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Apple's Future: Apple Watch, Apple TV, and/or Apple Car?

Since the release of the iPod in 2001, Apple had probably been the most successful technology company in the world. It revolutionized three businesses in the next 10 years: music, smartphones, and tablets. When Steve Jobs died in 2011, it was up to his successor, Tim Cook, to revolutionize the next set of industries. In 2015, Cook appeared to have three potential targets: watches (wearables), television, and cars. All three were bets on highly uncertain futures. Watches were off to a promising start in their first quarter of shipments, but it was far too early to declare victory. Television seemed ripe for disruption, but many firms had tried and failed to change the TV landscape. And cars, of course, represented the biggest opportunity as well as the biggest leap for Apple.

Financially, Cook and his team were virtually unconstrained: Apple was the most profitable company on the planet in the fourth quarter of 2014, generating \$18 billion in net income (see **Exhibit 1**). However, Jobs had famously said that Apple's success came "from saying no to 1,000 things to make sure we don't get on the wrong track or try to do too much. We're always thinking about new markets we could enter, but it's only by saying no that you can concentrate on the things that are really important."¹ The big questions for Cook and his team included: Were watches, TVs, and cars the right focus? Was Apple going down the best path in watches and wearables? Should Apple shift direction in TVs? Did it make sense for Apple to enter the car business, and if so, how?

The Apple Watch

When Apple released the iPhone 6 in September 2014, it also revealed the long-anticipated and much-rumored Apple Watch, which would ship in late April 2015. In announcing the Watch, Apple CEO Cook said, "We set out to make the best watch in the world. We've been working incredibly hard for a long time on an entirely new product. And we believe this product will redefine what people expect from its category."² Cook and Apple design chief Jonathan Ive, along with Apple's marketing material, repeatedly called the Watch Apple's "most personal" product ever and emphasized the Watch as both a piece of technology and a fashion item. The Watch, in Cook's words, "had to reflect your taste and express what you wanted to express about yourself. It's sort of like your clothes and your shoes. . . . We recognized that technology itself isn't sufficient, that it had to have a style element."³

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Apple saw the Watch as leading the way in what *Wired* called the “coming merger of tech and fashion.”⁴ The Apple team also sought to change the way people interacted with mobile technology by limiting the frequency and duration of interactions with their iPhones. A 2013 study found that users unlocked their smartphones an average of more than 100 times per day, and analysts estimated that as many as two-thirds of those interactions could have taken place on a watch or other wearable device.⁵ Apple designed the Watch to deliver only necessary information and notifications from users’ phones, which could be accessed at a glance, allowing them to stay focused on their other tasks or the world around them. Interactions with the Watch had to be brief, lasting only 5 to 10 seconds. To achieve this, Apple designers simplified some features and eliminated others completely. As Kevin Lynch, who ran the Apple Watch project, put it, “We’re so connected, kind of ever-presently, with technology now. People are carrying their phones with them and looking at the screen so much. People want that level of engagement, but how do we provide it in a way that’s a little more human, a little more in the moment when you’re with somebody?”⁶

Watches, Smartwatches, and Wearable Technology

Although the emerging category of wearable technology embraced a variety of form factors—including eyewear, smart shirts, and modular technologies that could be worn on various parts of the body—smartwatches and other wrist-worn technologies captured the highest volume in 2015. In the words of Alan Dye, head of Apple’s User Interface group, “There was a sense that technology was going to move onto the body. We felt like the natural place, the place that had historical relevance and significance, was the wrist.”⁷ That historical relevance came, of course, from the history of the watch as a timekeeping device. In developing the Apple Watch, Jonathan Ive had spent months researching the history of timekeeping and invited watch experts to Apple’s campus to speak about what one of them described as “the philosophy of instruments for measuring time.” Ive explained, “What was interesting is that it took centuries [for timekeeping technology] to find the wrist and then it didn’t go anywhere else. I would argue the wrist is the right place for the technology.”⁸

