The Role of a Retailer in Designing Our Connected Future

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Abstract. Even though it was coined nearly two decades ago, the Internet of Things (IoT) didn't really break into the market until around 2013 when it became evident the most popular topic at CES was smart, connected living with an endless showcase of consumer products embedded with sensing and communication technologies. As fundamental mediating bodies between manufacturers and consumers, it is up to retailers to adopt this concept and sell valuable solutions in order for the category to truly penetrate the market. In this paper we will explore trends in the public's awareness of IoT as well as how different retailers have marketed this category over time - and the different angles to storytelling they are each taking.

Keywords: Internet of Things · Smart home · Retail · Consumer electronics · Market strategy

1 Introduction

The nascence of the IoT market is extremely important because the ability for a retailer to make a statement and mediate - at a large scale - which products consumers are exposed to will shape the future of our connected lives. Whether this is direct-to-consumer commerce or big box, like Target, Lowes, or Walmart, the impact of different approaches to exposing the IoT concept to consumers will undoubtedly have lasting effects, with positive or negative consequences. Due to its nascence, this becomes even more complex and uncharted as manufacturers strive to provide unique value to consumers during the same time retailers follow the first-mover advantage paradigm; differing retailer and manufacturer strategies may not always align. One common negative consequence is the confusion and lack of compatibility experienced by the consumer where one product might not interact or communicate properly with another product.

As Rob Tedeschi points out, "if you buy a set of smartbulbs and you'd like them to flash if your smoke alarm is triggered at night or your webcam detects an intruder, for instance, you may be out of luck" [1]. With that in mind, if we briefly look at Lowe's IoT strategy of building a proprietary branded ecosystem, called Iris, we'll notice immediately that Philips Hue smart bulbs are not offered in their assortment. This is problematic for the consumer since Philips was one of the first of its kind to market and produces the most well known and compatible smart bulb in the category. Therefore, the likelihood a consumer would be experiencing these interoperability issues between devices due to proprietary ecosystems is quite high. Unfortunately, these examples are

seemingly endless and become more compounded as consumers naturally purchase different products from different retailers.

The working definition of IoT in this paper will focus on consumer applications and use cases. Although, a clear context of understanding is needed in order to avoid semantic debates and maintain a scope for this analysis. For example, this paper will not focus on such IoT applications for retailers related to supply chain, employee tools, or shelf stocking technologies. Since we are focused on consumers, a working definition will be established by reviewing how IoT terms and concepts have trended in popular culture.

After this analysis we will survey the ways in which retailers are communicating the concepts and value of IoT to consumers. This will be done largely through online marketing, but also through an analysis of the products they offer and how those products are categorized. Retailer's product categorizations will be reviewed in their current states as well as how they have changed over time, looking at milestone dates and marketing or branding changes.

2   The Rise and Awareness of *Consumer* Internet of Things

A Google Trends[1] analysis of the search terms "smart home," "internet of things," "home automation," and "Nest thermostat"[2] reveals a number of interesting observations as we can see from Fig. 1. First, "Nest thermostat" immediately grew to over 25 % of search volume relative to the four terms when introduced to the market in Q4 of 201. Second, the search term "internet of things" which is the widely used industry term for this domain really only grew to 25 % of search volume around Q1 of 2014. A third observation is that the term "home automation" has gone from nearly 100 % of search volume in early 2004 to roughly flatlining around 25 % by 2008. Interestingly, "home automation" has the least search volume of the four terms as of 2015. To further emphasize this observation is *Fortune* and Gigaom writer Stacey Higginbotham's comment during an interview with Jason Johnson, CEO of August Smart Lock, at Target Open House[3], "[…] maybe I need to step back and rethink how I've been thinking about the smart home. Maybe it's not home automation which is where we've been very focused" [2] but rather focus on highly valuable single-product solutions. This is a trend that we will also see evident in retailer's category messaging.

