Taking Digital Lifestyle Solutions Mainstream

Smarter Living: Moving beyond the smart home

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Smart Homes:
is there more than this?

It's time to go from talk to action

The Internet of Things (IoT) promises to enrich our personal lives at home with a deluge of gadgets and automation services. At best, we are incrementally closer to a "Smart Home." But do we even want Smart Homes? Perhaps what we seek is "Smart Living" at home.

Crossing the chasm to rapid market growth will require more than smart speakers and common standards. Smart Home vendors must enhance home living in personalized ways that matter to us, individual homeowners. In short, manufacturers must reach for a purpose beyond devices and services.

This paper explores:

- The market
- Adoption hurdles
- Framework for Smart Living
- Recommendations for both integrating business & technology strategy and pursuing privacy & security

Thanks for reading; we look forward to your feedback.

Leonard, Martin, Cristene and William

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State of the Market

According to industry analysts, the Smart Home market of $76.6B in 2018 will enjoy continued future growth, primarily in entertainment and simple solutions such as lighting control. Despite this rosy sales outlook, however, the Smart Home continues to be in a state of emergence.[1]

Three issues have kept this market in a nascent state. First, since the 1970's, smart home vendors have led with proprietary gadgetry and technical invention. An unintended consequence of this has been the numbing complexity that consumers experience as they select, install, provision, and interface with devices in the home. A second consequence, simplicity, has been lost in the push to differentiate by feature/function. Third, it remains largely unclear what utility the smart home offers to our individual lifestyle preferences. Focused on the device, the industry has failed to articulate what needs the smart home addresses.

Cartoon inspiration?

In 1962, the Jetsons painted a picture of the future home in the first color broadcast for the ABC network. Ten years later consumer-grade sensors and device control through power outlets fueled Smart Home speculation.

Empowered by this development, hobbyists found new ways to control thermostats, lights, solar panels, and robots with dashboards and even voice. Home controller systems appeared, driven by the Commodore 64, Vic-20, Apple IIc, and IBM PC. A GE appliance connected the home to the TV and land line phone.

Tinkerers thrived on the challenge of cobbling together a Smart Home from components purchased at Radio Shack. But consumers found systems hard to use and even harder to install.[2]

The sea change in the home was yet to come. And still is.

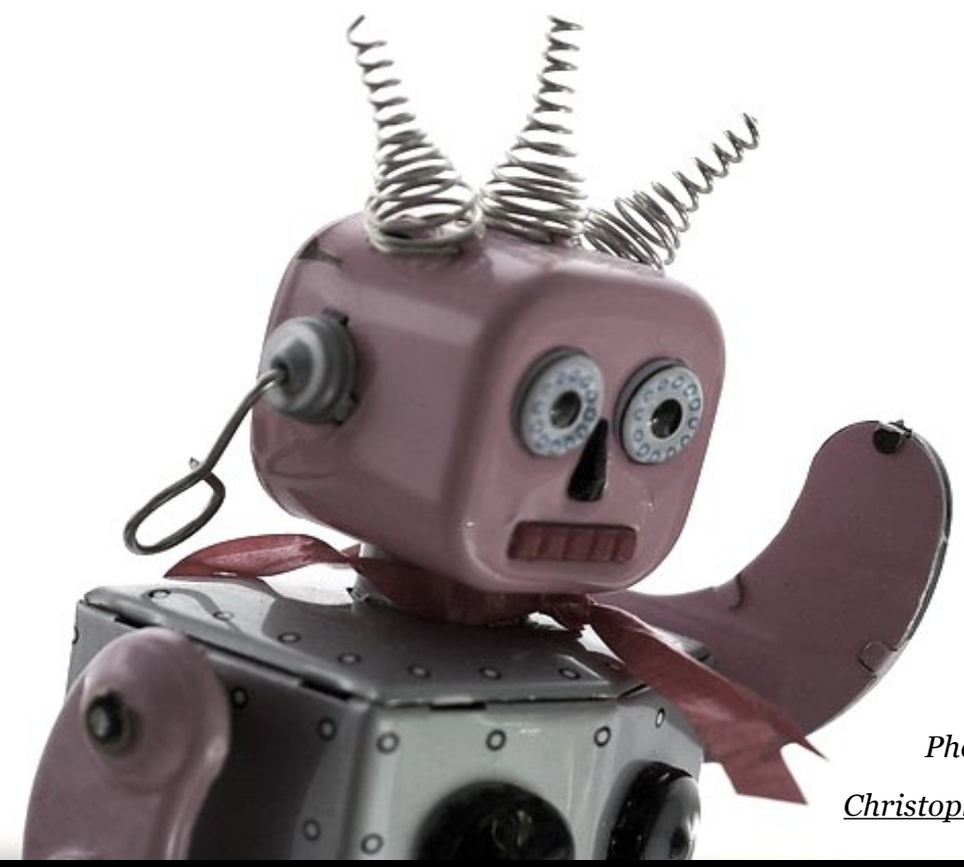


Photo credit: Christopher Angell

Atop all of that, privacy issues have plagued the Smart Home from the get-go. Data enables much of the value of the Smart Home, but the personal nature of in-home data generates heightened sensitivity to privacy issues.