While timekeeping devices dated back to the ancient Egyptians, the first mechanical clocks appeared in Europe in the 14th century. Clocks designed to be worn, i.e., watches, emerged in the 16th century. Early watches were worn around the neck or carried in pockets or purses. The first wristwatch appeared in 1810, and it was only after World War I that wristwatches supplanted pocket watches in popularity. Over time the geographical center of clockmaking and watchmaking shifted to Switzerland, and by 1945 Switzerland’s 2,500 watchmakers accounted for over 87% of world watch production.⁹ Under competition from low-cost manufacturers and the emergence of battery-powered watches based on quartz technology, the Swiss watch industry nearly collapsed in the 1970s and 1980s. It had recovered by the first decade of the 20th century, in part by positioning high-quality mechanical watches as luxury items, valued for their beauty, craftsmanship, and style as much as for accurate timekeeping. Swiss watchmakers continued to dominate the high-end mechanical watch segment with well-known brands such as Rolex, Omega, Breitling, and Patek Philippe.¹⁰ Inexpensive watches could retail for under \$10, but high-end watches priced over \$1,000 accounted for 45% of watch sales worldwide in 2014.¹¹ Globally the watch business generated over \$64 billion in sales in 2014, up from just over \$45 billion in 2009.¹²

Several major smartphone vendors had released smartwatches by the end of 2014, most of which paired with smartphones and allowed users to receive and respond to phone notifications and run third-party apps. Sales, although growing, remained small in 2014, with between 3.6 million and 6.8 million units shipped, depending on how the market was defined. (The larger number included health and fitness tracking bands with more limited functionality than true smartwatches.) Total revenues were under \$1.2 billion (see **Exhibit 2** for worldwide smartwatch sales, 2013–2014). Analysts

predicted rapid growth, however, partly driven by the release of the Apple Watch. Market research firm IHS estimated that the smartwatch market would grow from 3.6 million to 34 million units in 2015, with the Apple Watch accounting for over half of smartwatch sales. They predicted the market would grow to over 100 million units by 2020, with the ratio of smartwatch to smartphone sales increasing from 1:500 to 1:20 by 2020.¹³

In March 2014, Google announced Android Wear, which extended the Android mobile platform to watches (and other wearable devices). Samsung, Motorola, Sony, LG, and Asus introduced watches based on the platform later that year, although Samsung and LG continued to develop and release watches based on their proprietary platforms as well. Smartwatch pioneer Pebble also had developed a proprietary smartwatch OS. As with smartphones, implementations of Android watches varied considerably, with a range of specs, materials, prices, and form factors, including square and round watch faces (see **Exhibit 3** for smartwatch models and pricing). Android Wear watches could work with any smartphone running recent versions of Android. Watches paired with phones using Bluetooth or, as of the third version of the platform, released in May 2015, connected using Wi-Fi if the watch was not near the phone. Android Wear displayed text messages, emails, incoming calls, and other alerts from users' phones as small cards that could be swiped away or tapped to open. It also included standard health and fitness apps, and music could be stored locally on the watch. Android Wear supported third-party apps, and Google claimed that Android phone apps could be easily extended to the wearable platform. As of May 2015, there were over 4,000 Wear apps available, including hundreds of watch faces.¹⁴ Android Wear depended heavily on voice commands and dictation, and some users reported that its voice recognition was superior to Apple's. Android Wear also emphasized Google Now, its "intelligent personal assistant," which was designed to deliver time- and location-sensitive information automatically to the watch (such as weather reports, public transit information, or traffic conditions). While reviewers praised Google's notification handling as providing quick access to useful information, others complained that Android's limited ability to customize how notifications were delivered from the phone to the watch, along with its attempts to anticipate what information users might want, led to excessive notifications, crossing the line between useful and annoying.¹⁵

