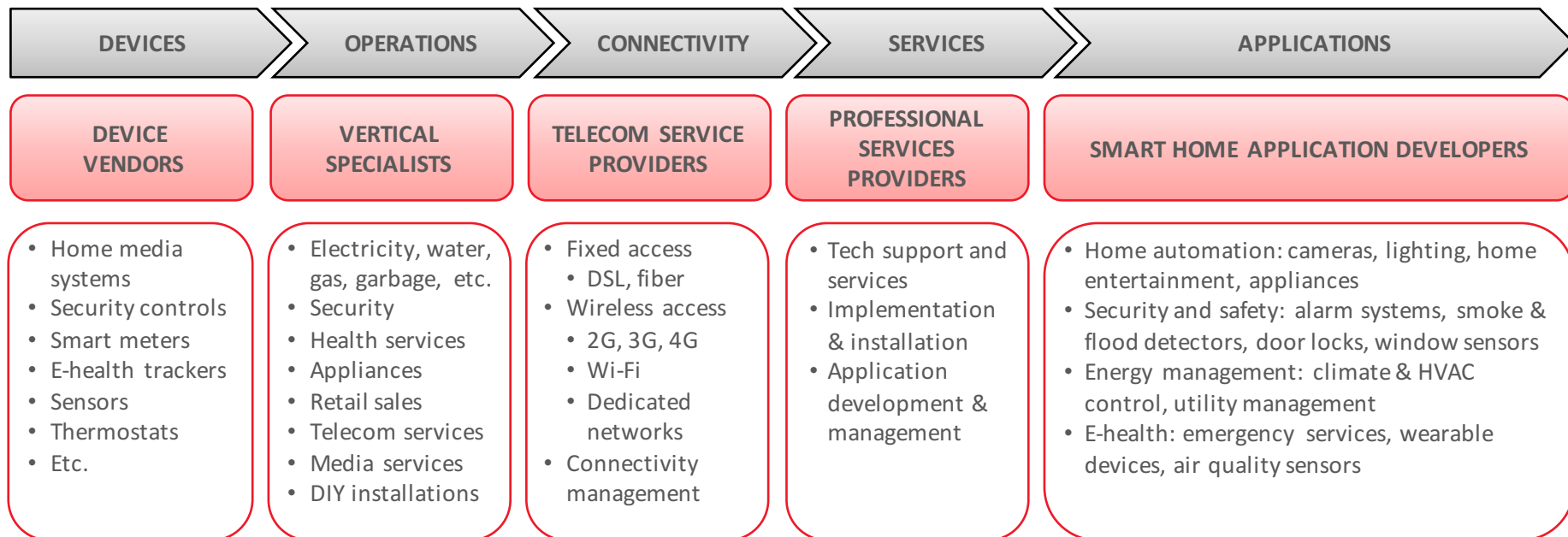


Source: Pyramid Research

## The smart home value chain

Operators can participate across the value chain either directly by offering connectivity, services and applications or via strategic partnerships with vertical specialists.

**EXHIBIT 13: TYPES OF PLAYERS IN THE SMART HOME VALUE CHAIN**



Source: Pyramid Research

## Prominent smart home players in the US

By being able to drive adoption in the world's largest smart home market, three companies are emerging as the main contenders in the US market for software platforms that tie function-specific peripherals and services together.

**EXHIBIT 14: US SMART HOME PLATFORM CONTENDERS**

Company	Apple	Google	Icontrol Networks
Platform	HomeKit	Nest Weave	OpenHome
Select device, software & service partners	August, Chamberlain, ecobee3, Elgato, GE, GridConnect, Haier, Honeywell, iDevices, iHome, Incipio, Insteon, Kwikset, Lutron, Netatmo, Osram, Philips, Schlage, SkyBell, Withings	Big Ass Solutions, Dropcam, Icontrol, Jawbone, Legrand, LG, LIFX, Logitech, Lutron, Osram, Pebble, Petnet, Philips, SkyBell, Tyco, Whirlpool, Yale, Zuli	AccuWeather, Bosch, CentralLite, Jasco, Nest, Piper, Rachio, Sercomm, Sylvania, TriTech, Yale
Marketing partners	Retailers, Apple Store	American Family Insurance, Austin Energy, Liberty Mutual Insurance, National Grid, NRG Energy, Southern California Edison	ADT, Best Buy, Bezeq, Comcast, Cox, iTSCOM, Rogers, Time Warner Cable, Swisscom
Device networks; controls	ZigBee, Z-Wave, Bluetooth LE (bridged), Wi-Fi; controlled from Apple Watch, iPhone, iPad, Mac, Apple TV	Wi-Fi, Thread; controlled from Android or iPhone handsets	Wi-Fi, ZigBee, Z-Wave; device control varies
Comments	Plusses: Siri hands-free voice control; iPhone and Apple TV customer base, which is tech savvy and high-income; the Apple brand. It is a secure walled garden; certification is difficult.	Users of Weave, a mesh network, must own a Nest product; security may suffer from the open approach. The Brillio OS for IoT devices is a plus for developers..	Its approach is vendor-agnostic but based on device standardization; in mid-2014, 70 applications and devices had been certified. It relies on resellers and integrators to reach customers.

Source: Pyramid Research

## The role of fixed and wireless broadband providers

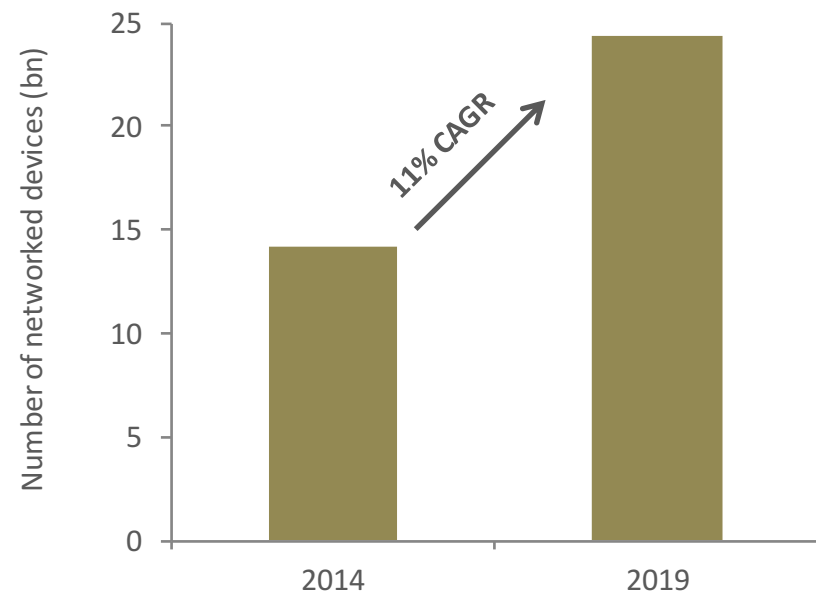
**Network operators are in a prime position to drive smart home adoption based on the need for connectivity and the increase in global IoT devices expected to result from declining chipset prices.**

Telecom operators provide four types of smart home functions:

- 1) **IoT connectivity:** Sensors and other devices send and receive information and user commands over fixed broadband and mobile networks.
- 2) **Platforms:** Whether proprietary or open, a platform allows different products to work together, with a smart device as a remote control.
- 3) **Applications:** Users control home automation via device-specific apps provided by platform makers.
- 4) **Services:** Their customer relationships and ability to bundle services make telcos natural agents of smart home support. They can also provide other services, such as home security and energy management.

**Telcos can grow their smart home base** by supporting multiple subscription options, offering tiered services and folding smart home connectivity into data plans. Both AT&T Digital Life and Orange Homelive offer these platform and product innovations in specific regions.

**EXHIBIT 15: NUMBER OF NETWORKED DEVICES GLOBALLY, 2014–2019**



Source: Cisco, Visual Networking Index (VNI)

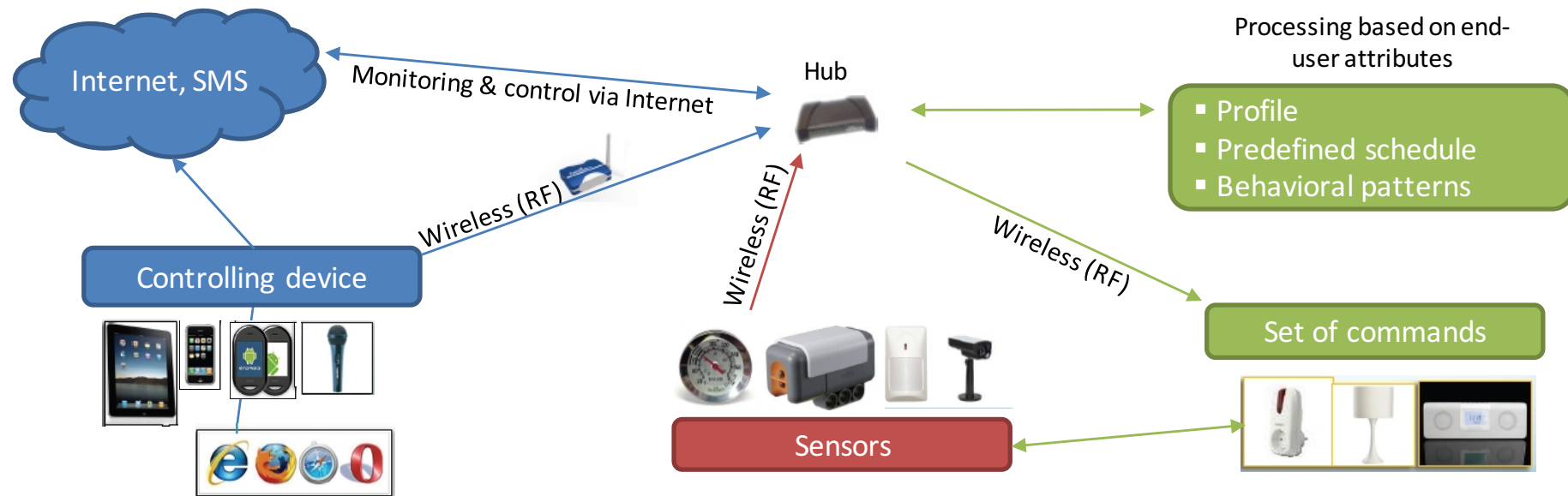


## The role of appliance and device manufacturers

From the perspective of manufacturers of everything from refrigerators to water leak sensors, the market is held back by a lack of unifying standards for integration and interoperability – fragmentation on the network and control levels.

