

**EXECUTIVE  
EXCERPT**

**Jefferson Wang  
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Amol Phadke**

# **THE FUTURE HOME IN THE 5G ERA**

**Next generation strategies for  
hyper-connected living**



# **PRAISE FOR *THE FUTURE HOME IN THE 5G ERA***

‘This book takes an in-depth look at one of the most fascinating challenges of today: It sheds light on the emergence of a radical new experience of home driven by new technologies such as 5G, AI, eSIM and edge computing. And by using a powerful mix of real-life examples, strategic frameworks and thought-leading themes, it brings some great new insights for business leaders in the ecosystem connected to the Future Home. A must-read.’

**Vinod Kumar, CEO, Vodafone Business**

‘As new technologies such as 5G and others disrupt our daily life – including our homes – this book shines new light on how communications service providers can thrive and grow in a landscape full of opportunities but also full of competitors pushing from many sides. It is an inspiring roadmap for leaders to do the right strategic steps into the promising era of the Future Home.’

**Mari-Noëlle Jégo-Laveissière, Deputy CEO/Chief Technology and Innovation Officer, Orange Group**

‘An inspiring book that helps industry leaders to finally capture the opportunity of the fast-growing Future Home market. The authors provide great insights about the impediments and challenges of the Future Home market as well as a practical guide on how to resolve them.’

**Dr Dirk Wössner, Member of the Board of Management, Deutsche Telekom/Managing Director, Telekom Germany**

'A comprehensive well-written book on the impact of new technologies such as 5G on the rapidly evolving Future Home. With a smart strategic framework complemented by compelling real-life examples and use cases, this book is an inspirational call-to-action.'

**Eric Bruno, Senior Vice President of 5G, Content and Connected Home Products, Rogers Communications**

'*The Future Home in the 5G Era* gives executives a language and a framework to determine how they will evolve their products, services and strategies to flourish and innovate in a large, fast growing market.'

**Clive Selley, CEO, Openreach**

'*The Future Home in the 5G Era* brings some great new insights into the new hyper-connected home environment in which devices and apps will work together seamlessly to respond and anticipate customers' needs. With grounded research and innovative ideas, this book makes a stringent case for business leaders in any sector relevant to the emerging Future Home market with its enormous new opportunities. A must-read.'

**Babak Fouladi, Member of Board/Chief Technology and Digital Officer, KPN Group**

'This is an inspiring book on how we can understand the emergence of a new experience of home and on how companies can seize the enormous business opportunities connected to this new experience. New perspectives, fresh concepts, unexpected ideas abound. *The Future Home in the 5G Era* is a ground-breaking book.'

**Ben Verwaayen, ex CEO BT Group, Alcatel-Lucent**

‘Unfulfilled promise or future revolution – the connected home remained an enigma until the appearance of this analysis. The authors make a compelling case that cloud and 5G connectivity will ultimately deliver the seamless platform play the world is waiting for. And in delivering this message they sparkle with ideas and innovative concepts – small wonder, given their collective entrepreneurial, corporate, tech and multi-industry experience.’

**Jens Schulte-Bockum, COO, MTN Group**

‘*The Future Home in the 5G Era* comes at an opportune time, as science and new digital technologies unleash disruptive change across all fronts, transforming the (digital) lives of almost every individual: as private person, as customer, as manager, as citizen or in other roles and function. An inspiring book – with fascinating stories, well researched, clearly explained.’

**Prof Dr-Ing Boris Otto, Managing Director, Fraunhofer ISST (Institute for Software and Systems Engineering)**

‘The nature and experience of home is fundamentally changing with 5G. Well researched and with concrete suggestions on 5G implementation, this valuable guide will help firms and leaders seize the opportunities of an emerging multi-billion-dollar market: *The Future Home in the 5G era.*’

**Igor Leprince, Chair, WM5G Board**



# Executive excerpt

*This is an advance executive excerpt from The Future Home in the 5G Era, which will be published in April 2020. The excerpt comprises endorsements, the table of contents, introduction, Chapter 1, Chapter 7 and information about the authors.*

*NB. The page numbering here is taken from the book and does not match the pages in this excerpt. The excerpt omits the endnotes, although markers to them have been left in the text.*

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# Introduction

## The Future Home in the 5G era and beyond

Home is where the heart is, so the saying goes. The old adage conveys a powerful truth that is increasingly relevant in the era of digital transformation. Because in essence it assumes that ‘at home’ can be anywhere. As long as emotional roots anchor us in a specific place or environment, the exact physical location of ‘at home’ becomes irrelevant.

In the era of advanced technologies, feeling at home depends mainly on the quality of the user experiences provided by the digital services that surround us, whether we’re stationary or mobile. If, for example, such services become so seamless and ubiquitous that we can start watching a film on a screen in our living room, then continue without interruption or hassle on the screens of the autonomous vehicle we boarded to get to a dinner with friends, we are likely to feel ‘at home’ regardless of whether we are between four walls or on four wheels.

In this book we assume that the traditional notion of home as a static shelter will soon be entirely replaced by the new consumer mindset of ‘at home is everywhere’. Central to this will be the idea that anything that means home to us – from our favourite room temperature and air quality to our preferred light shades, entertainment and education suites, fitness and health devices, door security features and refrigerator contents – will very soon be emulated in outstanding quality via advanced, seamless and intelligent technology wherever we go: in an autonomous vehicle, at a holiday resort, on a leisure cruise, or even, with allowances for the needs of others, during a stopover at our in-laws. This means, in essence, that our home will turn into an envelope wrapped around us throughout the day.

Consider the point connectivity has already arrived at today. We seem to be approaching the age of hyper-connectivity full-throttle. The broad digital transformation of society means that wave after wave of connectivity technology is turning the world of ordinary objects into one of connected intelligent items – the frequently invoked Internet of Everything. The benefits for our social life are massive. Mobile and digital technology already enables us to stay in touch over enormous distances. It allows us to monitor the moments, moods and well-being of people far away, and we can co-work and even participate in a romantic relationship from almost anywhere in the world. What meant ‘home’ to us for centuries has already started to morph into a fluid hyper-connected lifestyle filled with highly personalized services based on new technologies.