One might argue that as consumers and industries are introduced to new terms there would be heavy initial search interest, eventually declining as familiarity and awareness grows over time. But if we look at the same Google Trends graphic with the addition of the term "smartphone," shown in Fig. 2, this claim of interest versus familiarity is quickly debunked.

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[1] Data are represented in relative percentages, not absolute volume numbers. 100 % represents the highest frequency a given term was searched for relative to every other search term possible. This value is then remapped to all other terms to enable search volume comparisons.

[2] Nest Thermostat is included in this initial analysis because of its common recognition of being the first smart home consumer product to hit some level of mass adoption or awareness.

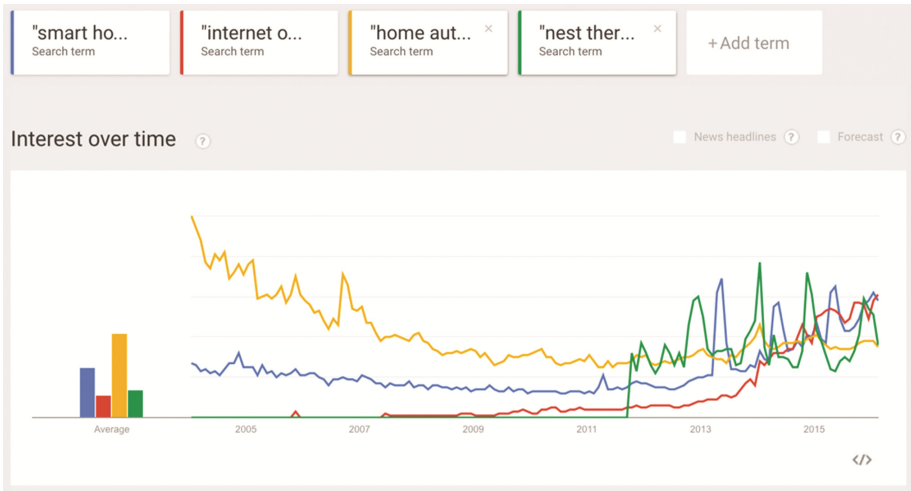[3] Target's flagship experience store for smart home technology in San Francisco.

Fig. 1. Google Trends search volume data. (Data Source: Google Trends (www.google.com/trends)). Color figure online
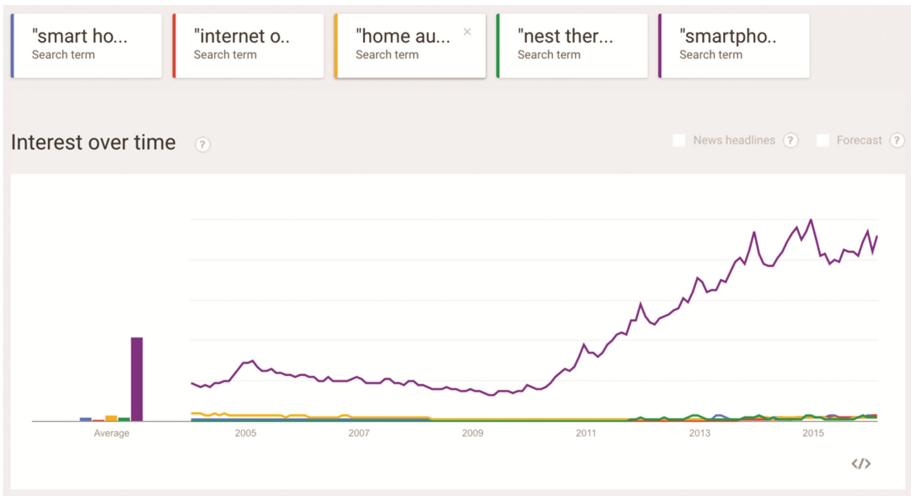

Fig. 2. Google Trends graph with the addition of "smartphone" term in purple. (Data Source: Google Trends (www.google.com/trends)). Color figure online