- Increased complexity has led to a growing number of partnerships between platform providers (telcos, utilities, etc.) and appliance and device manufacturers (Honeywell, Schlage, Whirlpool, etc.) to ensure that different devices work together.
- Devices such as the Nest thermostat use data analytics to learn behavior patterns in order to automatically adjust settings.
- Home automation systems have a number of components, with a central hub relaying commands to home devices (door locks, thermostats) via local networks. This hub then connects the smart home to both Internet-based services and the platform provider (telco, utility, retailer, etc.) via mobile or fixed connections.

### EXHIBIT 16: ELEMENTS INVOLVED IN SMART HOME INTERCONNECTIVITY



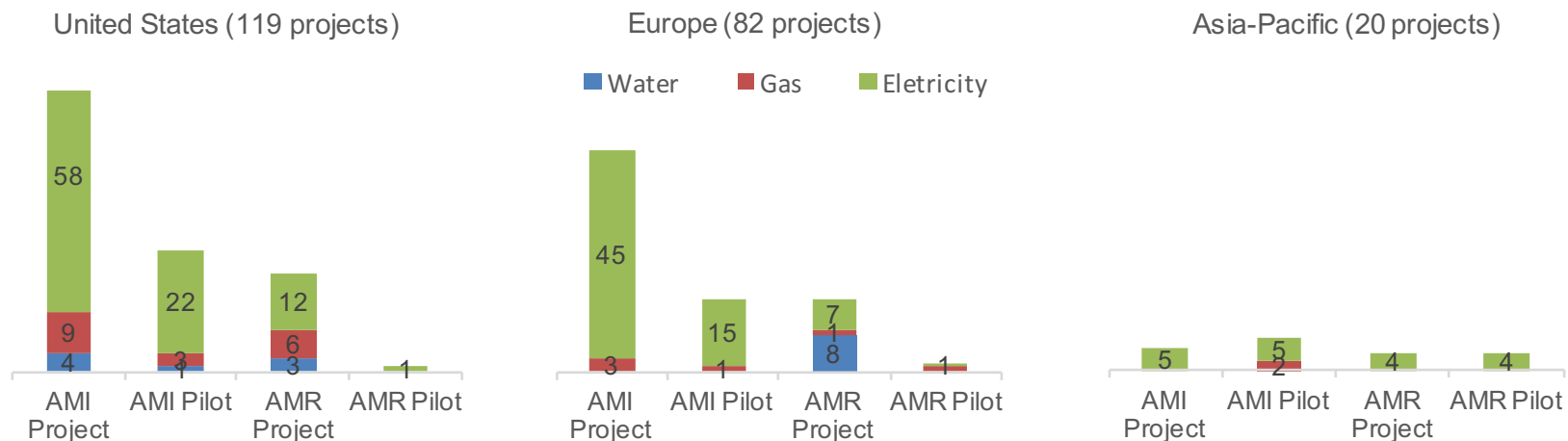
Source: Pyramid Research

## The role of utilities

**Home energy management (HEM) is a compelling opportunity for utilities.**

- **Home energy management products help customers track consumption patterns** in order to reduce their energy costs or improve their energy efficiency. HEM providers sell both directly to consumers and to utility companies. Opower and Google's Nest are leading brands in the US.
- **Telcos can contribute to the HEM market by partnering with utilities** and connecting home automation to smart meters. For example, in Europe, Orange partners with EDF to provide HEM systems in France and Vodafone with npower in the UK.
- **Energy conservation** is influencing public policy in North America and Europe. Government measures such as emission standards and conservation programs (US Energy Star, Europe Odyssee) promote awareness and the advantages of smart homes.
- **By partnering with utilities, network operators** can provide not only energy monitoring, but also services such as remote diagnostics, repair and ongoing tech support.

### EXHIBIT 17: SMART METERING PROJECTS IN ASIA-PACIFIC, EUROPE AND THE US



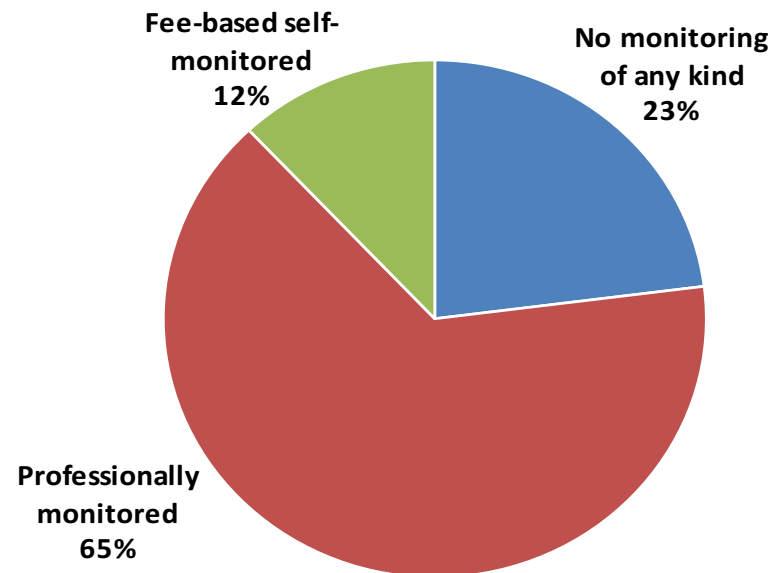
Source: Madrid Electric

## The role of home security platform providers and dealers

Security services, from sophisticated door controls to networked security cameras, are a major driver of smart home adoption.

- **Telcos have an opportunity to compete** with already established home security companies by providing branded platforms that offer security devices – door and window locks, smart alarms, sensors, alerts and video monitoring – at affordable fees.
- **Security pure-plays see their value-add capabilities** as clearly differentiating them from operators. Integrating security in smart home systems can, however, be lucrative for operators. Research in 2014 by platform maker Icontrol Networks found personal and family security to be the key driver in smart home adoption.

**EXHIBIT 18: MARKET SHARES OF HOME SECURITY SERVICES BY TYPE OF MONITORING**



Source: Securitysales.com

## Section 3: Telco positioning strategies and opportunities

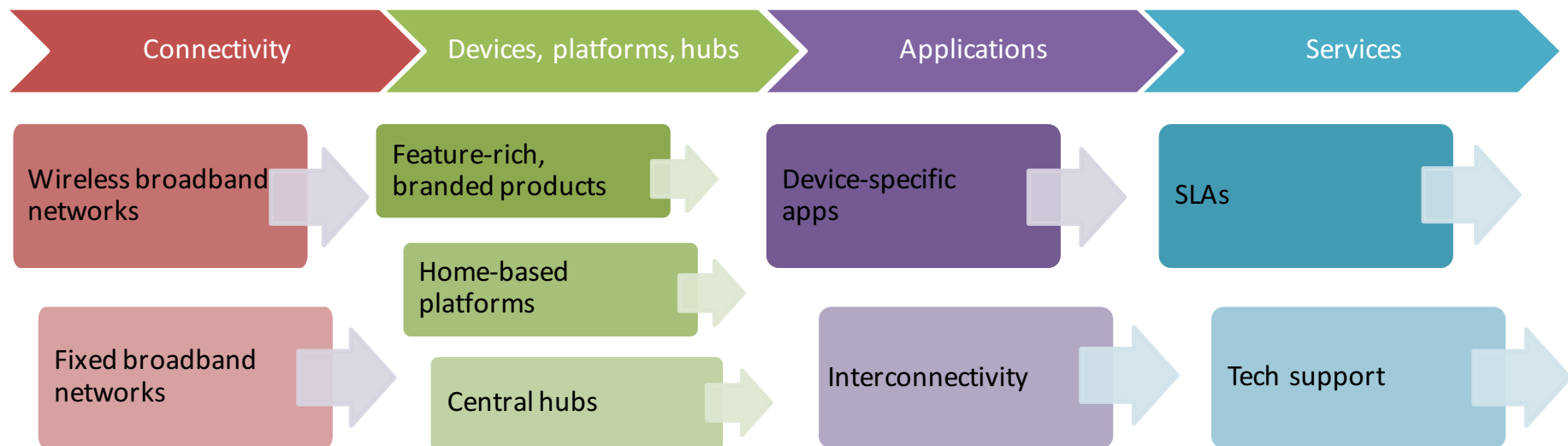
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## Opportunities across the smart home value chain

**Network operators have a role in every aspect of the delivery, daily functioning and maintenance of smart homes.**

- **Operators provide the connectivity** between end-user controls (smartphone and tablet apps), platform devices (hubs, bases) and the Internet via their wireless and fixed broadband networks.
- **Creating strategic partnerships** to provide white-label devices, platforms and apps are critical to increasing adoption. In 2011, Deutsche Telekom launched Quivicon to provide a platform that controls appliances from partners such as Samsung and Sonos. The operator also partnered with startup Yetu for its home devices and software.
- **A significant asset for operators is their central role in customers' lives**, a relationship they can use to offer smart home service bundles and supply much-needed technical support. For example, AT&T, Orange and HKT each offer comprehensive maintenance packages and service upgrades to increase adoption.