However, recent developments may have created the right conditions for an awakening in the Smart Home market.

1. Smart speakers continue to evolve from information and entertainment centers to natural human-to-system interfaces that participate in the Smart Home.

2. Industry-wide interest in standards promises to simplify Smart Home implementations with interoperability and the orchestration of hardware, software, and connectivity.

3. Governments are stepping in to address growing privacy issues and security concerns. Endemic to the highly fragmented Smart Home industry landscape, these issues provide a need—and an opportunity— to establish the foundation of trust that consumer privacy will be maintained at home.

Although important, these developments alone are unlikely to generate enough consumer interest and confidence to drive rapid market growth. Smart Home vendors have long relied on technical innovation to define the market. In this outmoded approach, vendors depended on the consumer to define the utility of the Smart Home features and functions. This is no longer sufficient. Future market growth will require Smart Home vendors to take up the challenge of defining new, life-enriching experiences that home dwellers find irresistible.

Adoption Hurdle One: Numbing Complexity

Smart Home vendors and service providers have defined the market by what is technically possible. This approach relies on the hope that consumers will identify a “killer app” by interacting with devices and serendipitously discovering unmet needs. Complexity is the legacy of this strategy of hope. For starters, Smart Home vendors flood consumers with a dizzying number and diversity of devices. It is erroneous to believe that pushing ever more features, functions, and capabilities into the market to accommodate any possible need is a positive differentiator. In fact, barring any other influences, this trend leads to increasingly greater complexity and confusion - a lack of common language.

If consumers were able to see any semblance of the Smart Home emerging from the device deluge, which has not happened on significant scale, they would face the frustrating problem of interoperability, or rather the lack thereof. The lack of standards

has presented a challenge in making the Smart Home plug-and-play across devices. Industry leaders are attempting again to address this problem with "Project Connected Home over IP" (see Point / Counter point sidebars below).

Ideally, standards will enable devices to recognize each other, self-organize and to collaborate autonomously with policy-based trust. As a result, homeowners can expect multiple devices to work in concert to accomplish life goals.

As a colleague asked several years ago: "when two 'things' encounter each other in the Internet of Things, how do they know who they are, what they can do, what they are allowed to do, under what conditions?" This is yet to be seen on a mass scale, but we are about to find out.

The "Project Connected Home over IP" standard promises to address many technical challenges to the Smart Home over the next few years. However, the market dynamics are a bit more complex. In the short term, fortune favors the heavyweights, though smaller players will see the opportunity to compete in specialized spaces. Over the longer term we can expect business consolidation, new economies of scale, and potentially some market growth acceleration.

Point

Key players take action on interoperability.

In December 2019, Apple, Google, Amazon, and the Zigbee Alliance announced "Project Connected Home over IP," a working group to "develop and promote the adoption of a new, royalty-free connectivity standard to increase compatibility among smart home products, with security as a fundamental design tenet." The working group board members include IKEA, Samsung SmartThings, Schneider Electric, Signify (formerly Philips Lighting), and others.

This working group is likely to develop lifecycle standards for discovery, provisioning /onboarding, device removal, secure software update and possibly more.

While we see that the alliance will create a new framework for interoperability and possibly a common lifecycle management model for devices connected on the IP network, unsurprisingly, the platform companies such as Apple, Google and Amazon are poised to benefit as their ecosystems open up to an expanded universe of certified devices. What can device manufacturers look forward to?

Luckily, consumers will benefit from the simplification of device installation and lifecycle administration as well as more device options for their Smart Home.

Counter Point

Smart Home standards are a long shot

The need for standards is indisputable for Smart Home to fulfill its potential, but history suggests that the odds are long for those to become prevalent. There is a rich history of attempts to develop standards, but none has gained traction in the marketplace. Early on, there was X.10, then there were Alljoyn, the Allseen Alliance, OIC, OCF, Thread, UPnP+, OASIS OBIX, HGI, LON, KNX, EN 50173, and a great alphabet soup of many others.

The new alliance appears to focus mostly on the network layer but could evolve up the stack. Developing standards at the application layer is much more complex and controversial. Spanning broad sets of functionality and a larger number of players, this architectural layer involves functional semantics, ontologies, data formats, security, and identities.

Having observed the World Wide Web standards process as it came about suggests this will be a long road. And there are commercial interests as well. Creating open APIs for the majority of functions threatens to commoditize devices, shifting the value to device agnostic applications. We are already seeing a great reluctance by device manufacturers to open their APIs, a trend that will be difficult to overcome.

Adoption Hurdle Two: Privacy, Permission, Preference

In the analog home, consumers feel in control because intimate details of their lives are confidential. What goes on in the Smart Home, however, is not private and often not secure. The data generated by Smart Home systems can be used to create a very detailed profile of our private lives, our behaviors, and our preferences. In the worst-case examples, Smart Home systems have enabled egregious privacy violations. Recently, unknown interlopers spied on families and interacted with children through hacked Ring cameras, in one instance posing as Santa Claus. In these cases the vendors attempted to deflect responsibility, alleging that the parents were responsible as they had neglected to use two-factor authentication on top of a strong password.[3] Shifting the blame in this way highlights a fundamental disconnect between the industry and its mass market customers.