## **The Future Home: The hub for hyper-connected living**

To frame this thrilling, emerging world, we’ve coined the term Future Home, which also gives us the title of this book. We see the meaning of this phrase as very specific, exclusively reserved for the home that finally and truly delivers on the promise of seamless, highest-quality and genuinely life-enhancing digital services.

What is it that makes us think the Future Home is within sight? It is the growing number of enabling technologies maturing to a level of quality that will allow them to render the home intelligent, aware, able to understand, anticipate, predict and decide or provide relevant options. The main plank among these new technologies is the 5G wireless radio standard and its possible advantages: near-real-time responsiveness (ultra-reliable low-latency), very fast speeds (enhanced mobile broadband), connecting almost all devices (massive Internet of Things or IoT) and network slicing. This is, in our view, going to be the number one Future Home driver among all the novel enabling technologies. However, artificial intelligence (AI), edge computing and advanced data analytics are similarly important as they will enable the outstanding user experience

we envisage. Enabled by 5G connectivity, they will reach the height of their potential in the Future Home.

As a feeling of ‘at home’ will always be relevant to human beings, those technologies will turn the Future Home into the central enabling hub of densely digitalized lifestyles for people from all walks of life. In such hyper-connected homes, we will have remote doctor’s appointments, learn with holograms of teachers and students, and have access to services via any surface or display at hand. Advanced home tech will also think ahead for us, doing things like checking for unexpected road construction to ensure you arrive on time at that important work meeting. Days in advance, intelligent kitchens will have thought about your birthday party, asked the invited friends for dietary restrictions and, in response to their replies, stocked up automatically on just the right amount of personalized food based on preferences.

## **Roadmaps and capabilities for success in the new home market**

In this radical perspective on Future Home life, our book lays out practical business strategies that allow a wide spectrum of sectors along the value chain of home services to make the most of the newly emerging markets. Among many other things, we show business practitioners the obstacles that need to be overcome so that we can create the Future Home. But we also crucially introduce readers to roadmaps and core capabilities that make them best placed to turn the opportunities of these new markets into value and profit.

We open our analysis of the Future Home with a brief scenic immersion in the day of a ‘person on the street’. This character, described in Chapter 1, is supported by digital services constantly. Following such an individual through the day colourfully illustrates our view that the Future Home will be the main enabling hub for hyper-connected life regardless of its dwellers’ physical locations.

Then we flip our perspective. From one possible lifestyle we enlarge the picture to describe a comprehensive typology of Future Home dwellers and how their lives will look when assisted by advanced home tech. The second chapter is therefore entirely dedicated to modern socio-demographic trends as well as the attitudes and mindsets of Future Home users – families, singles, youngsters and seniors from many contexts. Readers will realize one important imperative here: businesses interested in entering the Future Home market must focus on human needs, desires and dreams first and then create the technology stacks that fit these human requirements. Up to now, promising technologies have all too often been solutions in search of a human problem – thus failing to spark mass user demand. One of the central tenets of this book is to stick to a strict human-centric stance instead of imposing the marvels of new technologies on people regardless of need or desire.

In Chapter 3 we look at two of the mindsets from Chapter 2 in more detail, one giving us a window into family life and the other an overview of advanced healthcare at home. This provides a clear picture of how Future Home technology will need to be able to not only respond intelligently to the needs of different home users, but also communicate with service providers from outside the home and even with other Future Homes.

## **Experience-rich home services: Still held back by low tech**

User experiences in today's connected homes – we eschew the term 'smart homes', as it's undeserved – are still basic. As we lay out in the fourth chapter, they fall utterly short of an 'at home everywhere' experience. Worse, their sluggish primitivism seems to be caused by a chicken or egg problem: without enough high-quality and experience-rich consumer services, there will be no appetite for more advanced home technology, but without demand, the business cases that could drive Future Home development will not be created.

Technologically, today's connected homes are held back by too many isolated point-to-point device solutions without overarching orchestration.

They're a hassle to set up, in other words, and don't deliver the seamless interconnectivity and interoperability that could genuinely assist us, as in the example of the birthday party, in which the kitchen, calendar, e-commerce and address book work as one. This disjointedness, in particular, gives the tech a bad name and impedes expansion of demand. For the Future Home market to take off, much more service quality and tech orchestration is needed.

Beyond the problems of fragmentation and inadequate device orchestration, we also show how the arrival of the Future Home is held back by issues such as the high cost of connected devices and the shortcomings of the connectivity fragmentation in the home today with Wi-Fi, ZigBee, Z-Wave, Bluetooth and other standards. And we show how the incoming 5G wireless standard will change things, acting as a powerful consolidator and a kick-starter for highly commercial Future Home markets.

## **Data security: The factor putting communications service providers (CSPs) in pole position**

Nowhere do we interact with technology more intimately than at home. Therefore, data privacy and data security, as well as ethical standards on what tech-born intelligence is allowed to decide, will nowhere be as paramount as in the Future Home. We devote the whole of Chapter 5 to this important subject, a leading theme of our time and one of the most decisive factors for the emergence of the Future Home market. Just a few breaches, leaks, hacks or other data failures can obviously have enormously detrimental effects on user trust and willingness to accept advanced tech. Data security and data privacy, as well as ethically acting machine intelligence, are therefore make-or-break criteria for the success of the Future Home as a business case.

We postulate that users should be given absolute sovereignty over their data and that communications service providers (CSPs), platform providers, device manufacturers, cloud providers and third parties involved in Future Home ecosystems should work towards high and universal security standards to reinforce home tech against bad actors.

With regard to consumer trust, we make the point that CSPs such as wireless network operators, incumbent telephone operators or cable network businesses are well placed to inspire such faith, being the only parties with experience of handling sensitive user data in huge quantities for decades without significant breaches. What's more, they will be the players phasing in 5G networks, so will control one of the main Future Home enabling technologies.