While Google Trends data only goes as far back as 2004, the origins of IoT dates five years prior. MIT's Auto-ID Center co-founder Kevin Ashton coined the term Internet of Things in 1999 with the definition, "computers that knew everything there was to know about things—using data they gathered without any help from us—we would be able to track and count everything, and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling, and whether they were fresh or past their best" [3]. This definition comes from a very specific context of

RFID and small sensor technologies that can be embedded in physical objects - not dissimilar to Bruce Sterling's concept of GIZMOS and SPIMES[4] in 2005 [4]. The applications of this concept at the time, and to Sterling, revolved around information management of physical goods in the world; literally taking the idea of the internet and attaching physical objects to it. This is why the technologies being focused on and developed at the time were primarily for identification tracking. The benefits for industry, supply chain, and inventory management are obvious; but Sterling instantly positions this concept towards the consumer. In the third chapter of his book "Shaping Things" when discussing the importance of the "Product-Consumer technosociety" he says, "[a]s an End-User today, even a wine bottle will deliberately lure and reward me for becoming a stakeholder" [4].

Interestingly, the same year the Internet of Things was coined, the made-for-TV movie "Smart House" aired on the Disney Channel[5]. IMDb describes the plot of this movie, "A teenager wins a fully automated dream house in a competition, but soon the computer controlling it begins to take over and everything gets out of control" [5]. The movie addresses two aspects of a smart home: home automation and artificial intelligence - hence the term, "smart." The house can control temperature and lighting, take blood samples and match it to historical medical data, manage calendars, make phone calls, and even cook meals specifically for each household member's preferences. Both Disney's "Smart House" and the origination of the Internet of Things point to some shared technological qualities: embedding computers and sensors into physical elements in the world, information analysis and sharing, control or automation, efficiency, and the management of goods.

There is a difference though that is important to this paper's topic: Disney's movie and Ashton's term have little to do with brands for consumers. Ashton is focused on tracking technologies in industry and Disney's story is purely about the emotional interactions with an extremely personified smart home. Brands are producers of goods that consumers purchase which is much more in line with Sterling's book, having references to the words "consumer(s)(ism)" collectively 33 times over 77 pages. His first example of an object that participates in this technosocial world, the wine bottle, is from a specific brand within a specific context of purchasing goods - from a supermarket - and then advertises more goods through a user's interactions [4]. The brand observation is particularly important to note because it signals the bold effect a retailer has on influencing consumer purchasing, and ultimately post-purchasing, behaviors in the new world that Sterling describes.

The goal of this overview has been to look at how IoT-related concepts have trended in popular culture. With this we can now establish a working definition of *consumer* IoT. This takes into consideration insights from Google Trends, early definitions and concepts for IoT, and a reference from the one of the world's most popular consumer brand, Disney. Consumer IoT relates to products for consumers to purchase and interact

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[4] "'SPIMES' are manufactured objects whose informational support is so overwhelmingly extensive and rich that they are regarded as material instantiations of an immaterial system" [4].

[5] We consider Disney to be a telling source towards understanding consumer awareness and interest in IoT due to its market reach and brand awareness.

with that have elements of wireless control, analytics, and communication to devices and services. Those interactions open opportunities for consumers to become stakeholders in the technology itself, as Bruce Sterling discusses, that both affect consumer's lives and interrogate and improve the efficacy of the product through real time feedback mechanisms; as feedback is received, the ability for a product to positively affect a user's life increases. Consumer IoT encompasses products embedded with sensors and actuators like a Nest thermostat, wearable trackers like Fitbit, and the number of internet services - both paid and free - that consumers connect to these physical products such as IFTTT (If This Then That) or MyFitnessPal.

3   Retailer's Marketing and Product Categories

The above working definition for consumer IoT is purposely abstract. There are many aspects to a smart home, and retailers take different approaches to introducing the concept. Since retailers are attempting to sell, more or less, the same products - or at least value - it is important to have a singularly abstract view of consumer IoT that is encompassing of these differing approaches.