Even if external threats and malicious actors are deterred, many Smart Home vendors still may go beyond privacy norms - gathering copious personal data under the guise of improvements to functions, services, and outcomes. These vendors may even use that data as a source of revenue under a freemium business model. Most people don't read the terms defining a vendor's use of this data, but if they did, they would find the complexity of these documents dizzying; and creates privacy and security risks.

For example, to digest Ring's 15,960 word terms of service agreement the reader is referred to another 2,600 word notice to understand the types of personal information the customer allows Ring to obtain; the ways Ring may use personal information; with whom Ring may share it; and the choices available regarding Ring's use of personal information.[4] Even the most diligent consumer may not understand the full consequences invoked by clicking on "I agree."

The problem is compounded by the fact that assembling a Smart Home often requires multiple device vendors and service providers. Google's platform for integrating third party products into a Smart Home is called "Works with Nest." A study by a team in the UK showed that fully understanding the terms, rights, obligations and responsibilities for all relevant parties (including the customer) that are part of "Works with Nest" would require reading almost 1,000 license agreements! Moreover, interpreting the privacy terms in any given agreement typically require a specialized glossary.[5] (Note that Google appears to be moving customers away from the "Works with Nest" in favor of a more homogenous "Works with Google" platform.)

Smart Home vendors can do more in this arena, but they haven't. As a result, abuses of personal data continue with little action from the industry. Privacy has been compromised by social media, consumer intelligence companies such as the now defunct Cambridge Analytica, and the omni-present threat of hackers. Consequently, governments are the only game in town trying to protect privacy,[6] even though they often lack a comprehensive understanding of the technology. Two of the highest profiles examples of this are the European Union's GDPR (General Data Protection Regulation) implemented in May of 2018 after several years in development, and California's consumer privacy act which aims to ensure that, as the New York Times reports,[7]

'Businesses will have to treat that information more like it's information that belongs, is owned by and controlled by the consumer,' said Xavier Becerra, the attorney general of California, 'rather than data that, because it's in possession of the company, belongs to the company.'

These documents are themselves voluminous. The GDPR clocks in at over 50,000 words. They are complex, so much so, that it's neither clear what citizens should expect nor what companies are expected to do. As a result, privacy will likely be defined over years of litigation rather than by trust-building actions between customers and their Smart Home vendors.

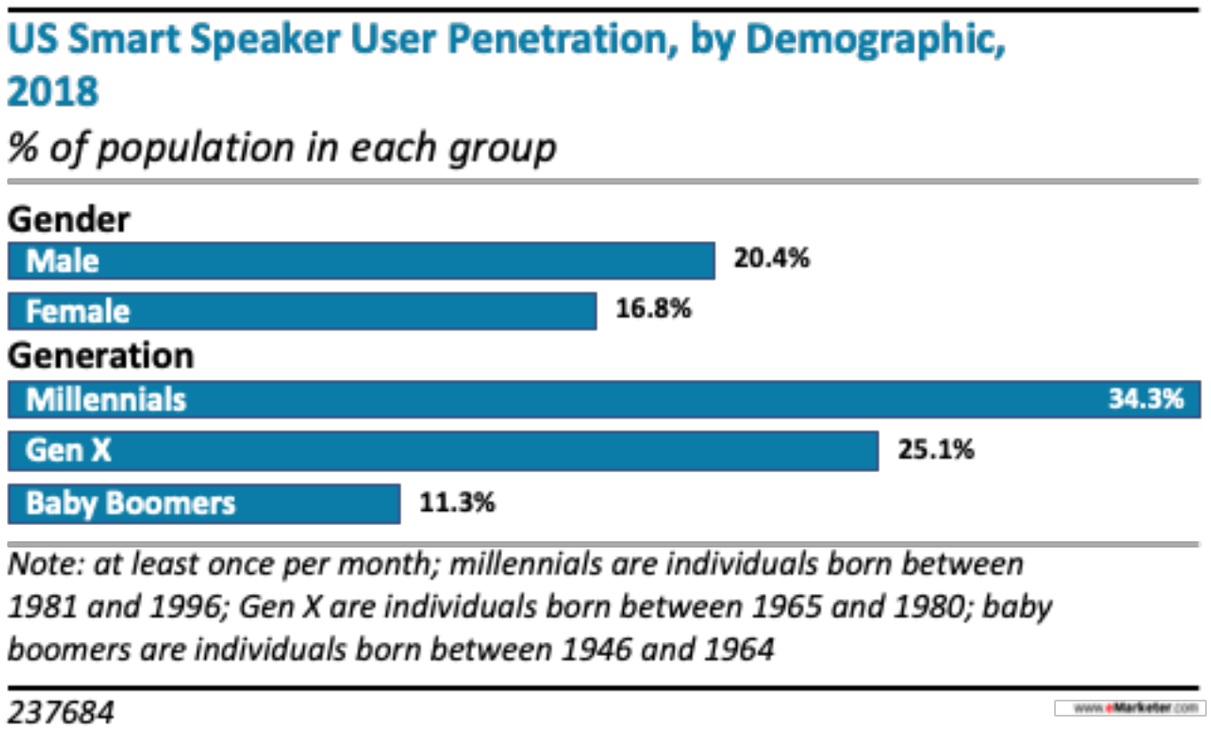
Smart Speakers: Another User Interface, Not the Solution