### EXHIBIT 19: IMPORTANT FUNCTIONS THAT NETWORK OPERATORS PROVIDE IN SMART HOME SYSTEMS



Source: Pyramid Research

## Telco positioning strategies

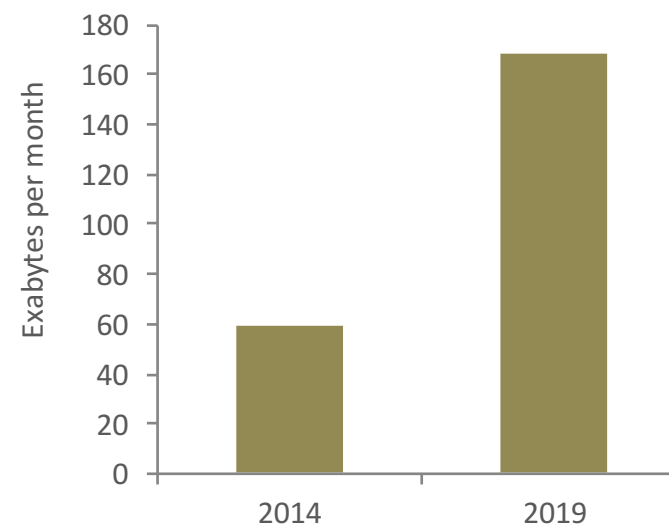
**Telecom operators are on the front lines of the onslaught of data traffic. They also have the tools for solving the complex issues related to smart home interoperability, installation, integration and data analysis.**

Telcos with successful platforms tackled five tasks:

- 1) Integrate stand-alone devices and apps** into a single platform, such as AT&T's Digital Life and Orange Homelive.
- 2) Partner with smart home service providers** as well as OEMs to offer innovative hardware. For example:
  - HKT collaborates with Cypress Systems, Schneider Electric and Philips.
  - AT&T partners with Samsung, LG Electronics, Lutron and Qualcomm.
- 3) Upgrade wireless and fixed networks** to handle increased data flows. For example, HKT launched its “ultra-broadband” in 2014 and expanded fiber-to-the-home deployments due to government directives.
- 4) Offer maintenance:** Providing tech support and services adds new revenue sources.
- 5) Invest in startups:** Funding new initiatives that provide innovative smart home products and services has helped telcos stay competitive. Telefónica and Deutsche Telekom each own startup incubators for innovative tech companies.

*Combining a number of approaches to launching smart home services – diverse partnerships, network upgrades, tech support, etc. – will enable telcos to capitalize on all their assets and increase adoption.*

**EXHIBIT 20: GLOBAL IP TRAFFIC PER MONTH, 2014–2019**



Source: Cisco, Visual Networking Index (VNI)

## Telco positioning: White-labeling

**By relying on white-label smart home devices and services and on products from established OEMs, operators can reduce overhead and accelerate the go-to-market process.**

- Selling white-label products and services from third-party vendors can benefit companies financially. Retailers (Iris by Lowe's, Connect by Staples) and network operators (Orange Homelive, Swisscom SmartLife) have built their branded platforms on top of SaaS or white-label technology from pure plays such as AlertMe (bought by British Gas), Icontrol Networks, Xanboo (acquired by AT&T), MiOS and Zonoff.
- White-labelling enables operators to take advantage of new innovations by third parties, saves resources and accelerates platform launches. For example, until British Gas acquired it in early 2015, AlertMe partnered with the UK utility to provide the infrastructure for HEM controls via its Hive Active Heating system.

### EXHIBIT 21: WHITE-LABELING ELIMINATES IN-HOUSE PRODUCTION AND EXPENSES



Source: Pyramid Research

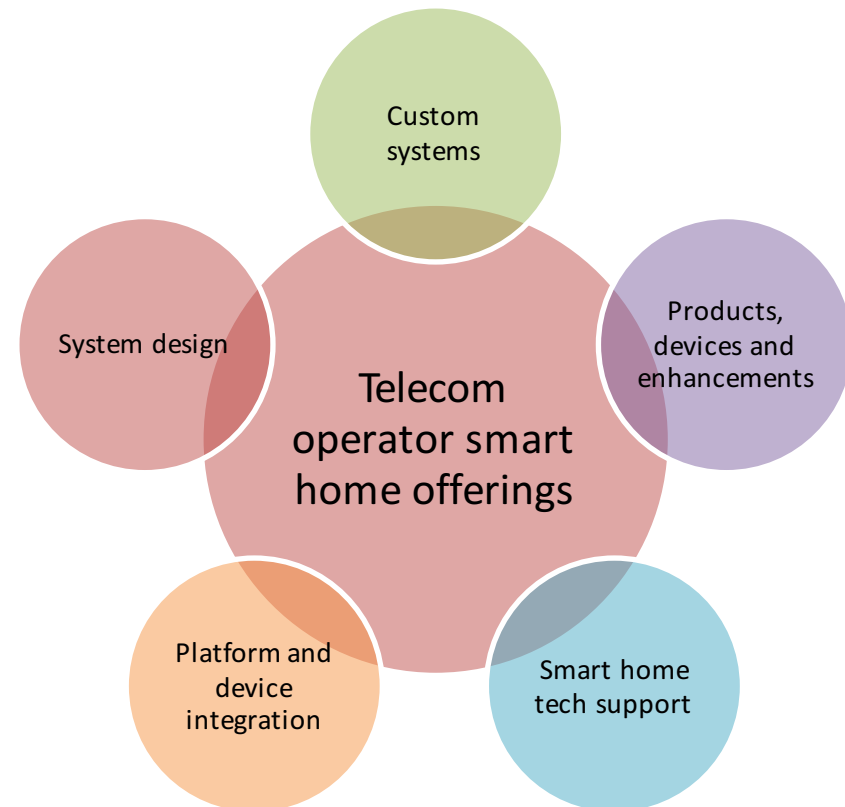
## Telco positioning: Smart home support services

**Telcos are the leading players in terms of penetrating households with smart home products – their Internet gateways, which offer an access point for support services.**

Able to draw on multiple assets – connectivity, devices, apps – operators are well-positioned to offer platforms. They also have other strengths:

- 1) **Secure, regular billing relationships** with phone and broadband subscribers are a direct line to potential smart home customers. Operators can support multiple subscription and payment options, including flexible split billing.
- 2) **Operators can use their existing sales forces** to promote smart home offerings to customers seeking technical support or sales guidance.
- 3) Operators already have **extensive tech support capabilities**, which can be used to acquire and service new customers. Smart homes would of course also offer a new source of tech support revenue.
- 4) **Remote diagnostics and maintenance** specific to the smart home can reduce homeowners' reliance on tech support and cut service costs. For example, Dutch energy company Eneco partners with platform maker Quby to provide smart metering that enables fraud detection and self-diagnosis, minimizing dependence on support services.

### EXHIBIT 22: ELEMENTS OF TELCO SERVICE OFFERINGS



Source: Pyramid Research



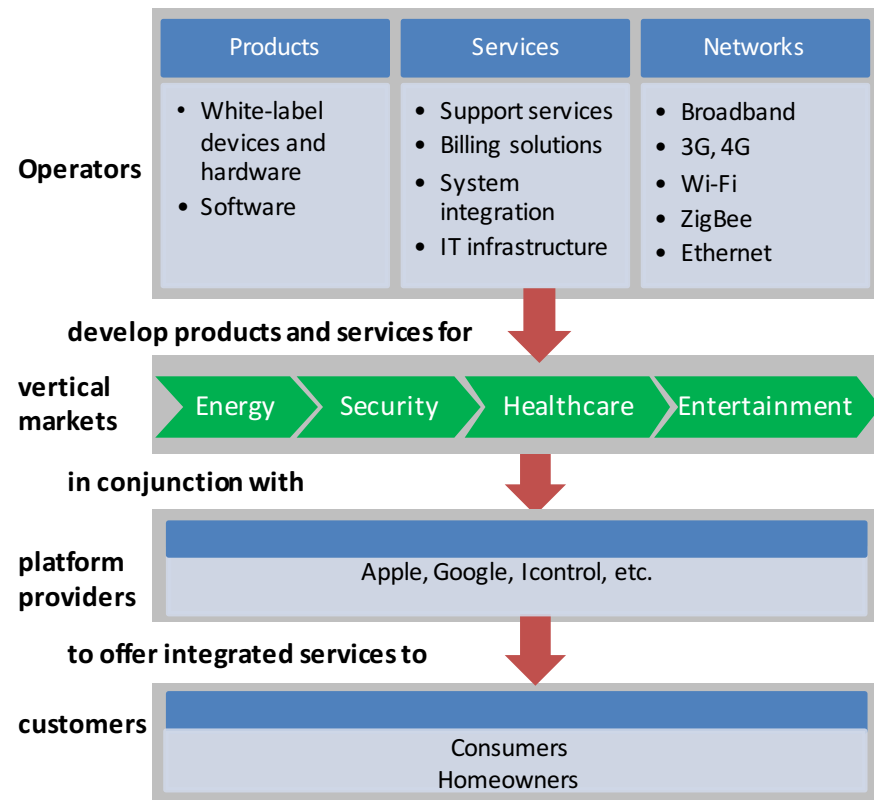
## Telco positioning: Bundling services, apps and devices

Historically, connected home services were led by home automation system manufacturers and installation companies, but telecom operators' bundled services have compelling advantages for users.