## **Orchestrating data management as a consumer trustee: The holy grail**

But which actors are best placed to be the orchestrating hand so badly needed in today's technologically incoherent homes? Our answer, condensed in Chapter 6, is, again, CSPs. No other businesses have such a high trust track record, millions of relationships with end-users, and long-term experience of running critical communications infrastructure.

But in the era of the Future Home, even CSPs cannot go on catering for their customers the old way. They need a radical revamp to become more agile, innovative and responsive to customers. Otherwise, we argue, they will not be able to conquer the economically attractive position of orchestrator for user services and data to improve lives. Without deep-running operative reform, many of them will lose out to other more platform-style parties taking that privileged role. We show what's needed for such thoroughgoing reform.

## **Overcoming inertia, tech hurdles and entrenched attitudes**

What is also clear is that the Future Home will be built around data – massive amounts of it – and pervasive information flows in the home. Therefore, businesses involved in home tech must open up and either form or join home tech platforms. Only a platform nourishes itself by

amassing user information to levels that can be transformed into insights and these, in the end, are what will feed experience-rich home services.

For CSPs, a group of companies given special focus in this book, this question will probably become one of survival. Historically accustomed to deliver hardware and connectivity in the shape of vertical organizations with siloed departments, most of them are still far from prepared to be the primary managers and traffic wardens of data flows in the Future Home. Just controlling data infrastructure, as they have done for decades in their traditional role, will not suffice here. We look in detail at the nature of their new role as Future Home orchestrators in Chapter 7.

Overall, the siloed containment of usage data by proprietary home device makers has been a huge problem. Up to now, it has hindered the creation of experience-rich home services as it prevents devices from sharing the information necessary not only to provide seamless services collaboratively, but also for the home as a whole to learn and develop its offering intelligently in line with changing user needs. We are not yet there by any means, but we hope that the multi-billion-dollar business opportunity the Future Home offers can act as argument enough to bring more coordination, interoperability and cooperation into this promising market. All industries involved, all partners joining ecosystems around Future Home markets, should open up to the idea of sharing standardized data for home solutions to improve the user experience.

In its last part, this book looks into ways to overcome the hurdles of old-style technologies and entrenched business attitudes. In Chapter 8, we dedicate much thought to strategies for CSPs and other ecosystem members on how to overcome data silence between Future Home devices and the different service, hardware and software providers involved. Here, we stress the necessity to create joint standardized data reservoirs that allied ecosystem partners must be able to tap into for good and experience-rich home services to improve the user experience.

Finally, to cap things off, in Chapter 9 the most important strategic points and pivots to keep in mind on the journey to success in the emerging



Future Home markets are summarized for quick, practical referencing by industry practitioners from all relevant sectors.

This book is, beyond the CSP sector, equally relevant to all other players within Future Home ecosystems: device manufacturers, platform providers, app designers and the industrial players that will provide goods and services to the inhabitants of Future Homes, such as retailers and healthcare or entertainment providers.

Essentially, the message for any relevant business is: as unpromising as the connected home market might look today, this is about to change – drastically. 5G is going to create a vast new world of opportunity in the Future Home, but also a great risk of leaving many behind.

This book will show you how to capitalize on the former and avoid the latter.

Commensurate with the importance and currency of this topic, there is significant movement in the market. As we went to press, one example is the establishment of Project Connected Home over IP (<https://www.connectedhomeip.com>), a working group for a new connectivity standard to increase compatibility among Future Home products. The authors regularly comment on new developments. Highlights of that commentary can be viewed at [www.accenture.com/FutureHome](http://www.accenture.com/FutureHome).

# A day in the life of a Future Home

## CHAPTER SUMMARY

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*The Future Home, the concept this book is built around, is a radical departure from today's standards of digital sophistication in homes. In just a few years people will be living lifestyles that are intensely assisted by intelligent digital technology. For them, 'home' will be everywhere. Technology will be their permanent companion and great enabler in everything, from meal preparation to childminding to working remotely. This will be a world unlike any seen previously, so before we begin to analyse its workings in detail, we should take some time simply to look at it. In this chapter, therefore, we present a sneak preview of the Future Home in the 5G era.*

---



In a northern hemisphere mega city, it is Tuesday, 6.30 am – roughly half an hour before John A Centure, a 41-year-old senior underwriter for a global insurance company, typically gets up. John is single. His digital bedroom command node has already batted away the first tasks of the day and now makes the solar-powered curtains glide open. The room's recessed lights, matching the exact daylight spectrum outside at any minute, turn on gradually. Gentle music starts to play at a very low volume, the beats matching John's heart rate and gradually increasing. Minute by minute the man in his sensorized high-tech pyjamas is drawn from deep sleep to a drowsy smile at the sunlight that is by now flooding the bedroom.

Fed by data from the bed, pyjamas and a wearable device, the bedroom node has calculated John's ideal wake-up time. In calculating this, it balanced a maximum of rapid eye movement (REM) sleep, the most relaxing human sleep phase, with news it had just received from the mobility node of the apartment's Future Home system: the autonomous bus John usually takes to work is out of action today.

## A life with the problems taken care of

This is just one of many decisions the Future Home will make for its inhabitant. To be on the safe side, it woke John up about 30 minutes earlier and added extra time for an alternative journey to work: a short walk to the municipal rail station followed by a four-stop ride to the Balboa Park stop. As John gets out of bed and glances out of the window, the Future Home central command node automatically brings up today's weather, his calendar and his new commute, overlaid using augmented reality on the glass window. It follows a visualization of the walk to the rail station. John accepts each decision because he knows he can rely on the system 100 per cent, allowing him to leave aside much of what concerns us today: no anxious speculating about different options, no hectic adjustments to unforeseen circumstances – the Future Home anticipates the problems, fixes the simple ones before they arise, and proactively

provides relevant options for the more complex problems. That is what John has learned since moving in two years ago.