In terms of units shipped, the smart speaker product category can declare success with Amazon Alexa as the notable leader. Many industry pundits consider this product success to be a breakthrough for the Smart Home as well. And why not? Smart speakers are the vanguard of large Smart Home ecosystems built on platforms such as Apple's HomeKit, Samsung's SmartThings, or Amazon's Alexa. These ecosystems provide the infrastructure and context for Smart Home functionality for which the smart speaker is one of many interfaces.

The ramifications for the Smart Home are not obvious, however. Millennials lead smart speaker adoption with their characteristic experimental attitudes to digital innovations and gadgetry. Based largely on their usage patterns, research shows the top smart speaker activities to be listening to music, checking the weather, and asking fun questions. Smart Home commands come in at eighth, just above shopping and ordering food delivery / take-out.[8]

It's safe to say that that most smart speakers are used for information and entertainment services, not for driving the life-changing transformation in our homes. Clive Thompson said in Wired, "I don't need light switches that tell dad jokes."[9] We can expect he would express a similar sentiment where smart speakers are concerned, at least currently.

After Smart Home devices have been installed and configured, the smart speaker can help solve the ease of use problem with voice control. There is a ceiling to its value, however. Applications built on Smart Home platforms provide functions and capabilities that transcend the smart speaker's capacity for automation and contextualization.



The 34.3% of Millennials who use a Smart Speaker at least once a month represent a higher level of penetration than Gen X and Baby Boomers.

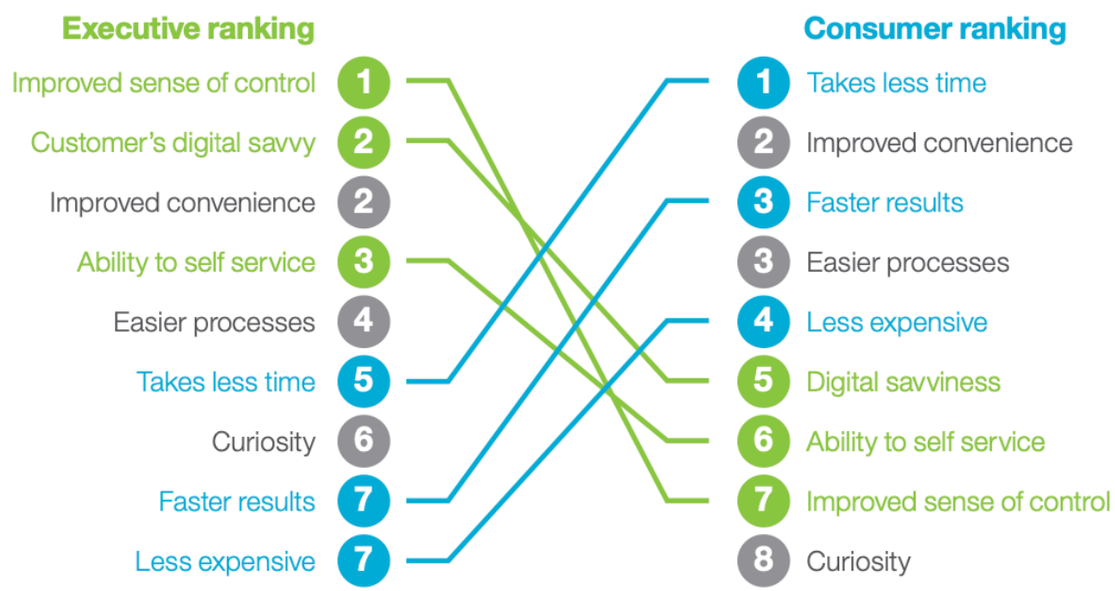
https://www.emarketer.com/content/the-smart-speaker-series-millennials-infographic

Smart Living: What is It?

Smarter Home adoption is a question of outcomes and value for people, not of devices or capabilities. Most consumers seek ways to improve their lives, not to clutter their homes with devices, no matter how technically marvelous, seamlessly integrated, or easy to use. On this count, there remains a remarkable disconnect between what businesses think consumers want and what they actually want.

Research from the IBM Institute for Business Value shows that consumers prioritize **time saved, improved convenience and faster results** over cost, digital savviness, self service, and control. *Improved sense of control comes in near the bottom of consumer priorities,* a finding that is most disconcerting for a market reliant on consumers discovering their own unmet needs. These results run counter to the technical innovation-led strategy of hope employed by Smart Home device vendors in this space.