Pebble Pebble, a start-up founded in 2012 and funded by a record-breaking Kickstarter crowdfunding campaign, introduced the smartwatch category with its Pebble smartwatch in early 2013. In 2014, it sold some 700,000 watches, grabbing 8% of the market.¹⁶ The basic Pebble watch had a black and white display, and the capacity to show (but not respond to) email, phone, text, and other notifications from either an iPhone or an Android phone. Pebble's platform also had several thousand iOS- and Android-compatible apps. The watch was waterproof and had a long battery life of up to seven days, but it suffered from limited storage capacity that allowed users to store only eight apps at a time, and had a small, non-touch, black and white display. It sold for \$99 (with a plastic case and rubber or silicon band) or \$199 (with a stainless-steel case and leather band). Pebble was slated to release an updated version with a new OS, color e-paper display, and a microphone in late 2015.¹⁷

Samsung Samsung was the market leader, selling 1.2 million watches in 2014. Of U.S. consumers who reported owning a smartwatch in late 2014, nearly 45% had a Samsung watch, with LG, Motorola, Sony, and Pebble each capturing between 8% and 11%.¹⁸ In September 2013, Samsung released its first smartwatch, the Galaxy Gear; by the end of 2014, Samsung offered six different watches in its Gear line. Most of its watches ran the Tizen OS and required a Samsung Galaxy smartphone for pairing. Samsung also offered the Gear Live, which came with Android Wear and could pair with any recent Android smartphone. Tizen, like iOS and Android, was designed to cross multiple device categories: smartphones, tablets, in-vehicle infotainment systems, netbooks,

smartwatches, and smart TVs. Though Tizen was technically an open platform, Samsung was the only manufacturer that had released devices with the OS by early 2015.

Other major entrants among technology companies included LG, Motorola, and Sony, while luxury watchmakers also had plans to enter the market. In March 2015, for example, Tag Heuer announced its intention to partner with Intel to release an Android-based luxury smartwatch by the end of the year.¹⁹

Versions and Pricing

To make the Watch a deeply personal product, Apple provided users with a range of options. The Watch came in three versions, or “collections,” as Apple called them, differentiated by the materials used for the display, cases, and bands, rather than by the technical specifications, which were the same across collections. Every version was available in either 38mm or 42mm display sizes. The main collection, simply called Apple Watch, came with stainless steel cases, a sapphire crystal display, and a variety of bands made of leather, stainless steel, or a high-grade rubber called fluoroelastomer, starting at \$549 and ranging up to \$1,099, depending on size and choice of band. The cheaper Apple Watch Sport started at \$349 (\$399 for the larger display), with aluminum cases, fluoroelastomer bands, and a glass display. The Apple Watch Edition, with 18-karat gold cases and sapphire crystal display, started at \$10,000 and could cost as much as \$17,000. The choice of display sizes and bands across the three collections generated a total of 38 different combinations to choose from. In addition, the wide range of customizable digital watch faces meant there were an almost infinite number of varieties. According to Alan Dye, “We didn’t want to have three variations, we wanted to have millions of variations. Through hardware and software, we could do that.”²⁰

As with PCs and smartphones, Apple aimed for the high end of the market with the Apple Watch. The least expensive 38mm Sport, at \$349, was priced higher than even the most expensive smartwatches from competitors Samsung, LG, Motorola, and Pebble. (See **Exhibit 3** for smartwatch models and pricing.)²¹ Apple achieved its typical high margins at those prices, with the bill of materials for the 38mm Sport Watch estimated to be less than \$84, or only 24% of the price.²²

The Launch

Apple began taking pre-orders on April 10, 2015. The initial stock sold out within hours. Unlike previous product launches, Apple initially did not sell the Watch in its retail stores, although customers could make an appointment to try one out in the store. Most versions of the Watch were available only online, although Apple was selling the high-end Watch Edition through a few designer boutiques.²³ In the run-up to the Watch’s launch, analysts’ estimates of potential 2015 sales varied widely, from 8 million to 41 million units.²⁴ A Reuters survey in early April estimated that sales would reach approximately 15 million, which was more than double the total industry shipments for 2014²⁵ (see **Exhibit 2**). Apple sold 1.7 million watches in the first two weeks after launch, but was able to deliver only a fifth of those orders.²⁶ Noting that “strong customer demand will exceed our supply at launch,” Apple promised that all models would ship by June, two months after the official April 24 release date. In addition to high demand, there were reports that an important component of the Watch made by one of two suppliers was faulty, forcing Apple to scrap some finished watches and shift all of its manufacturing to a single supplier, slowing production.²⁷