Consumers of smart home products and services are demanding a single source of support. Since operators already provide support for broadband or multiplay services, they are perfectly positioned to extend those support activities to include home automation.

- **The resulting service bundles add new revenue streams** from related features, such as app sales and advertising. Moreover, operators can get more out of their platform support by offering multiple tiers of service packages.
- **Broadband operators can capitalize on** their double- and triple-play services by providing smart home packages that include operational and technical support, repair, firmware upgrades, warranties and billing.
- **Operators can leverage online and retail portals:**
  - To promote their smart home services to potential customers.
  - To sell their own or branded devices as part of larger smart home packages.
  - To bundle data network subscriptions with smart home devices and services.

### EXHIBIT 23: VALUE CHAIN OF OPERATOR BUNDLING



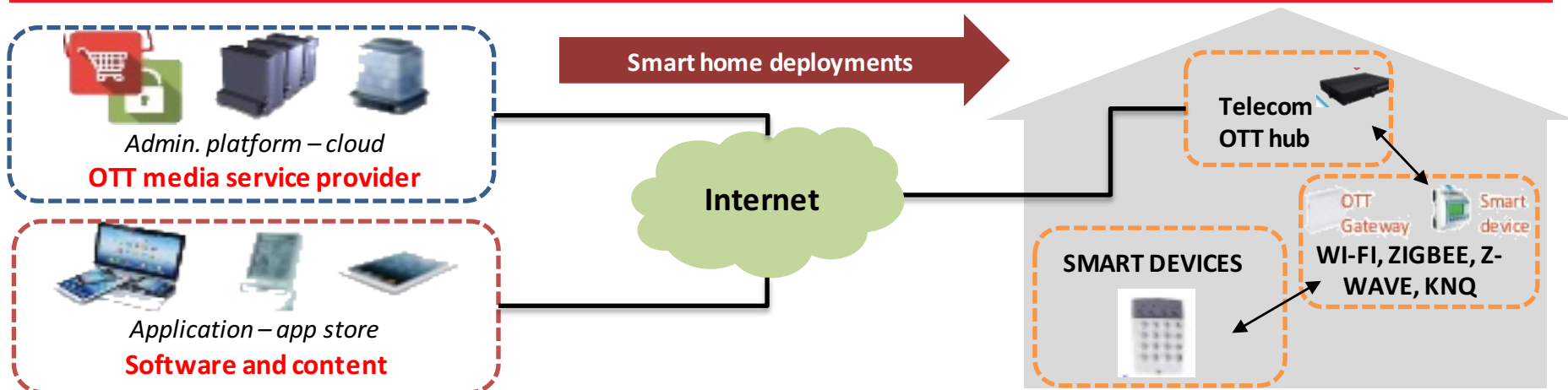
Source: Pyramid Research

## Telco positioning: Incorporating OTT in strategies

Partnering with OTT (over-the-top) players can expand the range of home-based digital services and increase smart home adoption.

- Regulations, technology and competition are driving open access, removing barriers between OTT and network providers, whether fixed or wireless.
- By bundling their services with other features, platform providers can improve the value of automation.
- Service bundles such as the classic quad-play provide the ability to layer more services on top, such as home alarms, motion detection, monitoring, streaming media, HVAC, lighting, home access and health monitors.
- Apple's HomeKit is an inclusive platform that capitalizes on the OTT services available on the Apple TV device by adding automated device and appliance control. Similarly, Microsoft's Home OS enables control of multiple kinds of home devices as well as a variety of media content via its central dashboard.

### EXHIBIT 24: HOW SMART HOME DEPLOYMENTS CAN USE OTT SERVICES



## Section 4: Key takeaways

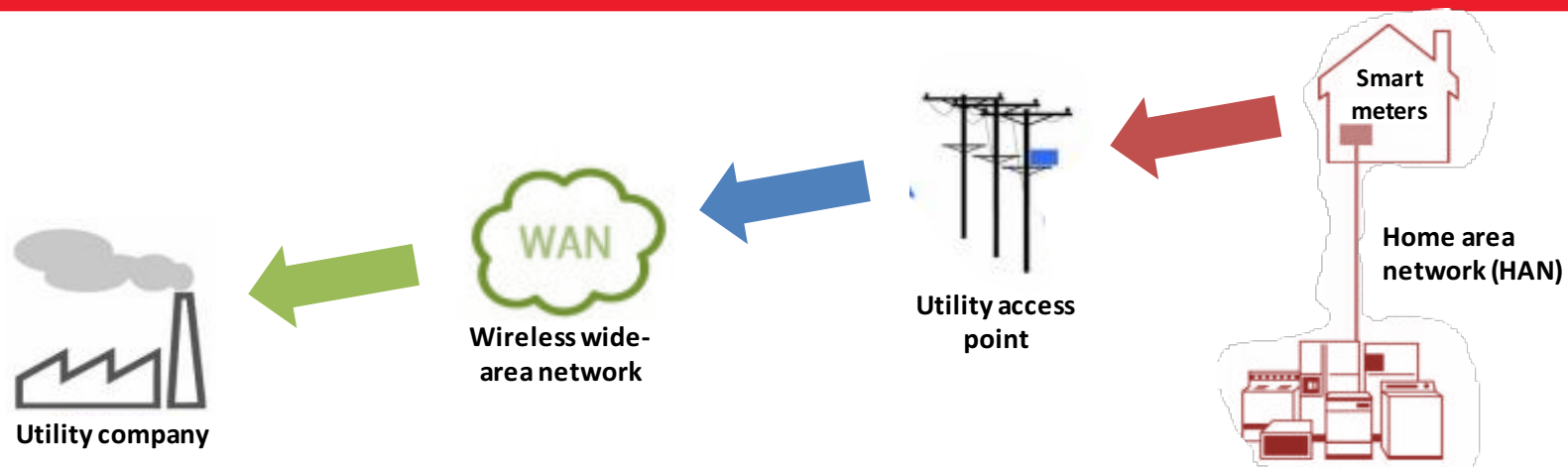
## Key takeaways

**Security and safety, smart meter deployments, energy conservation, government regulations and home electricity generation are spurring smart home adoption.**

Pyramid Research expects that beyond providing mobile and fixed broadband connectivity, operators will:

- Provide tech support services while offering white-label devices and platforms.
  - Help consumers derive optimal value from their smart home devices through installation, activation, connectivity and support.
- Improve the smart home proposition by bundling services such as broadband, HEM, device automation and support.
  - Telcos are in a unique position with customers thanks to:
    - 1) Preexisting billing and phone support relationships.
    - 2) Direct connections into the home environment via phone, wireless and Internet services.

### EXHIBIT 25: SMART METERING NETWORK COMPONENTS



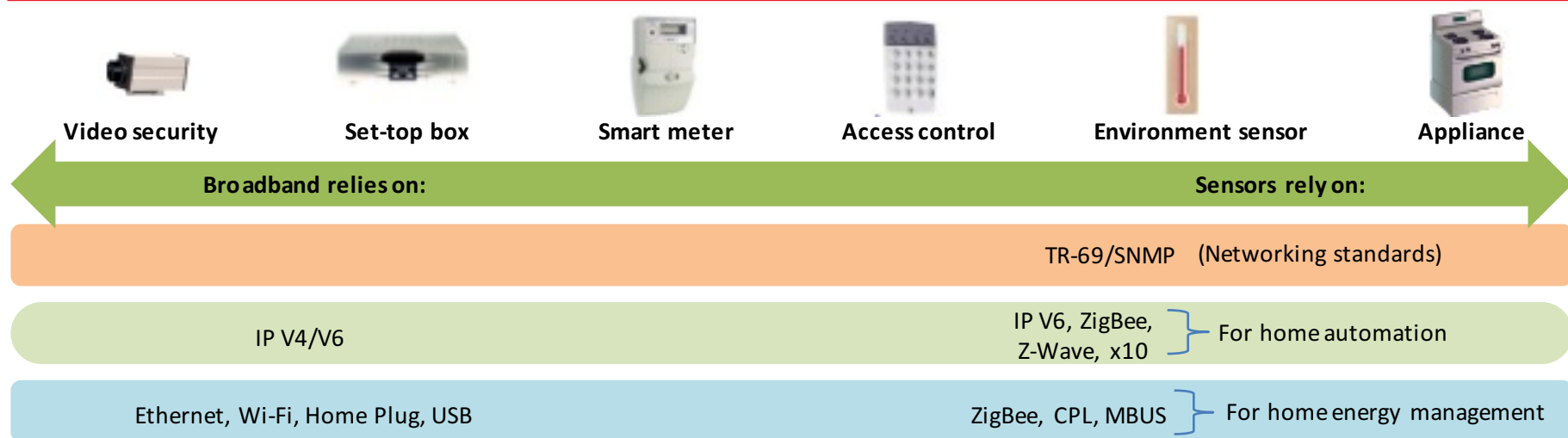
Source: Pyramid Research

## Key takeaways

**Telcos improve the value proposition of home automation by implementing a multi-play OTT strategy that offers a range of capabilities (security, HEM, appliance control, etc.) and by bundling services.**

- Telcos should use their online and retail portals to sell smart home devices and services.
- Regulatory mandates for energy conservation are spurring smart home market growth.
- Adoption is increasing in countries where governments actively promote faster broadband services.
- The TR-69 standard will play a major M2M role in delivering future smart home services.
- Operators can expand their service footprints by offering all-inclusive subscription-based smart home packages.
- Partnerships with companies from different industries are key to ensuring the role of operators in smart home functionality.