## **At home alone, and out with friends – simultaneously**

It is now 7 am. Leaving home is still an hour away. Putting on his workout gear and his smart glasses, John joins a streamed virtual workout meet-up with two of his friends. They are in the same virtual gym, chatting with each other. To increase competition, each can see the other's scoreboard of calories burned right from their bedrooms. Each workout is tailored. As John is recovering from a sprained wrist, the physical activities node of his Future Home thinks it better for him to avoid push-ups and focus on his lower body instead. John is today's 'calorie champ' and the system has prepared a highlight reel of his workout session, set to his favourite music, presenting his score at the end. It asks John for permission to post the clip on social media platforms to a group of friends that all three have in common, which he gives by simply saying 'Yes.'

## **The ever-present personal assistant and servant**

After the morning workout John enters the bathroom to brush his teeth. The Future Home system raises the air temperature a few degrees and turns on the shower at his desired water temperature. Weight sensors in the bathroom floor relay data to the bathroom node. John is still slightly behind his weight-loss goal so the node starts a discreet conversation with its opposite number in the kitchen where an algorithm asks John if he'd like to eliminate sugar from his morning coffee for the rest of the week. That should help him to arrive at the target weight. As John dries off, his intelligent closet picks two outfits based on the professional and private

events on his calendar that day. While he decides on one of the two, an interactive assistant speaker integrated into each room reads out the morning news.

7.30 am – John enters the kitchen. A robotic arm has prepped and cooked him breakfast, balancing nutrient and caloric intakes to help lose the one last pound this week before his weekend beach vacation. His virtual personal assistant uses pattern matching technology, machine learning and natural language processing to provide the right information at the right time. It has studied his behaviour and is trained to know the right time to provide him with more information on the person he will see during his first meeting – a client who wants to take out an earthquake policy. Then, as he has just finished his first cup of coffee, sadly unsweetened, a hologram playback of his last meeting with this client, a month ago, is displayed in front of him. The meeting was volumetrically captured at John's office. Everyone opted into a privacy statement allowing a digital memory capture to replace meeting minutes.

## The empty home doing its homework

Once the breakfast is finished, the kitchen transforms into a living room where furniture is repurposed and the room reconfigured. A wall lights up and John's digital assistant displays a household checklist scheduled for today. Point 1: an automated vacuum cleaner will clean the carpets before it becomes a mop and does the tiles. Point 2: John's plants will receive their daily watering but are also due for a monthly fertilizer treatment. Point 3: the laundry hamper is near capacity and the Future Home suggests using video analytics to determine the colour, fabric type and shape of the clothes to more accurately separate the laundry prior to washing, drying and folding. But the home also points out that energy usage is cheaper after 9 pm, so John decides to defer the service until then. Point 4: since it's the first day of spring, with a higher than normal pollen count, new allergy medication is ordered and will be delivered today to John's delivery lockbox. Point 5: before leaving the Future Home, John is reminded to take his daily vitamins and blood

pressure medication, so that the health node can send a treatment adherence confirmation to John's doctor and his insurance company for a monthly discount incentive.

## At home while on the move to work

At 8.15 am John closes the door behind him and the home security node activates. It automatically locks the door, sending the home into energy-saving mode. John walks down his street. His Future Home has calculated 10 minutes of walking, giving him ample time to catch a train at 8.30 am. As he walks, his favourite podcast and navigation route are streamed to the smart glasses John wears on the end of his nose. The augmented reality feature overlays the quickest route in real time onto the sidewalk ahead of him, guiding him to the rail station.

At the station, the smart glasses guide John straight to the correct track and even to a platform spot where a carriage with free seats will come to a stop. John enters the train, falls into a seat and the podcast continues. But today's edition is boring, so John pushes up his glasses, which darkens the lenses and turns them into an immersive virtual reality device shielding his eyes from most of his surroundings. He enters a digital replica of his living room and begins to play a streaming multiplayer video game on the large-screen TV hanging on the virtual wall. His friends from this morning's workout session are all also live in the game during their morning commutes in autonomous vehicles. While playing the video game, they alternate between communicating with each other and voting on which exercises they want to do tomorrow morning. All of a sudden, a tiny figure appears in the bottom left corner of the display, letting John know that the train will arrive at Balboa Park in two minutes. John lets the device slip down his nose which lightens the lenses and instantly turns them into his normal reading glasses again, with augmented reality features where necessary. He gets off the train and is guided to the office.

## At work and feeling very much at home

Hot-desking is the norm in offices now. John's smart glasses guide him to today's work spot, an elegant 10-square-meter, fully transparent office. Not just the desk, but the office where underwriters like John work, can change every day. Employers minimize their costs by picking the most affordable office spaces rented out at dynamic rates.

Still, once John gets into an office space for the day, everything is already there – thanks to his Future Home system, which knows where he is and what he is doing once he has left his apartment. His work office turns instantly into his familiar workspace at home, displaying framed desk pictures of his late father and his dog, Beethoven. His computer system is also ready to go, with the files for the first client meeting opening as John puts his jacket on a hanger. He is not constrained, however, by physical monitors, a keyboard or a desk. Depending on the files he needs, virtual walls and glass panes fill with the relevant presentations and spreadsheets for comparison and recommendation. John uses only minimal hand gestures to close sheets and move presentations around.

The first meetings and calls go well and at noon, lunchtime rolls around. John's food is delivered with the usual balanced nutrition but a slightly increased lean protein intake since he walked an extra 10 minutes to the rail station this morning. His Future Home has taken care of it all. After a quick bite, John gets a notification from his dating profile. Someone who finds him compatible has requested a virtual coffee and John decides to accept. It's all arranged on his multipurpose smart glasses. The fact that he wears formal office attire is no problem. He takes part in the virtual coffee date as a volumetric twin and can choose to wear whatever he wants. He decides on a combo of beige chinos, sneakers and a fitted dark-blue shirt. After some lively exchanges, John and his date decide to meet up in person at a later date. Riding the excitement, John goes right back to work for the remainder of the day.