Apple invested heavily in advertising. In the month between its March 9 launch event and taking initial pre-orders April 10, Apple spent \$38 million in television advertising for the Watch. For comparison, it had spent \$42 million on TV advertising for the iPhone 6 over the previous five months. For its first print advertisement, Apple took out a 12-page spread in the March issue of *Vogue*

as part of the magazine's spring fashion issue (at a cost, according to ad industry analysts, of over \$2.2 million)²⁸ and appeared on the cover of the March issue of *Self* magazine on the wrist of a supermodel.²⁹

Functionality

At its most basic level the Apple Watch was a watch, with an array of different digital watch faces to choose from, and an extremely accurate timekeeping engine. In addition to telling the time, the Apple Watch incorporated common health and fitness apps, including a heart-rate monitor, motion tracker, calorie counter, and periodic reminders to stand up and move. Like other smartwatches, the Apple Watch, when paired with an iPhone 5 or later, brought some of the functionality of the phone to the user's wrist, such as notifications of incoming texts, calls, emails, calendar events, or information from third-party apps. The goal was to give the wearer brief notifications and information accessible at a glance to limit the number of times they had to interact with their iPhone. It also allowed users to control music playback (and store music on the Watch), access maps and navigation, and incorporate additional functionality from third-party apps.

The Watch introduced several innovations in its user interface. It included what Apple called the "digital crown," which looked like the stem on a traditional watch and allowed the user to scroll and zoom. The touch screen had a feature called "force touch," which opened additional options if the user pressed down harder than normal on the screen. Another innovation was the "taptic engine," which alerted the user to different types of notifications by tapping out different patterns on the user's wrist. Also, interacting with the Watch depended heavily on Siri, Apple's voice-activated assistant.

While early reviews were mostly positive, reviewers pointed out some shortcomings. Sluggish performance was a common complaint, especially when the Watch was pulling data from its paired iPhone. Some complained about battery life, since the Watch typically required recharging every day. In addition, the roughly 3,500 available apps in the early days after launch represented a tiny fraction of the apps available in the app store. Early reviews indicated, moreover, that most apps were not successfully optimized for the Watch, either providing too little information or trying to do too much. Nonetheless, analysts estimated that the number of available apps would grow to 100,000 by 2016.³⁰

Many big questions remained about the Watch: After the initial burst in demand, would Apple be able to sustain interest? As competitors responded, would Android take over 80% of the category, like it won in smartphones, or would Apple retain its market share? Should Cook even care about the relative market share? And what should Cook tell his team about the next strategic steps?

Apple TV

In addition to the Apple Watch, everyone was waiting for Apple's big move in TVs. Steve Jobs himself had fueled speculation in the space when he told his biographer Walter Isaacson in 2011 that "'I'd like to create an integrated television set that is completely easy to use. It would be seamlessly synced with all of your devices and with iCloud. . . . It will have the simplest user interface you could imagine. I finally cracked it.'"³¹ Despite Jobs' claims, though, Apple had not made its TV offering into a significant business by 2015, nor had it become a meaningful player in the TV industry. Apple executives, however, continued to make it clear that they saw television as ripe for disruption. Eddy Cue, Apple's Senior Vice President of Internet Software and Services, complained in the spring of 2014 that "the TV experience sucks," dismissing new technologies as "glorified VCRs," and lamenting that "the experience has been stuck." Cook echoed those sentiments later that year: "TV is

one of those things that, if we're really honest, it's stuck back in the '70s . . . the interface is terrible . . . you watch things when they come on unless you remember to record them."³² After Apple announced in March 2015 that HBO Now, HBO's new stand-alone subscription streaming service, would be available exclusively on Apple devices for its first 90 days, Cook claimed that "Apple TV will reinvent the way that you watch television, and this is just the beginning."³³