Factors driving customers' willingness to try companies' digital CX initiatives



Source: IBM Institute for Business Value, Executive survey n = 600; Consumer survey n = 5,895.
Note: Multiple instances of the same ranking number represent a tie.

https://www.ibm.com/downloads/cas/Q1K5AKNQ

A recent IKEA home study issues some evocative challenges to the Smart Home. Per the report, "60% of people are ready to create a life at home that's different from the one they were brought up in," and a third of people struggle to find the right balance with technology. The Smart Home opportunity lies not in leading with technical capability, but in helping consumers understand how they can change the way they live. Smart Living innovation presents a cyber-physical experience in the home that simplifies our lives and allows us to focus on our personal priorities. The complexity of the technology needs to be invisible. In this context, IoT devices are a key contributor to rendering digitally augmented home life experiences that provide value in three ways:

Enhance lives and create time by understanding goals and taking over operational details of achieving them	**Provide a sense of security and peace of mind by continually watching out for problems including problems that we can't detect.**	**Delight us by anticipating needs and automatically tending to them.**

These three points outline a manifesto for how Smart Home vendors can move the needle on broad consumer adoption. In the short term, Smart Home vendors can build momentum by solving problems that consumers have right now in ways they can understand intuitively and with an emphasis on transparency and reliability. Importantly, this requires a solution mindset. It's not about a smart oven, it's about convenient healthy eating. It's not about a video camera at the front door, it's about safety. It's not about a water sensor, it's about preventing damage from water leaks. Ultimately success relies on replacing siloed value propositions with holistic living experiences that enhance lives tangibly.

Turning the Corner: the Smart Living Mindset

Recall that Smart Home vendors defined a market by what is technically possible, relying on the hope that consumers will identify a "killer app" by interacting with devices. Smart Living inverts this, designing experiences and building to them in ways that incorporate elements like preference, meaning, and purpose. Each Smart Living solution is a personalized portfolio of hardware (devices), software (apps) and services subscriptions). Solutions are configured, integrated, and

At the root, this represents a shift from a product focus, *to a solution focus.*

orchestrated dynamically based on three principles: utility, simplicity, and most importantly, new living experiences.

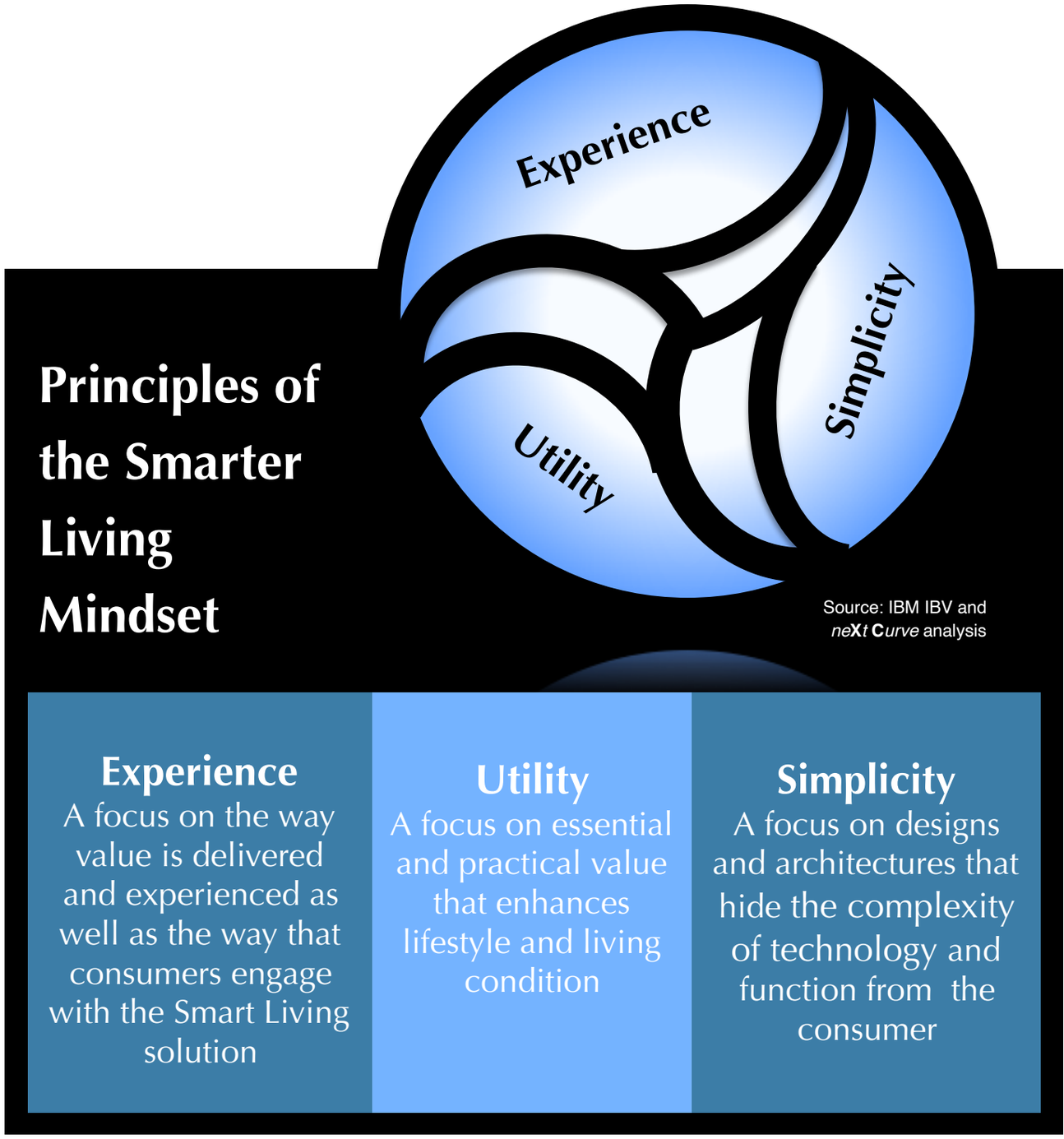
To drive adoption, Smart Living solutions need to be simple. At a minimum, the complexities of setup, provisioning, integrating, securing, and operating the pieces of a Smart Living solution should be hidden from the consumer even as they are plainly transparent. Ideally, they accomplish consumer goals seamlessly and unobtrusively. Simplicity means only calling for human attention when it is really needed or beneficial (such as "you used 20% less energy this month.")