### EXHIBIT 26: DEVICE INTERCONNECTIVITY DEPENDS ON DIVERSE BROADBAND AND SENSOR NETWORKS

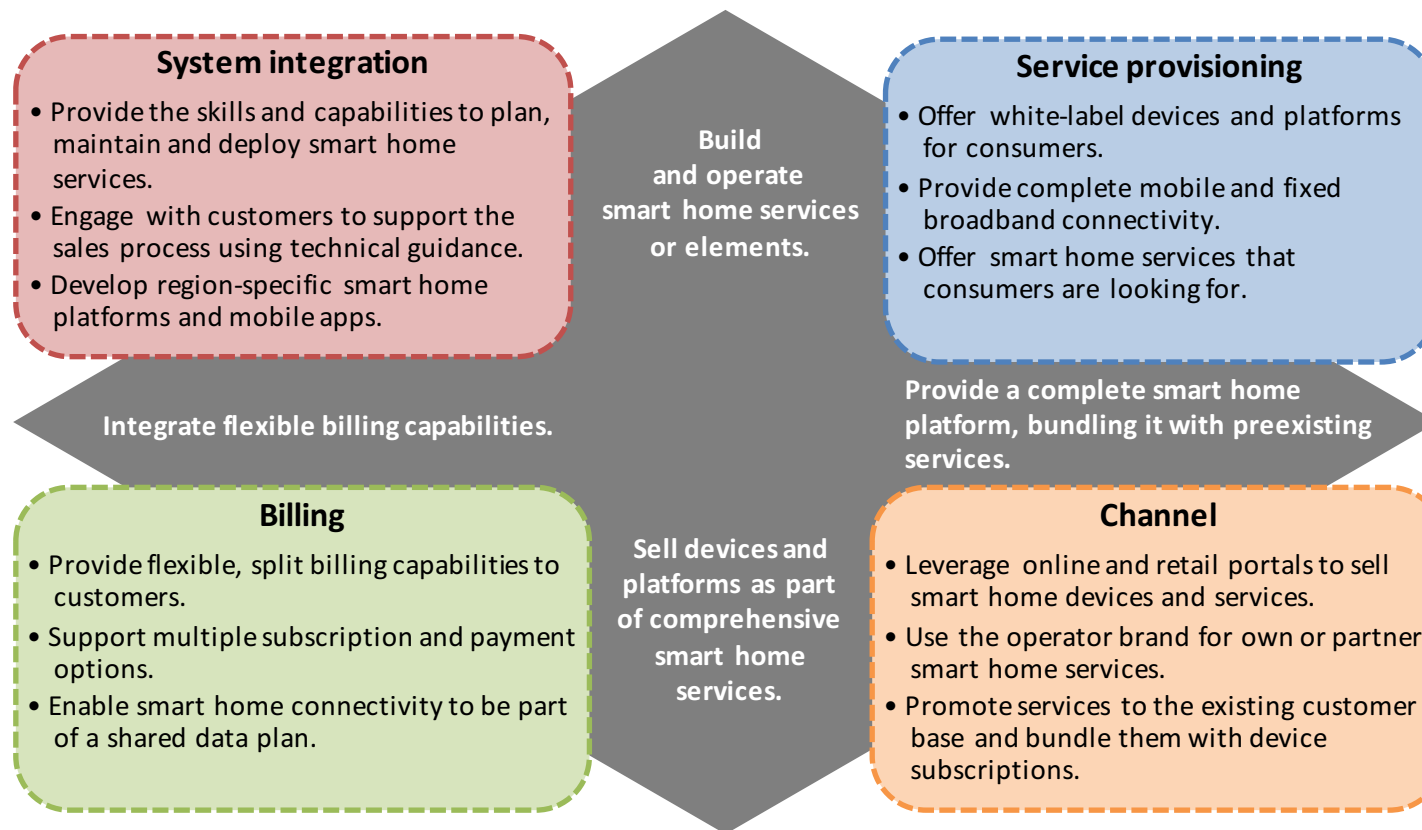


Source: Pyramid Research

## Key takeaways

Operators can combine elements from different approaches to create, market and operate compelling smart home services.

### EXHIBIT 27: INTEGRATED APPROACHES TO CREATING COMPELLING SMART HOME SERVICES



Source: Pyramid Research

## Section 5: Case studies

- I. AT&T, USA
- II. Orange, France
- III. HKT, Hong Kong
- IV. Rogers, Canada

## Case study: AT&T, USA

**AT&T introduced its Digital Life security system with home automation, energy management and e-health in 2013.**

- AT&T charges a monthly fee for Digital Life services, depending on the type of service and the level of functionality. Digital Life is available regardless of the customer's broadband provider.
- Packages start at \$39.99 per month and range up to \$64.96 per month, not including installation. Installation prices depend on the package selected. The service requires a two-year monitoring contract.
- Digital Life comes with an AT&T wireless connection and requires neither an AT&T fixed or mobile network subscription nor wireline broadband. It is not bundled with AT&T's U-verse fiber or DSL services.

### EXHIBIT 28: DIGITAL LIFE HAS ALLOWED AT&T TO INTRODUCE A RANGE OF SERVICES FOR THE SMART HOME

#### Automation

Alarms, access control systems, surveillance systems, door contacts, touch screens, motion sensors, keypads



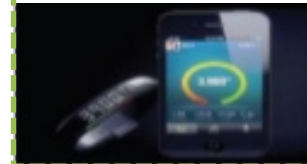
#### Energy

Keypads, display systems, advanced metering infrastructure (AMI)



#### Health

Remote monitoring and control, vital signs monitoring through sensors, data gathering over mobile networks



#### Entertainment

Video streaming, smart TVs, online content, virtual TV commerce



Source: AT&T



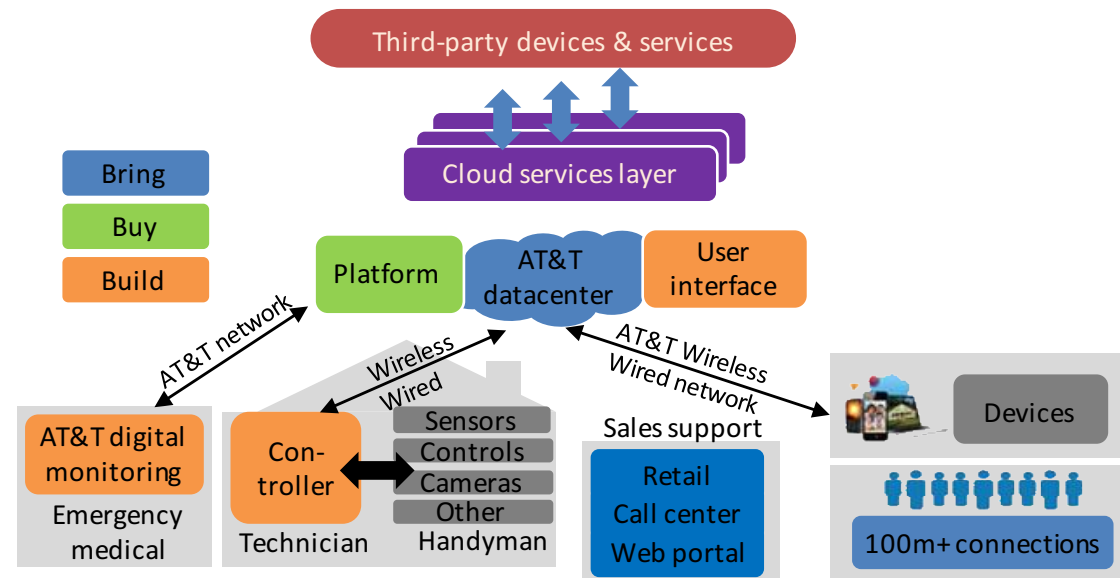
## Case study: AT&T, USA

**The open platform for global home monitoring and automation offers an advanced ecosystem of support services.**

- AT&T's smart home service, Digital Life, uses a proprietary platform that allows third-party devices, apps and services to be integrated. It can be used with broadband from any operator, but a monthly service fee and a two-year monitoring contract are required.
- The Digital Life portfolio is vertically integrated, offering various packages of hardware, such as a hub and sensors, for use with cloud-based applications. Instead of developing products and services solely in-house, AT&T has expanded the reach and influence of Digital Life via partnerships with other home automation companies.

### EXHIBIT 29: AT&T DIGITAL LIFE PLATFORM SERVICES

- AT&T has integrated its Digital Life offerings with products in strategic areas such as cloud computing, virtualization and security.
- Additionally, AT&T supports Digital Life through partnerships and its enterprise-focused program of opening its network APIs, which encourages developers to introduce and integrate a growing number of applications.