We will now review a number of major retailers to understand the landscape of marketing messages to consumers and product assortment and categorizations. But first, it must be acknowledged that retailers have unsuccessfully attempted to sell "home automation" for much over a decade now. In 2002 Sears launched its Connected Home initiative partnering with Home Director to provide a complete home automation installation solution. And in 2006 Best Buy launched its own automation package called ConnectedLife.Home, which was a $15,000 equipment and installation solution to help automate your home centered around a media hub [6]. There are a number of other examples like Sears and Best Buy from both current and defunct retailers. Not surprisingly, these solutions are nearly identical in technical integration to the appearance of the smart home in Disney's "Smart House."

The fundamental differences between this wave a decade ago and the current IoT boom can be attributed to two major points, one experiential and the other technical. First, smartphones and tablets did not exist in the early noughties. The significant change that this brought was to the overall user experience of a smart home system. Previous to the interface of a smartphone, interactions with a smart home were through a website or a proprietary display with buttons installed in a wall similar to that of a light switch, as seen in Fig. 3. The second major difference is that consumers were not purchasing products to place in their homes, they were buying a complete service as an infrastructure installation. As Mashable points out, the standalone elements of a home automation service a decade ago were not available to consumers directly, "[…] because many of the components are sold and marketed within the realm of the professional installers, who buy this gear wholesale from suppliers and then mark it up to a price this well-heeled market will bear" [6]. Fortunately, this model has changed significantly ever since the hardware and maker movements exploded. Once startups and larger companies were able to hack their own products together (from improvements to technology miniaturization), with easily available hardware and wireless communication capabilities, the

home automation market truly turned into a consumer electronics market where consumers could purchase individual products instead of solely installation services.

Fig. 3. Intelligent building control panel ca. 2009 [7]

Now that we are in the second wave of retailers selling the concept of a smart home to consumers, the focus is currently on products with strong brand affinity as opposed to installation services from a professional installer partnering with a retailer. Therefore, there are more products to sell and more stories to be told by retailers and their vendors. A common theme we will see is how retailers are building out distinct landing pages for their smart home category of products in order to sell the concept. In the following analysis we will emphasize the main marketing text that titles the IoT category on each retailer's website so we can quickly look at the similarities or differences across companies.

Lowe's has its own IoT platform called Iris, but it does have a minimal landing page on its main commerce site; these products are categorized as "**Home Automation & Security.**" They define this category as, "Home automation marries devices, utilities and home features with your smartphone, tablet or web browser." On the more specific IrisByLowes.com website the tagline is, "Life, Made Easier." Lowe's is clearly marketing consumer IoT through the lens of automation and convenience, or simplifying your life. Interestingly, the Iris platform is built exclusively around home automation. They are one of the only remaining retailers to focus heavily on automation.

Walmart has their IoT section under the Electronics category. They market to their customer as, "**Your Life. Connected.** More living your life, less figuring out how to manage it." Walmart then has the following subcategories: routers, entertainment,

health, home automation, and monitoring. From the marketing copy it would seem that Walmart is similar to Lowe's Iris in pushing a message of convenience and life simplification, even more overtly than Lowe's and without the sole focus on automation. But when we look at the categories of products, Walmart appears to be adopting a broader categorization of IoT by including entertainment and health along with smart home products.

This broad approach is similar to Target's marketing and product categorization. Target.com has a landing page found through the Electronics & Office category. Although, interestingly, if you follow the breadcrumb trail after navigating to the IoT category you'll notice it doesn't sit within electronics, but actually Home Improvement. The landing page talks about IoT as "**smart home & connected living**" with the description of, "building [sic] a smart home is a smart idea. from [sic] conserving energy to increasing safety to simply reminding, connected living is as easy as a few connections." Providing a contextual experience for the consumer, Target provides an interactive room selector showing different smart products placed around the rendering. These rooms consist of a home's entryway, living room, kitchen, nursery, and home gym. Target sub-categorizes this section with energy & lighting, security & monitoring, entertainment, smart hubs & routers, and lastly wearable tech. Similar to Walmart, but with much more clarity, Target brings health and fitness to the category. This is completely in line with its "connected living" messaging rather than home automation like other retailers.