Smart Living solutions deliver outcomes that collectively result in utility and value. They resist the Smart Home tradition of gadgetry, specs, and features. Rather than thinking in the conventional categories of lighting, surveillance (security or baby monitoring), home entertainment or climate control, they determine where autonomy and automation provide practical, life-enhancing value to the residents and visitors of a home.

Better still, allow consumers to set and achieve goals that help them understand and take charge of home operations.

Finally, the Smart Living provider is an architect of personalized home experiences that are digitally enhanced and constantly optimized for those dwelling in a home. Since the Smart Living solution is context-driven, it adapts the functions of a home and its contents (e.g., appliances and fixtures) in anticipation of individual needs. Much like a butler, the Smart Living solution predicts what you will find valuable under any given circumstance and acts to provide it.

The concept of an interface will change significantly for Smart Living solutions. The exposure of individual device features and configurations will be replaced with the production of an experience across devices within a home. Consistency and continuity of experience across interfaces will be a defining characteristic of Smart Living. Many modalities will be affected including touch screens, voice commands, simple presence, gestures, the output from sensors such as light sensors and thermometers to name a few. This will be a marked change from the dedicated device interfaces of, for example, a garage door opener, a thermostat, or a light switch.



Our experience advising some of the leading electronics companies has shown that becoming a solution company is much more difficult than it appears on the surface.

Failure to understand this difficulty leads to failure to plan for the change.

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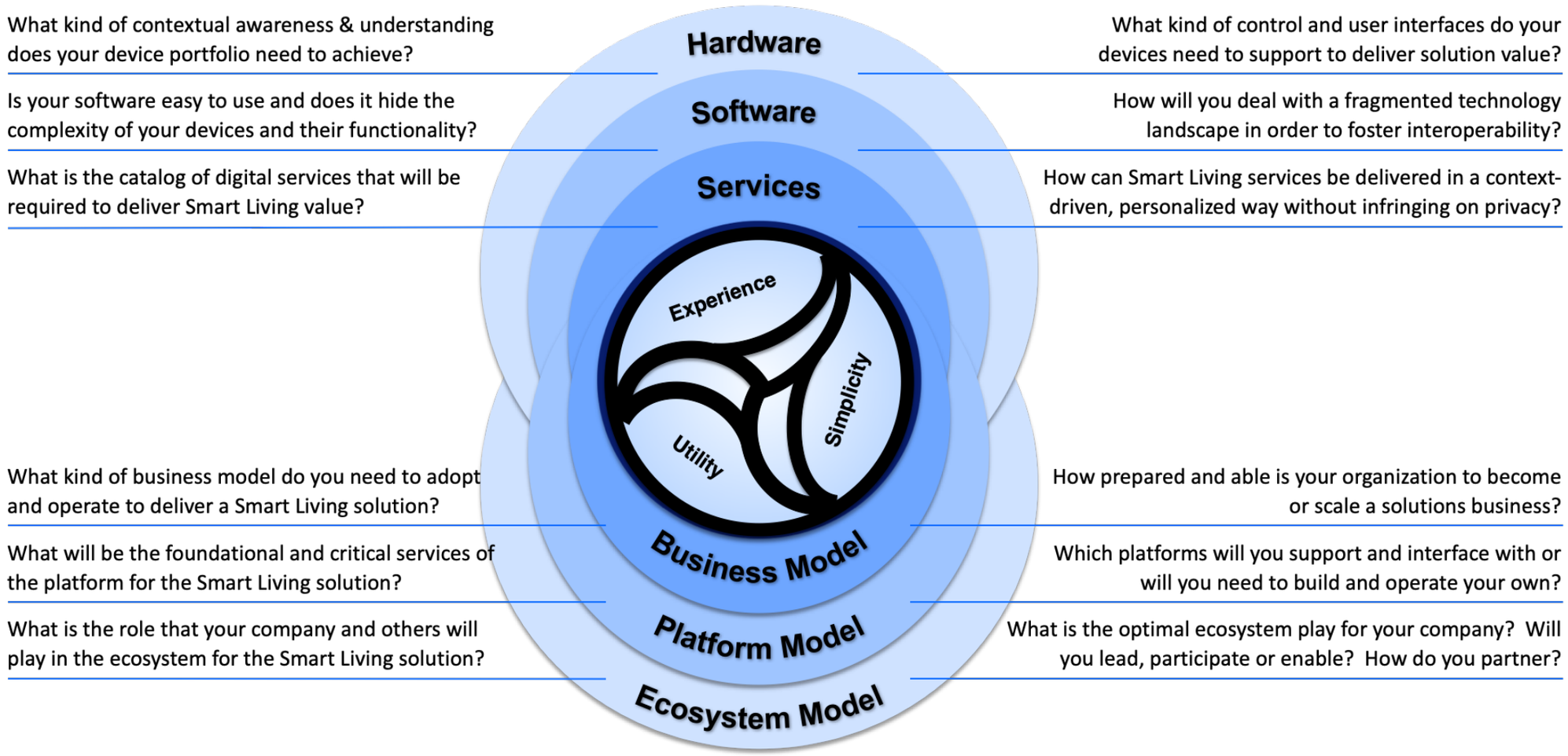
Solution-Oriented Thinking: The Essence of the Smart Living Mindset