## Collapsing distance to maintain contact

At 6.30 pm John winds down in his apartment. The sun is setting and he gets a video call from his mother. John again pushes his specs into virtual reality mode. His mother is feeling nostalgic, she says, since her husband passed away of stomach cancer 20 years ago to this day. She asks John to go for a virtual walk with her. She is in her home hundreds of miles away while John sits on his living room sofa, but via this hologram call, mother and son are both transported to the tree-lined suburban street of John's childhood. The street and surroundings are presented just as they looked when John's father passed away. As his mother shares stories about his father, John asks if they can watch one of his father's volumetric recorded memories. She agrees and they are both greeted by his father's hologram, a virtual and volumetric set of messages he recorded for them both before he passed away. This makes John reflect on the fact that tomorrow is not guaranteed for anyone, on how suddenly loved ones can be lost, and on how lucky he is to still be able to spend time like this with his mother even though he no longer lives nearby.

# Emerging business models for the Future Home

## CHAPTER SUMMARY

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*In order to make the most of the emerging Future Home market, communications service providers (CSPs) will need to evolve their incumbent vertically integrated service provider model. To stay relevant in the digital daily routines of their customers, they will set themselves up as a multi-sided platform orchestrating and coordinating the Future Home. The move represents huge opportunities as it means controlling data and its flows rather than just being an infrastructure provider supplying connectivity. As a whole new business model this is faster, much more nimble and expansive than the old one. It requires a very different set-up, not just internally, but with various external stakeholders: tech specialists in device manufacturing, app development, AI capability and edge computing, and also a wider range of service providers from non-tech sectors such as health, finance or entertainment to name just a few. These partners must find a mode of alliance that rewards all their contributions to the multi-sided platform effort – with CSPs having the best chances of becoming the main orchestrators.*

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The Future Home will be built around a new value chain of ecosystem partners. Opportunities around this newly emerging market will invite those partners to benefit and extract enormous value. Everybody joining the value chain will need to develop initiatives to contribute in some form or another to Future Home solutions with outstanding user experience – in areas such as streaming multi-player gaming, energy management, remote home health or immersive entertainment. Flexible and organically morphing partnerships will evolve, enabling CSPs to undertake entirely new operational approaches behind novel business models.

## **The limited return for CSPs of conventional home services**

Against this rather fluid future scenario, most of today's incumbent CSPs have tried to remain the equivalent of static soloists rather than orchestra conductors with a talent for improvisation. Their main aim was, and in most cases still is, to sell bundles of handpicked connected home services at most, and connected devices alone in some cases, to the millions of customers they cater for as legacy infrastructure providers connecting households to broadband networks. This strategy has not been without success, as solutions such as Xfinity Home from Comcast or Magenta Smart Home from Deutsche Telekom demonstrate, though the question remains if such business models could not get a further economic boost by being tweaked towards a broader alliance model.

In Chapter 4, we discussed the issues with today's connected home. To recap, it starts with a hub, a central hardware item in the home that is equipped to handle different radio standards, functioning as a universal connector for various devices. Applications running on the devices allow users to control and derive data from them, managing things like energy usage or the video from the connected doorbell. None of this, however, has really delivered relevant growth or significant new profit pools for CSPs or other companies active in the field. While there is admittedly some value in managing energy consumption, controlling lighting, or looking

after the house when you are away, the benefits for users and providers alike are so far limited because each service only works in isolation.

Some incumbent CSPs have introduced a service fee for cellular connected devices in the home to recover the investment and increase their average revenue per user (ARPU). This, however, has not been convincingly successful either. Even among those customers paying the fee, only a few have really activated the cellular and used the service. This is rather a risk, as it does not deliver on the promise CSPs charge their customers for every month, and it could turn into reputational damage for their entire franchise if customers find out that they have paid without getting significant benefits in return. So, it is hard to see how CSPs can drive a significant connected-home business profitably within their traditional business models.

## **Voice-controlled platform devices: Leading the way to the Future Home**

At the same time, when CSPs started promoting their proprietary home offerings, the first voice-enabled ambient devices such as Amazon Alexa or Google Home entered the market, putting a smart device on people's coffee tables or mantelpieces: the personal home assistant. Though many users had concerns about trust and privacy vis-a-vis such speaker devices, millions of households have adopted them in just a few years.

The devices crucially boast voice control, which significantly increases their usability. However, even more importantly, they focus not on connecting devices in the home but on solving a two-sided problem: for the user, they provide interesting and relevant use cases wrapped in a customer experience that most people like; at the same time, third parties can add skills to such assistant devices, so that the range of services can grow steadily. Incumbent CSPs have also entered this new market. In a joint big push, Orange and Deutsche Telekom have created their own version of a voice-enabled assistant. Its main difference from pioneering precursors is a promise to handle personal data differently, with an offering specifically designed around security

and privacy.<sup>1</sup> Concurrently, this CSP-provided assistant still works to the same basic model as the devices that led the way: an open, multi-sided platform approach.

## How multi-sided platforms will disrupt vertical integration

With this notable exception, the traditional CSP approach to business remains, as we have said, that of a siloed vertically integrated service provider. We say it's time for them to take heed of Amazon and Google's success with a platform model and try to understand how they can harvest the benefits themselves, or team up with an existing platform and tweak it in a way that it creates a credible benefit for their end user. The opportunity is big and the crucial open question is whether CSPs can seize it and thereby put themselves at the profitable centre of Future Home markets.

Why is now the moment for CSPs to seriously consider transitioning from vertically integrated service provider to multi-sided platforms? There's a strong argument that vertical integration was always vulnerable to disruption. CSP incumbents have a long history of adding services to their main role of infrastructure access providers. In the early days, they introduced portals and access to exclusive content to foster loyalty, reduce customer churn and escape pricing pressure in competitive markets. However, that led to several waves of 'walled garden' building where CSPs offered their own proprietary services and remained inward looking, making little effort to partner with or platform other service providers' offerings. In most cases, this created limited economic value, even though it helped stabilize market share for a while.