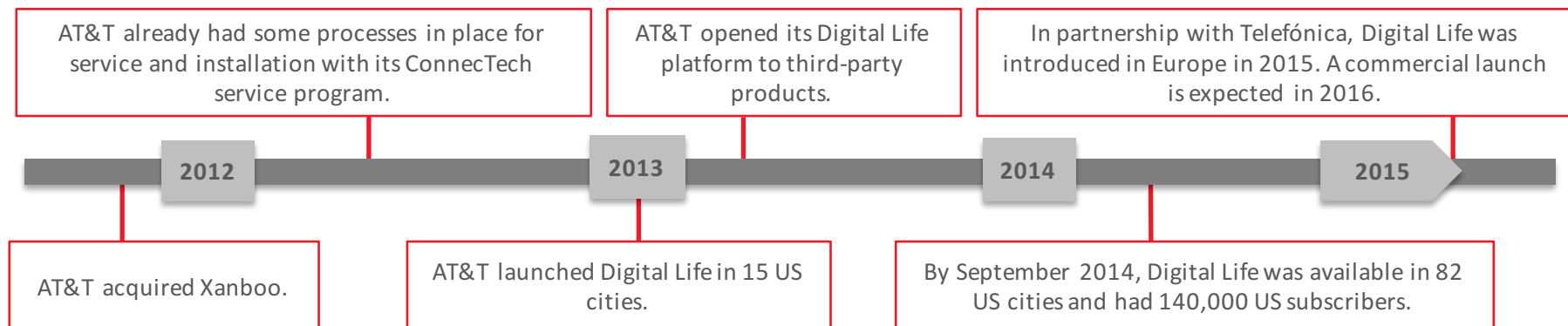
Source: AT&T

## Case study: AT&T, USA

**Digital Life is designed for multi-country use, enabling OEMs and developers to extend new services to global markets.**

- AT&T Digital Life differs from competing offers by network service providers, with more devices and package options to increase customer loyalty and revenue. The operator coordinates installations, and there are straightforward smartphone apps to control everything. AT&T stands to gain significant ARPU from subscribers.
- By allowing third-party products to work with Digital Life, AT&T makes it easier for the platform to keep growing and remain relevant as the number of digital home and wearable devices explodes.
- In 2014, Telefónica unveiled a plan to run a limited trial of AT&T's home security and automation service in Europe in H1 2015. If the trial and evaluation in Europe were successful, this will perhaps be extended to its Latin American markets.

### EXHIBIT 30: AT&T SMART HOME SERVICES TIMELINE



Source: Pyramid Research

## Case study: Orange, France

**Orange France launched Homelive in 2014; the service relies on a single smart app to control connected appliances.**

- Orange Homelive lets users manage appliances as well as security and energy devices and services remotely using the Homelive control platform on smartphones, tablets or PCs.
- The Homelive offering includes intelligent sensors and other devices from Orange partners that are compatible with the Z-Wave protocol.
- The service is not restricted to Orange customers and can be installed in any home with an Internet connection.
- The devices and other hardware are available from Orange stores throughout France and via the Orange.fr online shop. A basic pack is available for €79 (\$87), and users have to pay €9.99 per month for a 12-month subscription, which includes unlimited SMS alerts, tech support, data storage, service monitoring and notifications in case of Internet failure.

### EXHIBIT 31: THE HOMELIVE PLATFORM DEVICES & APPLIANCES

The basic Orange Homelive pack includes a Homelive hub, door and window controls, a motion sensor and an intelligent socket (which controls energy usage) from third-party OEMs.



**Homelive hub**



**Door & window sensors**



**Motion sensors**



**Intelligent socket**

Source: Pyramid Research, Orange

## Case study: Orange, France

**The Homelive platform provides customers with a diverse set of benefits, including security and monitoring of energy consumption.**

- Orange offers a feature-rich, easy-to-install platform that allows a smartphone or tablet with an HMI (human-machine interface) to control all home appliances. To provide additional peripherals and devices, the operator partners with Fibaro for smoke sensors, door and window sensors, motion sensors and more, with Vera for a cellular-capable hub and with Sercomm for cameras. Built on an open source model, Homelive lets customers add extra functions.
- While it has a smart-home-as-a-service (SHaaS) cloud component, the Vera platform is self-contained. The hardware includes a SIM card and cellular radio access for controlling devices when the home Internet access is down.
- Orange France plans to open concept stores focusing on the home, entertainment and office markets and to offer products and services for sectors such as smart cars and wellness.

### EXHIBIT 32: COMPONENTS OF THE ORANGE HOMELIVE PLATFORM



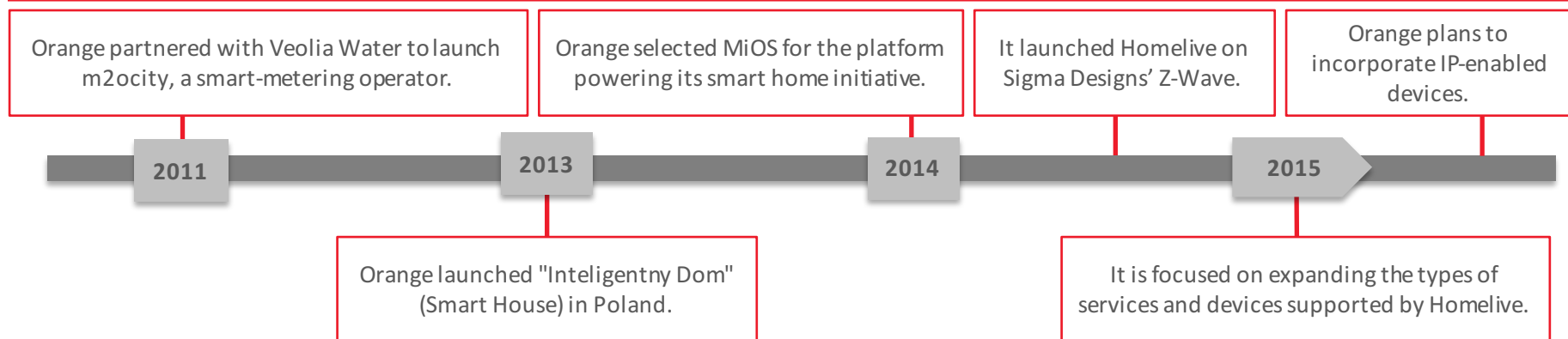
Source: Orange France, Pyramid Research

## Case study: Orange, France

**Homelive will be opened to third-party equipment, and Orange plans integration with IP-enabled devices.**

- Orange France intends to expand its smart home business by focusing on low-cost and easy-to-use offerings via Orange Labs, its R&D wing. For its home automation research, Orange Labs is setting up partnerships with a wide range of industry participants: new suppliers of connected devices, established OEMs and large service providers.
- Orange plans to further expand Homelive, which had more than 10,000 customers in March 2015. It is opening the service to third-party equipment and integrating IP-enabled devices, including Philips Hue, the Netatmo weather station and health-related wearables. It aims to develop a smart home platform that combines interoperability with an open architecture, with cloud storage for applications, data and its APIs, and with connections to a home network.
- Orange's developer program, Orange Partner, and its open-API platform, Datavenue, will also drive the company's smart home business.

### EXHIBIT 33: ORANGE FRANCE HOME SERVICES TIMELINE



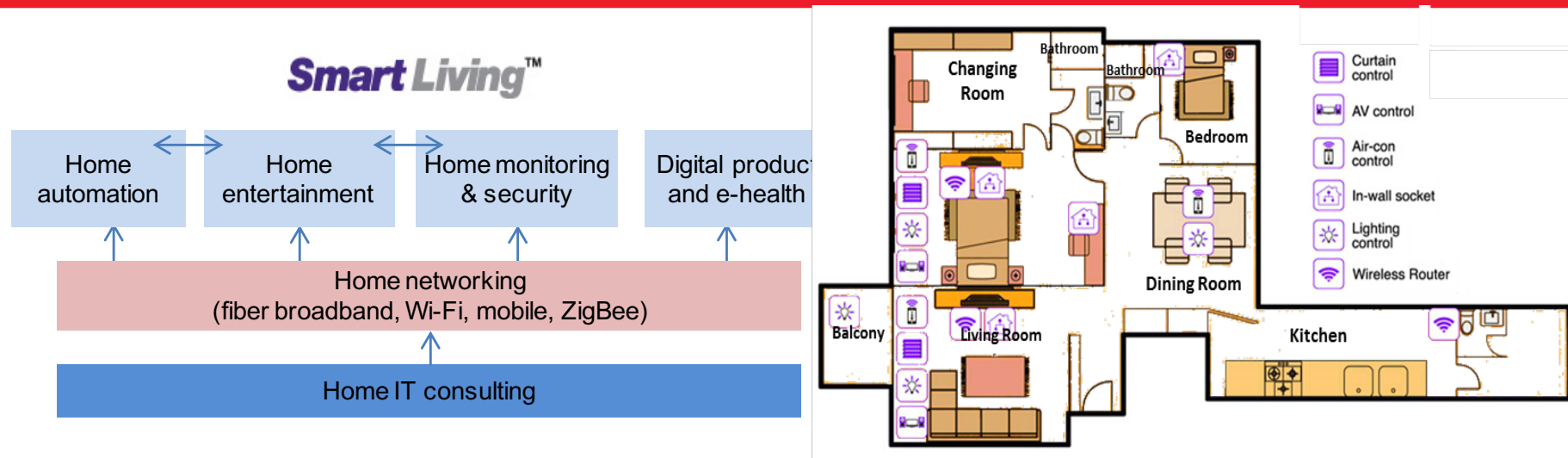
Source: Pyramid Research

## Case study: HKT, Hong Kong

**HKT launched its Smart Living platform in 2012 to provide customers with comprehensive home automation.**

- The Smart Living system from HKT includes home devices, security, media services (now TV, Moov), e-health (eSmartHealth) and cloud storage (uHub), accessed and controlled via HKT's white-label tablet, Eye. The operator also offers services like automation, network design and equipment installation.
- In addition to the Smart Living platform and its unique quad-plays, HKT also plans to offer customers content, applications, cloud services and transactional services.
- The price of the Smart Living home automation package, which can control air conditioning, lighting, curtains and TV sets, starts at HKD 11,800.
- HKT plans to expand the number of smart home devices connected to its existing in-home modems, STBs, now TV boxes and home networks, which are monitored and managed via its tech support service.