Marc Andreessen famously proclaimed that, "Software is eating the world." Perhaps, but it is solutions that matter to consumers and improve lives. The authors of this paper have advised some of the world's leading consumer electronics companies as they have transformed traditional hardware-oriented models toward service and solution orientations. In these new models software is, as they say, table stakes. Software success requires disciplines that are very difficult for hardware businesses. Conversely, the hardware business is deeply challenging for most software-oriented companies. For one example among many, consider Google's smartphone and smart speaker struggles versus competitors such as Apple and Amazon.

It's no small task to transition a hardware company into an integrated hardware + solution company. It means not only engineering devices, architecting software, and hosting digital services, but composing these elements together into utility and personalized experiences that make home living smarter.



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As Smart Home device makers contemplate moving up the value chain by transforming themselves into Smart Living solution companies, there are a number of important questions that need to be answered.

• Do we have a commitment to implementing a solution strategy? Do we know how to support that conviction?

• What role will the company play in the Smart Living ecosystem? How will that role evolve over time? Will our company lead the ecosystem? Will it play a supportive, enabling role? Will it focus on a niche solution?

• What will the platform strategy be given the company's current and planned portfolio of offerings (products and services)? Will the company contribute to an open platform, leverage and build on proprietary platforms such as Apple's HomeKit, or create and control its own platform?

• What will the company's business model be today? How will it go to market with and operate to deliver Smart Living value to its customers through its ecosystem and market choices? How will the business model evolve over time?

These are daunting questions. Answering them can be a difficult endeavor with significant implications for the company. In our opinion, many Smart Home device vendors will evolve into a hybrid hardware+software+solutions model.

Successful evolution will be described in a data-driven and compelling Smart Living strategy. It must be informed by a realistic look at constraints including legacy capabilities. A Smart Living business can't compete using yesterday's approaches to differentiation any more than it could using outdated technologies.

It is popular to proclaim a plan that will command an industry leading platform. In reality, only a few large players have the technical sophistication and scale to drive any semblance of platform standardization in the Smart Home industry. These players are established and include Siemens, GE and Samsung as well as newer but market-leading entrants such as Apple, Google and Amazon. The momentum of these large players means that each smart home vendor must evaluate what an achievable role is within a viable ecosystem. It's not an easy thing to get right, but a necessary one - failing at becoming a solution business is easy. Success is hard.

How to make a living from Smart Living

Against the backdrop of a fast-evolving consumer IoT trend there are great expectations of hundred million dollar Smart Home market opportunities. It is not easy for players in the Smart Home space to make a living. However, this difficulty has led to a variety of revenue models combining tried-and-true and innovative go-to-market approaches.

Let's consider the four archetypical models that have emerged to date.

1. Consumer electronics manufacturers such as Samsung and Haier have typically driven revenue from device sales as they sought to drive home automation starting with the device.

2. Relatively new Smart Home players such as Google and Amazon monetize their platform services by driving advertising or channel revenue from collected personal data and its proxies.

3. Telecom operators and ISPs look to expand their average revenue per user (ARPU) by bundling connectivity with value-added (e.g. content and home security) services.

4. Subscription-based services rely on a "land and expand" approach often starting with free basic services.

While these models are distinct, they will continue to evolve in support of the value created by the simplicity, utility, and experience of Smart Living. Underpinning this evolution will be the industry trend toward "tech stack" platforms that enable a diverse range of devices and services to play together, to scale economically, and to create new revenue opportunities across a Smart Living ecosystem.

Implications and Actions for Business and Technology Leaders

Historically, the Smart Home focus on device innovation and siloed revenue models has fragmented both the market and vendor landscapes. Companies with the intention of mining this long-nascent market will need to shift away from this focus and embrace human experience design innovation. This represents a hard pivot for device manufacturers with a proud legacy in hardware and embedded software. It is a fundamental reinvention of purpose accompanied by the transformation of product strategy, operations, organization, and culture.