But recent communications tech history provides multiple warnings against vertical integration long-term. Because eventually a platform will appear and disrupt your business. Take mobile telco portals like i-mode, Terra or T-Online. They have been eclipsed, first by Google Search on the computer, and then by Android on the smartphone. Google saw that, with Android, it could be both the provider of a

mobile telecommunications and internet operating system, offering a platform for third-party apps. Profit for them came both from these collaborations directly and from the value they added to customers – without owning or over-curating one single bit of content delivered over the platform.<sup>2</sup>










The 5G wireless standard likely provides an additional discontinuity threat to the integrated business model for CSPs. While traditionally asset-oriented financial investment in the physical network has been the key source of revenue for incumbents – and their exclusive defensible control points – the physical assets are increasingly being superseded in importance by data flows and software. After all, 5G networks bring the great novelty of very low latency, high speed and broad data capacity, connecting devices directly to one network. Such capabilities can consolidate access and data traffic from a Future Home into one single wireless transmission channel. And this crucially allows home services and home devices to rely more on configurable software, with the immediate effect that services reach a much higher quality and become more deeply involved into the lives of home consumers. CSPs can be at the heart of this, if they contribute the essential elements that will make the Future Home work – relevance, scalability, experience and trust.

## **Seeking service relevance for the end user within ecosystems**

To create true economic value for themselves and sufficient user value for the consumer, CSPs will have to increase their relevance in the daily digital routines of Future Home users. In order to accomplish this, they need to find ways to open up and engage with some form of ecosystem. And that entails not least reinventing the new front-office and back-office capabilities, and all the innovative skillsets and capabilities laid out in the previous chapter. CSPs taking up this challenge will become orchestrators of ecosystems for their customers and users.

The departure from their traditional integrated business model is massive though, the success factors and critical capabilities in a platform and ecosystem-based market being significantly different. The following list (Figure 7.1) provides an overview of how far apart these two business models are. One can see from it how drastically the capital expenditure, the key performance indicators (KPIs) and the creation of good consumer experiences shifts. From their old siloed, vertical, in-house structures, CSPs must take responsibility for a whole Future Home ecosystem which safeguards the data flow and provides not only services to the user, but also a broad suite of ancillary services to the ecosystem.

**Figure 7.1 From the old to the new for CSPs: Vertical integration vs platform ecosystems**

		<b>VERTICALLY INTEGRATED SERVICE PROVIDER</b>	<b>ECOSYSTEM PLATFORM PLAYER</b>
	<b>Control points</b>	Contract, physical control points, customer service	Manage identity, security and privacy as well as data stocks and flows
	<b>KPIs</b>	ARPU	Reach
	<b>Business focus</b>	Bundling services	Relevance and ecosystem around tradeable information and data
	<b>Customer engagement</b>	Minimize interaction	Open and seamless omnichannel experience
	<b>Go to market</b>	Own and third-party channels	Federated through ecosystem
	<b>Investment profile</b>	80+% network infrastructure assets	Software capabilities Leverage ecosystem for infrastructure investments
	<b>Products and services</b>	Communication services and bundling content	Enabling ecosystem-based services
	<b>Platform</b>	Walled garden-based Closed	Ecosystem-based Open
	<b>Talent management</b>	Own the full delivery chain and vendor management	Owning the experience and heavy leverage of ecosystem skills



## Conquering new control points as a data gatekeeper

In the five years since Alexa was first introduced in November 2014, Amazon has sold more than 100 million such devices. More than 100,000 Alexa skills have been developed by third parties as of today, and 150–200 skills are added each day. Amazon attracted a developer community that is now in the hundreds of thousands.<sup>3</sup> CSPs can find similar success, but, in another crucial departure from their incumbent business model, they will need to find a way to master the massive scalability challenge with the developer community.

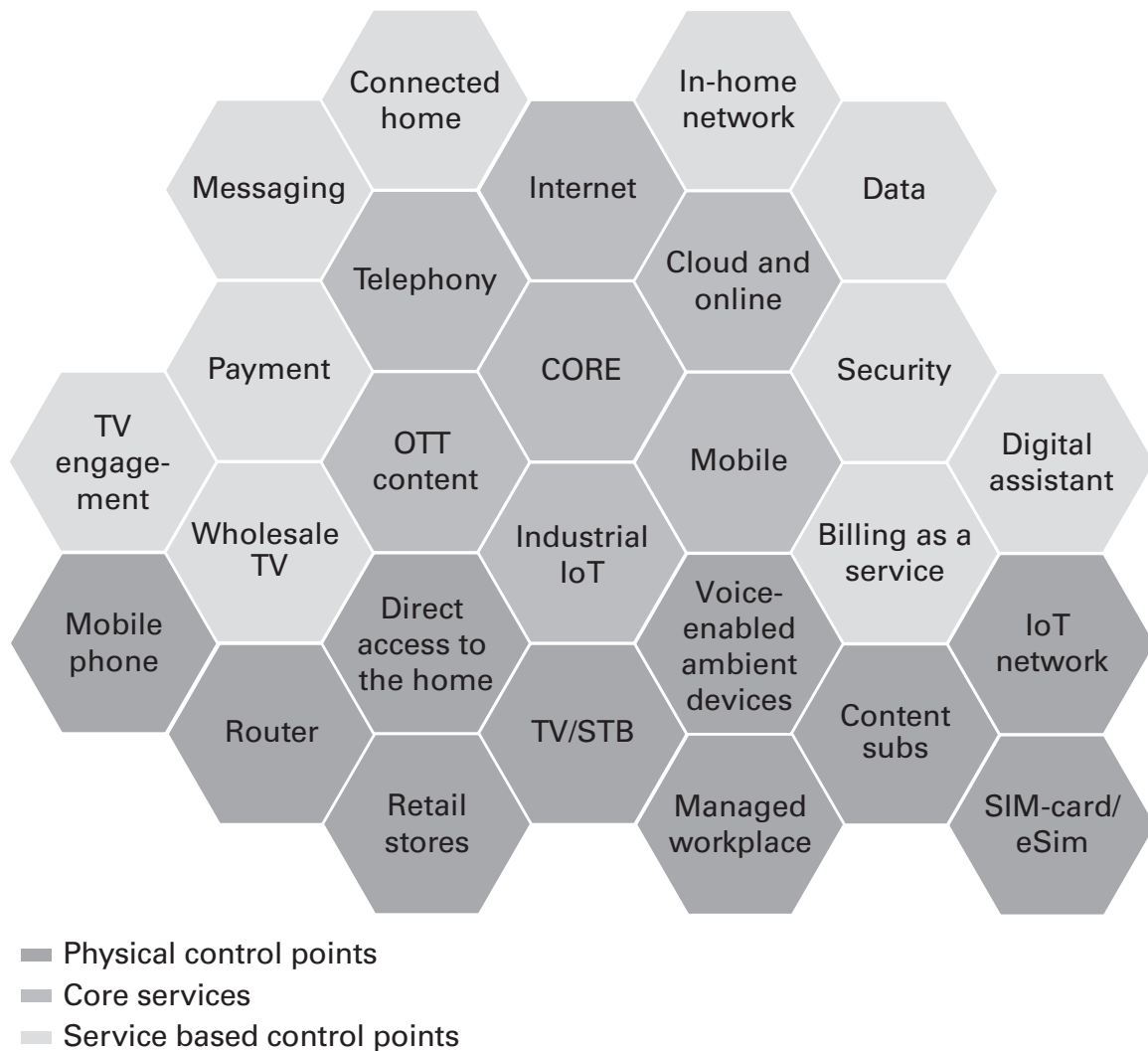
In order to do so, CSPs will again find orientation in the success of dominant smartphone operating systems such as Android. It attracts a huge developer community that contributes new applications constantly and similar activity is currently observable around the voice-enabled platforms we just discussed.