### EXHIBIT 34: HKT SMART LIVING'S RANGE OF SMART HOME FEATURES



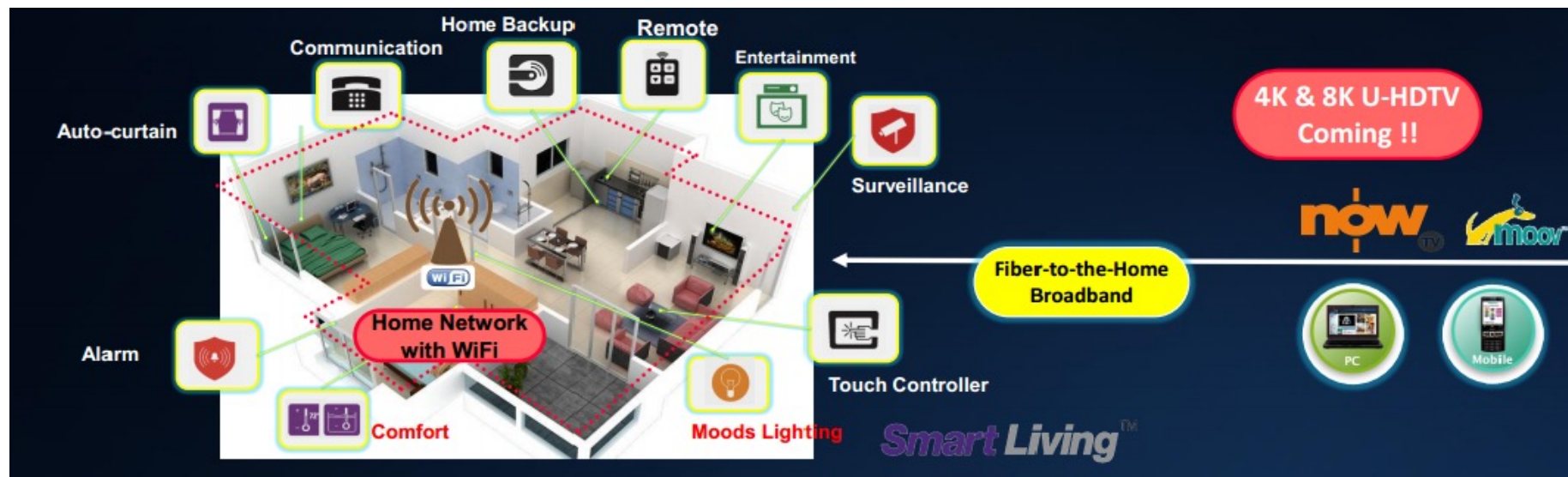
Source: HKT, PCCW, Huawei

## Case study: HKT, Hong Kong

**HKT's global partnerships show a company with a strong international focus on smart home innovation.**

- HKT pursues a quad-play strategy for its Smart Living home automation system, offering a uHub cloud storage service on top, with a promotional 25GB of free storage.
- Because it supplies broadband service to more than 68% of Hong Kong residents, HKT has a number of devices in the home, including modems, STBs and the EYE device. This creates an already-in-place network for smart home
- In order to expand its global footprint, HKT has partnered with Dubai-based du to offer smart home services across the UAE. Their cooperation will focus on five pillars: home networking (Wi-Fi, cloud); home automation and control; home entertainment (AV and TV services); surveillance and monitoring (intercom, IP cameras); and retail (VAS, devices and consoles).

**EXHIBIT 35: HKT'S SMART HOME CONTENT & SERVICES ON VARIOUS PCCW PLATFORMS**



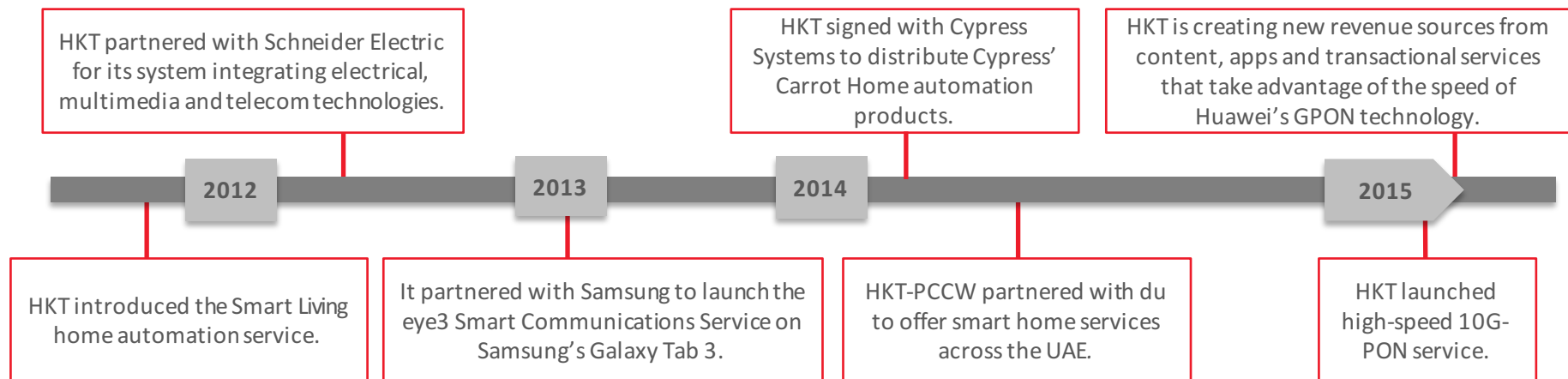
Source: HKT, PCCW, Huawei

## Case study: HKT, Hong Kong

**The operator aims to add interactive services to its Smart Living portfolio and upgrade its fixed network to 10G PON connectivity.**

- In order to improve ARPU and reduce customer churn, HKT has been increasing the number of installed devices – STBs, modems, white-label Eye tablets and fixed phones – that are connected via fixed, Wi-Fi, ZigBee or other networks.
- Devices on connected home networks can be discovered, configured, monitored and maintained through HKT's network operations center.
- HKT makes use of the capabilities of its partners: Panasonic (home monitoring and security), Cisco (smart device apps), Samsung (remote devices) and Schneider Electric (automated electrical devices, control technology).
- Upgrading its GPON FTTH network to 1Gbps and 10Gbps and adding interactive services such as applications, content and transactional services to its Smart Living portfolio will strengthen HKT's home entertainment offerings.

### EXHIBIT 36: HKT SMART HOME SERVICES TIMELINE



*Source: Rogers Communications*

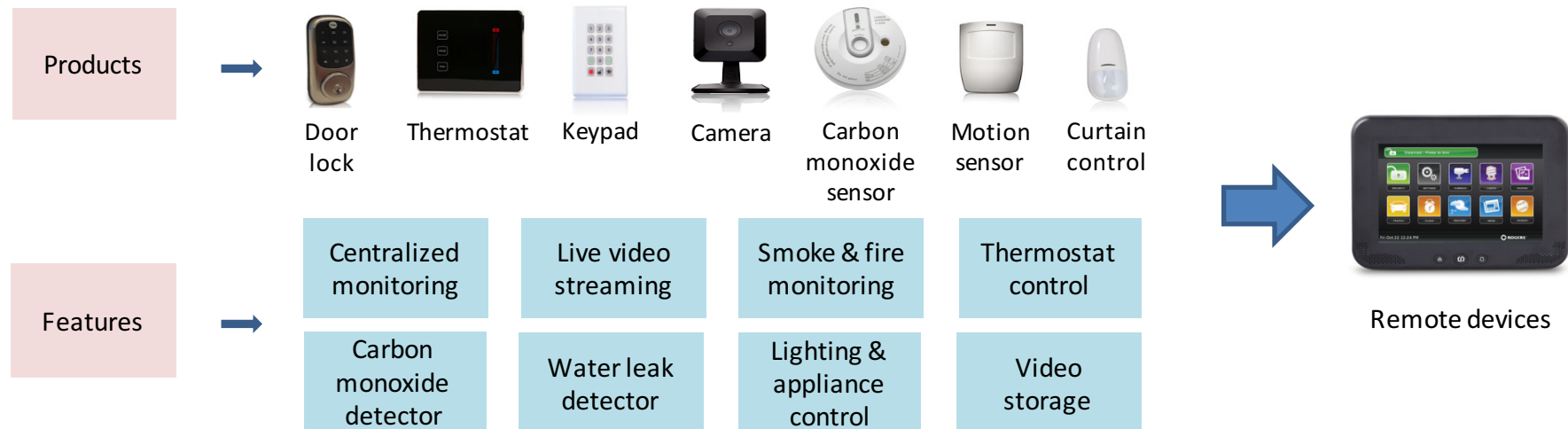


## Case study: Rogers Communications, Canada

The communications and media company launched its Smart Home Monitoring platform on its cable network in 2011.