Sears also uses the Electronics category to guide users into what they call "**Connected Solutions**." They describe this category as, "From wireless, streaming entertainment, media and devices; to smart thermostats, home security and wifi [sic] baby monitors; to fitness trackers, smart watches [sic] and wearables, Sears Connected Solutions has the cutting-edge home automation products and services to streamline your routine, save you money and put control in the palm of your hand. Smart Made Simple." The experience reads as very deliberately using the word "solutions" and offering the word "simple" not as an effect of smart technology, but as the value Sears offers to the customer through simple solutions for integrating this technology into your life. In contrast to Lowe's "Life, Made Easier" Sears is instead saying "Smart Made Simple." It's about the solution being simple, not your life becoming simpler. This is evidenced by the amount of educational content available to consumers from its website, such as buying guides and shopping by compatibility.

Amazon, like Sears, has a much greater lens on educational content that most other retailers. Amazon's IoT section is navigated to via Home, Garden & Tools where the high level categorization is "SmartHome." Amazon's tagline messaging is, "**Smart Home. Smart Life.**" with an immediate reference to Amazon Echo. Products within this category are under the following subcategories: thermostats, lighting, cameras, entertainment, kits & bundles, and Echo smart home. As we navigate Amazon's various pages and navigations around its smart home category (unfortunately the information hierarchy is not very evident), we are peppered with Amazon Echo throughout the page. The immediate reference to Amazon Echo on the main smart home landing page brings us to yet another landing page dedicated to Echo. This page states, "Echo Smart Home, explore compatible devices and solution." Amazon's overall marketing and product

approach doesn't have a singular lens like some other retailers, like automation or security, but it's much more broad trying to educate the consumer about the multiple aspects to a smart home. Because Amazon is also pushing its own proprietary platform some of the messaging and content focus is quite similar to that of Lowe's with its Iris platform. Interestingly there is no mention of Amazon Dash[6] anywhere on their smart home pages.

Lastly we have Best Buy. Similar to Lowe's, Bestbuy.com doesn't route customers to its IoT category through another existing category. Rather, it created a dedicated top-level category called "Connected Home & Housewares." Unlike every other retailer, Best Buy doesn't have any introduction messaging to explain to consumers what the category is. Instead of marketing a high level story for consumers, Best Buy chooses to explain each subcategory as the value proposition. And there are many subcategories: smart & Wi-Fi- thermostats, security cameras & systems, networking & wireless, appliance & outlet control, home alarms & sensors, remote home monitoring systems, smart lighting, smart door locks, streaming media players, wireless & multi-room audio, and finally TV & internet service providers. Importantly, the word "smartphone" is referenced in nearly all of these solution descriptions. This is a strategy that is also found on Apple's website where all of their smart home products are categorized under iPhone accessories, where phone covers and cables are also listed.

In summary, there are only a few marketing strategies being applied across a number of retailers. These loosely fall under (1) automation and simplifying life's routines, (2) connectivity and the ability to track and control from a smartphone), and then (3) an educational focus (buying guides and compatibility lists). In terms of product assortment, retailers who rely on the automation message are less likely to include products like health and fitness trackers in this category as opposed to retailers focusing on the broader connected or smart story. These strategies are even more interesting when taking into consideration the Google Trends data showing "home automation" significantly declining in search term volume. As noted before, "smart home" along with "internet of things" are exploding terms as of 2014, surpassing home automation. This is aligned with the timelines in which retailers have changed their messaging to consumers.