In this new approach, data control points will be on connected devices – routers and set-top-boxes as well as voice-enabled devices. And as 5G wireless networks play a greater role in the Future Home, further data control points will evolve directly from this CSP-owned network. So CSPs must find ways to access and control the data flows, and manage them on behalf of the customer. We recommend that CSPs differentiate themselves with notions of trust, safety, reliability and security – because the new role of such providers will entail being principal managers of protected customer data, the information that flows from the various third-party devices in the Future Home.

The more data control points there are, the more user transactions a platform owner can enable within their ecosystem, and that means more value for them.

Figure 7.2 shows the various chambers of value CSPs could tap, grouped around their core service of delivering 5G connectivity to homes.

One can see on the chart that CSPs have a broad set of control points under their aegis from which to extract relevant user data. They have the billing relationship with millions of end customers. They run the physical

**Figure 7.2** Potential data control points in a CSP's platform ecosystem

access point in the home in the shape of routers or set-top boxes. They own the SIM cards built into devices. They already have access to some connected devices on the edge of the networks and are adding new control points there as they move into 5G.

## Justifying data control through excellent user experience

The main challenge of such a strategy might be that CSPs are not always allowed to use the data flows running through their networks and turn them into tradable assets with the trusted Future Home ecosystem

partners. To become authorized to use them in line with customer expectations, they need, simply, to provide excellent and essential service. The user's net benefit from a Future Home service needs to be higher than the perceived loss of control over specific personal or usage data.

Yes, CSPs also need to prove that they won't abuse their controlling power over user data. But privacy and security pledges are not enough without great customer experience. Numerous research studies have shown how much value users attach to good experiences of services and products. They deepen consumer trust and the inclination to sustain a relationship with a service provider. The explosion of internet services and mobile applications outside the Future Home is the proof: consumers are happy to share data if they can trade it for a service that creates true value for them.

Customers trust services that they find relevant and helpful in their daily routines. One CSP, Swisscom, recently introduced a new omnichannel platform (OCE, Omnichannel Customer Experience), the primary focus of which is no longer the product but its user.<sup>4</sup> The platform gives Swisscom a view on each of their customers, making it possible for the first time for them to understand which service is consumed by which user in any given household. In March 2019, Telia of Sweden launched Telia Smart Family, a concept in which a CSP proactively supports their household communities' daily digital routines.<sup>5</sup> For most CSPs, however, achieving this kind of relevance to customers is still a long and ongoing journey. And even the ones who have adopted platform technology, like the above examples, are still at the beginning of their journey to turn the newly acquired capabilities into real new value for their customers.

## **The platform need for partnerships and alliances**

In the past, CSPs just integrated partner services into their products and offered the whole bundle under their name. Thus, the whole value chain hinged on the successful marketing of such bundles. The value that was

generated, small as it was, was then distributed by the CSP to all contributing parties and the ecosystem was dependent on the CSP pulling the train.

In stark contrast, the Future Home must be dominated by open platforms that, unlike the bundle approach, offer incentives for all participants to build their own business case using the platform's capabilities. Many types of partners need to be attracted to build and sustain the platform's growth and success. It starts with connected devices and services. Instead of being integrated into bundled offers, they need to have the opportunity to provide their services either directly to the user or to offer the functionality and data that is generated to other applications.

Then there are all the different industry partners from areas like healthcare, fitness, finance, insurance, consumer goods, retail, food delivery and more. CSPs will need to attract all of them to join the platform over time.

Next comes the developer community. There are about 25 million developers active globally. Of those, 7.5 million work in Europe and Asia, a good 5 million are in North America, and the rest are distributed across the globe. Sixty-five per cent of them work part-time and nevertheless want to earn incremental money on their applications or see adoption of their great ideas.<sup>6</sup> They therefore only put their effort behind platforms that create sufficient reach.

Finally, other service providers will be needed. They'll support CSPs when it comes to unlocking edge computing, big data analytics, AI and machine-learning-based insight creation, actionable analytics, security services, and payment and delivery services.