- Rogers Communications' Smart Home Monitoring (SHM) platform lets users control alerts, access, cameras, thermostats, lights and appliances from smartphones or PCs.
- The home automation system is offered with free installation on a two-year contract. For \$19.99 per month, Rogers sells a basic plan that includes remote access, alerts, appliance control, a touchpad rental, a smart light bulb, a small appliance module and a door or window sensor.
- Because the operator subsidizes the hardware, customers must pay back the subsidy prorated if the contract is cancelled within the two-year limit.
- Customers are not required to take on additional services, and the platform functions with any ISP. Discounts offered by insurance company Allstate can offset any initial investment.

### EXHIBIT 37: FEATURES OF ROGERS' SMART HOME MONITORING PLATFORM



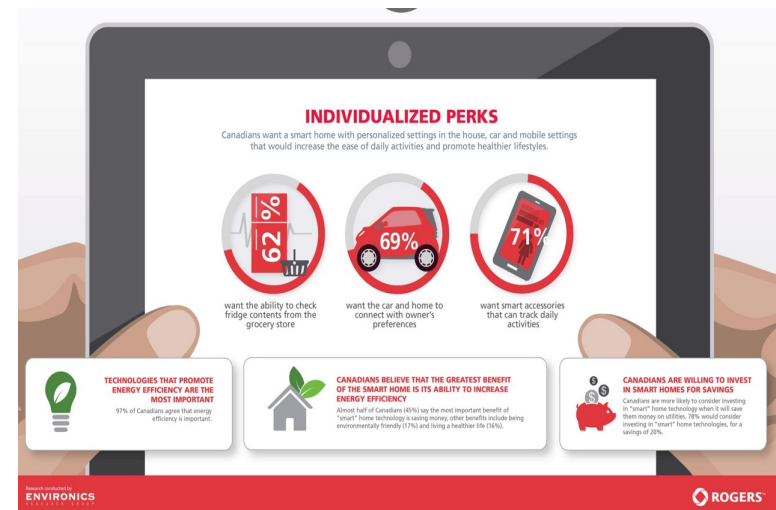
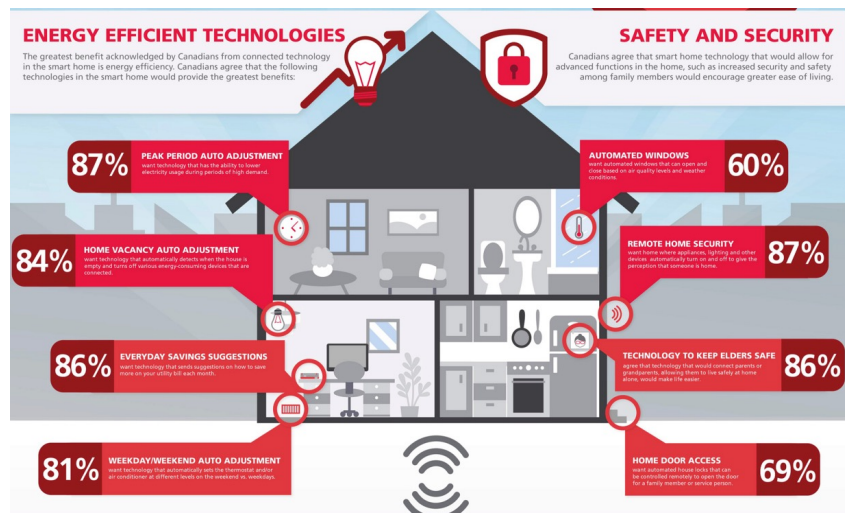
Source: Rogers Communications

## Case study: Rogers Communications, Canada

### Rogers' Smart Home Monitoring platform could disrupt traditional home security service providers by capitalizing on demand for connected devices.

- Rogers built the SHM platform on the OpenHome software platform from Icontrol Networks.
- The affordability of the operator's basic smart home package should leave room in household budgets for additional connected devices, such as door locks and cameras.
- Besides its cable network, Rogers owns media, sports and entertainment properties that may benefit its smart home foray; it also has partnerships with broadcasting companies and provider agreements with Canadian utilities. The company has extensive experience with bundling services.
- Rogers strengthened its position in the Canadian smart home market in mid-2015 by acquiring mobile operator Mobility.

#### EXHIBIT 38: ROGERS' SURVEY OF CANADIAN SMART HOME PREFERENCES



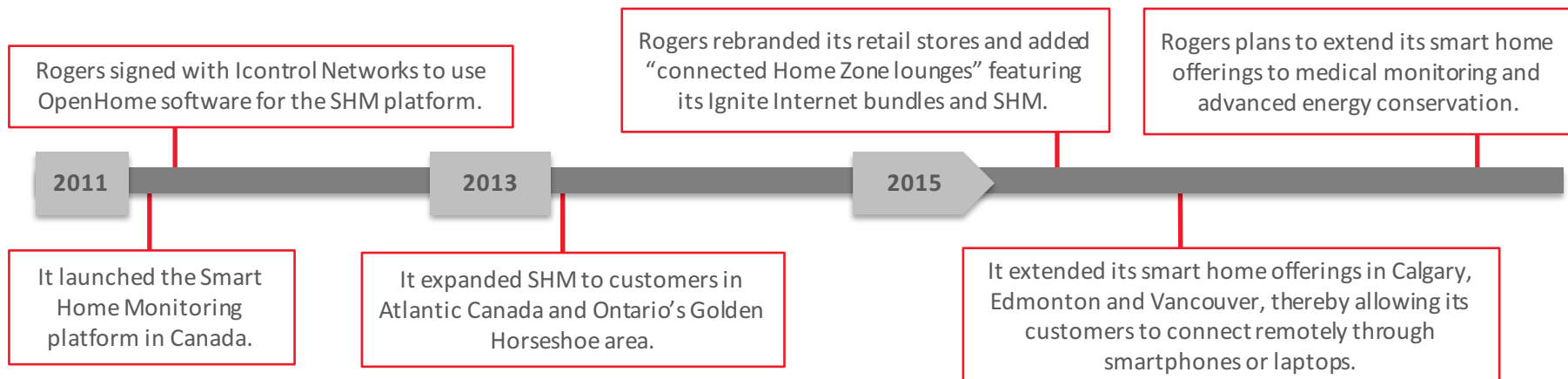
Source: Rogers

## Case study: Rogers Communications, Canada

**The operator is extending its national smart home service footprint by launching services and rebranding its retail stores.**

- Rogers ventured into the smart home market in response to the energy efficiency and spending preferences of Canadian households. Because of the climate in Canada, energy efficiency is crucial to household cost savings, interest in smart home technology is higher than in most comparable economies.
- Smart Home Monitoring users can control their homes using a smartphone app and a central online portal, which are powered by OpenHome automation software from Icontrol Networks. Rogers also partners with third-party vendors for the apps that run on the platform.
- Roger wants to extend its smart home footprint across Canada: in 2015, it launched service in Calgary, Edmonton and Vancouver. It also rebranded its retail stores and added ‘connected Home Zone lounges’ featuring its Ignite Internet bundles and Smart Home Monitoring offerings.

### EXHIBIT 39: ROGERS SMART HOME MONITORING SERVICES TIMELINE



Source: Pyramid Research

# Appendix

- I. Companies mentioned
- II. About Pyramid Research
- III. Pyramid Research contact information

## Companies mentioned

ADT  
AlertMe  
Allstate  
Apple  
AT&T  
British Gas  
CGI  
Cisco  
Cypress Systems  
Denon  
Deutsche Telekom  
du  
Eneco  
eSmartHealth  
FrontPoint Security  
General Electric  
Google  
Honeywell  
Hong Kong Telecom (HKT)  
Icontrol Networks  
LG Electronics  
Lowe's  
Lutron  
M2ocity  
Microsoft  
MiOS  
Mobilicity  
Moov  
Netatmo  
Now TV  
Orange  
Panasonic  
PCCW  
Philips  
Qualcomm  
Quby  
Quivicon  
Rogers Communications  
Samsung  
Schlage  
Schneider Electric  
Sonos  
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Telefónica  
uHub  
Veolia Water  
Verisure  
Whirlpool  
Xanboo  
Yetu  
Zonoff

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### ADVISING LEADERS IN THE GLOBAL COMMUNICATIONS INDUSTRIES ON EMERGING MARKETS AND SERVICES OPPORTUNITIES

Pyramid Research ([www.pyramidresearch.com](http://www.pyramidresearch.com)) offers practical solutions to the complex demands our clients face in the global communications industry. Its analysis is uniquely positioned at the intersection of emerging markets, emerging technologies and emerging business models, powered by the bottom-up methodology of our market Forecasts for more than 100 countries — a distinction that has remained unmatched for more than 25 years.

### HOW WE COVER COMMUNICATIONS MARKETS

Our highly structured analysis closely examines the performance, technology trends, and macroeconomic and regulatory environments of service providers and equipment vendors in each of the more than 100 countries we cover. Using a bottom-up approach, we size market demand across services and countries, and conduct end-user surveys to validate adoption trends and anticipate shifts in demand. Our commitment to intensive, direct interviewing of regulatory authorities, service providers and manufacturers — complemented with end-user data — ensures the most reliable portrait of every market we examine.



## Meet us in person

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