By digging through the Internet Archive's Wayback Machine for each retailer's websites we can see that the Home Automation category has largely existed on site maps since around mid-2013. These categories remained stagnant for nearly two years as these retailers adopted a new language and site structure by adding their new landing pages for smart, connected, and still automation categories. For example, Best Buy first introduced "home automation" to its website in August 2013 [9], as did Amazon in September 2013 [8]. Then in October 2015 [10] Best Buy eventually removed the 2nd-level category of home automation from under its higher-level Home section by evolving "connected home" branding to a top-level category. Not much later, in February 2016 [11], Amazon introduced its "smart home" branding replacing the home automation

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[6] Amazon Dash is a replenishment service for consumer brands to integrate as a fulfillment option for quickly reordering consumable products, like laundry detergent or coffee. The product is a backend service for device makers as well as a consumer product in the form of a physical "order now" button.

category entirely. Each retailer has followed this trend within similar timelines. Based on Wayback Machine data and Google Trends data, it isn't unreasonable to assert that retailers will likely grow their marketing in the IoT category more specifically around education and "smart" or "connected" rather than "automation." This trend will likely be followed with product offerings focusing less on automation and more on single product solutions by a multitude of consumer brands from both established companies and the startup world.

4   Conclusion

We have shown through analyzing mainstream sources that IoT as a realistic consumer market has really only broken into the public eye within the past four to five years. As Mashable wrote, "[2013] was the first year that home automation and tangible smart home products truly dominated the forefront of CES" [12]. Home automation seemed to be fairly popular in years past, but the market was largely controlled by professional installation companies. These installations required wholesaler technologies not available to consumers and complete installations of control systems in a home. The smartphone as an interface and the maker movement catalyzed the push of this paradigm into a consumer-manufacturer relationship with electronics rather than the previous wholesaler-professional installer-consumer relationship. The major consequence of this shift is the explosion of consumer electronics brands building smart home products rather than complete home automation solutions. It is with this shift that the role of a retailer in the smart home market has really taken a stronghold.

While the interfacing role of retailers is critical to the success of a brand in all markets, it is even more significant in emerging markets such as the Internet of Things (IoT). More so than devices like cellphones or tablets, selling IoT products becomes more politically charged as brands try to take over the consumer's home with both products and platforms. For example, Apple's recently removed the Nest Thermostat (widely recognized as the "gateway drug" for consumer IoT) from its retail stores in July 2015 as it shifted its focus to its HomeKit platform [13].

Indeed, IoT is still an early-adopter market, with most retailers only adopting a strategy within the last year, but as more brands and retailers make big moves into the ecosystem it will quickly grow into a mass market category where relationships and curation will be impactful to the shaping of our connected future. This is evidenced by Home Depot teaming up with Wink home automation hub to offer its customers a curated solution with what it felt was a good, affordable hardware and software integration [14]. Although, a quick look at the app's reviews reveal that consumers don't feel the same towards Wink, with an average rating of 3 out of 5 and many complaints about the hardware. Equally, with a recent Chapter 11 filing by Wink (and Quirky, its parent company) [15] it appears Home Depot may have bet on the wrong horse.

As Sterling discussed in Shaping Things, IoT will (and arguably has) enable a new form of interaction between consumers, data, and brands. This interaction will fundamentally change the historical relationship consumers have had with retailers, potentially causing an effect of disintermediation. Therefore, it will be imperative that retailers

explore new business opportunities that become exposed through this relationship change or they run the risk of being shut out and potentially becoming defunct. As seen with Wink and Home Depot, large strategic decisions may not always pan out, but these efforts must be made. Strategic approaches to the IoT ecosystem by retailers, while unfortunately out of scope for this paper, should be considered next. Retailers have many choices in forming IoT strategies; what they decide will have lasting ramifications on consumers and the future of consumer IoT at large. With the exhaustingly multi-faceted considerations needed for successfully developing IoT products and selling the value to consumers, often a cohesive approach cannot be taken due to technical and political roadblocks - even when it is the best approach for the consumer.

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