To attract such partners, CSPs will need to offer platforms that have a value proposition superior to the conventional platforms already run by CSPs bundling media content via infrastructure products. The key to success will be finding the way to transition to the new, more attractive platform models without abandoning what is profitable about the old.

At the same time CSPs – often former state monopolies active within national borders – need to achieve scalability and reach if they want to appeal to developers. How, for instance, would a home service app developer in Singapore find a CSP in Canada worth partnering with on a Future Home solution when there is only a small market in Canada

amounting to just 10 per cent of the population of the United States, and they, anyway, can only be reached via designated data protocols provided by a specific CSP?

International standards are the solution here. CSPs have seldom been very successful in collaborating to create globally scaling platform solutions or standards, but now it will be essential that they align themselves behind one or two global standards. Where they once did – for example when they agreed on the global GSM wireless standard – they created exponential value for both themselves as well as for users and society. They just need to do it again.

## **Why individual connected home apps are not enough**

Most operators so far have tried to win the battle for the home with a home automation application. iControl by Comcast and Qivicon by Deutsche Telekom were early and successful attempts.<sup>7</sup> iControl had the advantage of providing a cheaper DIY-like home security solution than most of its alternatives. But from any perspective, the advantages of this approach had to be developed further.

As on a smartphone, so in the home: what's needed is not just one app that allows the user to steer a specific scenario, it's myriad little things that make life better and support us every day – as well as a continuous stream of innovation offered to the user by inventive developers.

In Chapter 2 we looked at eight different user mindsets and the proliferation of Future Home needs. It is unlikely that just one app will cater to all of these needs and keep the different user segments interested. CSPs can still offer their own applications, and they surely will. But at the same time they need to provide open application programming interfaces (APIs) for third parties to bring their own offerings to the household customers. This will be the route for CSPs to attaining multiple control points, generating data and turning that data into tradeable assets that deliver value for all – CSPs, ecosystem partners and consumers.

## The protracted game of aligning platform partner incentives

All ecosystem partners will have different interests that CSPs will need to understand and align with. A key task here will be reinventing monetization so as to provide incentives for all partners to get involved.

While some device manufacturers may not expect any additional revenue streams to come from connecting their devices, only being interested in the relevance and attractiveness of their products in a Future Home, other industry partners may already be in a service business or on the path to turning their hardware business at least partially into one. As a consequence, some may want to create a broader service portfolio on their own, offering a stream of innovation-based services through their hardware to the household.

Developers will look for reach and for monetization opportunities as well as for the customer experience they can create on a specific platform. Service providers in turn will either look to sell opportunities to the CSP to enhance their platform capabilities or to work jointly with the CSP to sell value-added services to households, connected device manufacturers, or industry partners – things like services to enhance broadband coverage in the home, firewalls, and other security solutions, or specific services to enhance experience.

All these different partner types will judge their engagement based on the scalability and reach they can generate if they partner with CSPs. They will also assess the ease of creating incremental service revenues around a Future Home platform. These groups will be very much driven by reach and the convenience of creating a business around the CSP platform.

## How basic services can attract new ecosystem partners

The appeal to third parties will also, crucially, be driven by the attractiveness and ease of use provided by the CSP service catalogue to the end user. That includes identity management, service discovery, value-added

offerings around service delivery (notification, fulfilment, assurance, billing), and the opportunity for continuous learning and feedback from usage. Only if CSPs can keep up with industry best practice for these services will partners be loyal.

So CSPs as platform orchestrators can attract partners by offering a lot of basic services to them. Via their infrastructure control points, they can manage end-user identities when a third party wants to offer a service on the platform. Due to the rich user data assets they create from studying user behaviour, they can also suggest services to ecosystem partners and add components of service fulfilment, service assurance or service optimization for a service offered by a third party. Finally, they can provide ecosystem partners with user feedback.

While today CSPs mainly receive their revenue streams from subscription services for connectivity from the end-user, in the Future Home, all those ancillary services can create additional revenue streams and increasingly turn CSPs into very profitable ecosystem orchestrators.

### **Takeaways**

- 1** The multi-sided platform is at the heart of the success of Amazon, and the hitherto vertically siloed CSPs need to grasp the benefits of such platforms.
- 2** Opening up, controlling and managing data, instead of infrastructure, will allow CSPs to create advanced Future Home data management services that hold higher margin value for themselves and trusted partners.
- 3** Any CSP remaining in its 'walled garden' should be under no illusion: it will have to change anyway, one way or another. CSPs need to become open ecosystem orchestrators building on relevance, scalability, experience and trust.

“This book takes an in-depth look at one of the most fascinating challenges of today: It sheds light on the emergence of a radical new experience of home driven by new technologies such as 5G, AI, eSIM and edge computing. And by using a powerful mix of real-life examples, strategic frameworks and thought-leading themes, it brings some great new insights for business leader in the ecosystem connected to the Future Home. A must-read.”

**Vinod Kumar, CEO, Vodafone Business**

“As new technologies such as 5G and others disrupt our daily life – including our homes – this book shines new light on how communications service providers can thrive and grow in a landscape full of opportunities but also full of competitors pushing from many sides. It is an inspiring roadmap for leaders to do the right strategic steps into the promising era of the Future Home.”

**Mari-Noëlle Jégo-Laveissière, Deputy CEO/Chief Technology and Innovation Officer, Orange Group**

“An inspiring book that helps industry leaders to finally capture the opportunity of the fast-growing Future Home market. The authors provide great insights about the impediments and challenges of the Future Home market as well as a practical guide on how to resolve them.”

**Dr Dirk Wössner, Member of the Board of Management, Deutsche Telekom/Managing Director, Telekom Germany**

“A comprehensive well-written book on the impact of new technologies such as 5G on the rapidly evolving Future Home. With a smart strategic framework complemented by compelling real-life examples and use cases, this book is an inspirational call-to-action.”

**Eric Bruno, Senior Vice President of 5G, Content and Connected Home Products, Rogers Communications**

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