Based on our real-world experience, we recommend five actions for leaders of Smart Home beginning the reinvention journey:

Initiate processes to develop fresh insight into consumer lives and homes. This will provide competitive advantage. Place product development priorities around consumer home life.

Confirm and monitor your position in the market. Understand your current and desired role in the vendor landscape. Partner to fill gaps in solution architectures, go-to-market capabilities, skills and processes.

Make simplicity of design and practical utility baseline requirements. Employ these key design points to lower the current barriers to Smart Home adoption.

Plan to evolve the operating model accordingly. Seek flexible operations in anticipation of ongoing changes in the competitive landscape and the market. Determine localization needs.

Subordinate distinct product and service roadmaps for comprehensive solution and ecosystem roadmaps that deliver digitally-augmented homeowner experiences.

The recent focus on consumer privacy and a global trends toward regulation create opportunity for the Smart Living industry to deliver the right to a private life in our own homes. The alternative: become a distrusted vendor. There are a number of recommendations for vendors to deliver Smart Living solutions that build trust:

Ensure data security and privacy across the Smart Living experience and the ecosystem. It's not enough to be sure about your own offering. Vet your ecosystem partners and suppliers.

Clarify privacy policies in simple terms to foster transparency for consumers. Don't hide behind legalese. No matter whether you lead or participate in an ecosystem, the aggregate privacy commitment is your privacy commitment.

Ensure there is true consumer consent and value generated by all data collected. Secure and manage collected data in compliance with regional regulations such as GDPR. Where there is regulatory ambiguity, take it upon yourself to set a clear, high bar.

Develop a clear data management lifecycle and governance model to ensure the proper treatment of personal data from collection to obsolescence and destruction.

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Drawing upon over twenty-five years as a managing partner, principal consultant, and industry analyst with Gartner, IBM, and PwC, Leonard has advised and delivered emerging technology and business solutions to leading enterprises across a broad range of industries. His perspective is shaped by extensive experience helping Global 500 companies drive business innovation and value through digital technologies, and assisting top technology vendors with their go-to-market strategies for their digital products and services.

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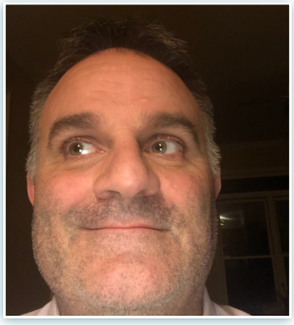

William Thomas, Empathetic Machines

William reimagines organizations. A twenty year advisor to the Global 2000, he is an expert at marrying business, operations, and design strategy to envision what's next— and then delivering new value where the rubber hits the road for leaders and organizations. He connects technology with business outcomes and individuals by following insights with rapid prototyping, for example, mobile, AI & deep learning, IoT, and automation.

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Sources and Detail

1. Smart Home Market by Product (Lighting Control, Security & Access Control, HVAC, Entertainment, Smart Speaker, Home Healthcare, Smart Kitchen, Home Appliances, and Smart Furniture), Software & Services, and Region - Global Forecast to 2024, *https://www.marketsandmarkets.com/Market-Reports/smart-homes-and-assisted-living-advanced-technologie-and-global-market-121.html*
and
Big Tech in The Smart Home Briefing, https://www.cbinsights.com/research/briefing/facebook-google-amazon-smart-home/

2. How close are we to living in 'The Jetsons'? Checking in on our smart home future, *https://www.digitaltrends.com/home/evaluating-smart-home-technology-from-the-jetsons/*
and
The COMPUTERIZED HOME, *https://www.atarimagazines.com/compute/issue70/058_1_The_COMPUTERIZED_HOME.php*

3. Somebody's Watching: Hackers Breach Ring Home Security Cameras, *https://www.nytimes.com/2019/12/15/us/Hacked-ring-home-security-cameras.html*

4. *Ring Privacy Notice (Note: these terms are dynamic. The most recent version can be located here), https://shop.ring.com/pages/privacy-notice*

5. The New Terminology for Privacy, *https://www.nytimes.com/interactive/2019/04/10/opinion/internet-privacy-terms.html*

6. Americans' complicated feelings about social media in an era of privacy concerns, *https://www.pewresearch.org/fact-tank/2018/03/27/americans-complicated-feelings-about-social-media-in-an-era-of-privacy-concerns/*

7. The California Consumer Privacy Act: What You Need to Know, *https://www.law.com/njlawjournal/2018/12/01/the-california-consumer-privacy-act-what-you-need-to-know/?slreturn=20200124205523*
and
What Does California's New Data Privacy Law Mean? Nobody Agrees, *https://www.nytimes.com/2019/12/29/technology/california-privacy-law.html*

8. Study Finds Consumers Are Embracing Voice Services. Here's How, *https://cmo.adobe.com/articles/2018/9/adobe-2018-consumer-voice-survey.html#gs.xeevmi*

9. Worried About Privacy at Home? There's an AI for That, *https://www.wired.com/story/edge-ai-appliances-privacy-at-home/*

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