Apple had made its first forays into the TV business in 2005 when it started selling TV shows for download through the iTunes store for users to watch on their computer or video iPod. After Jobs commented about "cracking" TV, analysts were waiting for Apple to ship a new high-definition TV set. The TV set business was over \$100 billion in sales, but it was very challenging: TV set manufacturers typically had low margins, averaging 5%, and television sets had a long upgrade cycle, averaging about eight years.³⁴ Apple had apparently been working on a TV for several years, experimenting with ultra-high-definition displays, motion sensors, and cameras to permit video calls. However, the *Wall Street Journal* reported in May 2015 that Apple had ended the effort and disbanded the team working on the project sometime in 2014.³⁵

Even though Apple scrapped plans to manufacture a TV set, analysts expected Apple to make significant moves in TV in 2015 or 2016. Industry observers assumed that Apple would launch an over-the-top (OTT) subscription-based online video streaming service. Over-the-top referred to TV content streamed to computers, mobile devices, or Internet-enabled TVs over a broadband Internet connection, allowing users to bypass cable or satellite pay services.

The core of any Apple offering was likely to be a new generation of the Apple TV set-top box, which had not been updated since 2012. Apple had released the first-generation Apple TV in 2007. Priced initially at \$299, Apple TV provided users with a way to consume their iTunes content (purchased and downloaded movies, TV shows, and music) on a TV set. The second-generation Apple TV, released in 2010 at a price of \$99, moved from a storage and playback model toward a streaming model, and did away with the large hard drive. It provided an easy way for content to be accessed, organized, and streamed to the TV. Apple TV also featured AirPlay, which allowed consumers to display approved content from iPhones, iPads, or Macs onto their TVs. Much of the content on Apple TV came from other providers, such as Netflix or Hulu, which required individual subscriptions, or from networks that required an existing pay-TV subscription. By early 2015, Apple had sold some 25 million Apple TV boxes overall; its relatively small (by Apple standards) sales led Apple executives to refer to its TV offering as a "hobby." Apple reduced the price to \$69 in March 2015, probably to clear its inventory. Apple TV had several competitors, including Roku, Amazon, and Google, which sold devices that streamed content to users' TV sets, at prices ranging from \$35 to \$99.³⁶

The sweet spot for Apple and other OTT competitors was to encourage so-called "cordcutting." Dissatisfaction with rising cable prices had led to a small, but growing number of consumers "cutting the cord" with their cable or satellite operators (or never connecting the cord in the first place, especially among younger consumers). One option for Apple was to offer a subscription service that would include fewer channels than a typical cable or satellite subscription, perhaps 25, for a lower price, maybe \$30 per month. Apple was said to be in talks with Disney, 21st Century Fox, CBS Corp, Discovery, and other media companies to license their content, which included such networks as ABC, CBS, Fox, ESPN, and the Discovery Channel. According to industry observers, talks with Comcast, owner of NBCUniversal, had broken down in 2014.³⁷

The TV Industry

If Apple were to enter the TV content delivery business, it would be entering an industry in flux. The traditional TV industry was divided between programming networks that developed content and pay-TV operators that delivered those networks to people's homes. Major programming companies included Viacom (which owned the networks MTV, Nickelodeon, and Comedy Central), Disney (ABC, ESPN, the Disney Channel), Time Warner (CNN, TNT, TBS, and HBO), 21st Century Fox, and NBCUniversal. Pay-TV operators included Comcast, Time Warner Cable, Charter, and Verizon, as well as satellite providers DirecTV and Dish Network (see **Exhibit 4** for the largest pay-TV services).

Streaming As broadband Internet access became more prevalent in U.S. homes—75% of homes had high-speed Internet access by late 2014—streaming video emerged as an alternative to traditional cable, satellite, and broadcast TV. The wide availability of broadband was one of the most important enablers of cord-cutting. Over 40% of U.S. TV homes had subscription video-on-demand (SVOD) access in 2014, and 12.5% of households subscribed to multiple services. Netflix led the way, with 36% of U.S. households subscribing (and over 62 million subscribers globally in early 2015), while Amazon Prime and Hulu Plus followed at 13% and 6.5%, respectively. Homes with SVOD services had substantially higher median income, were younger, and were more likely to have children than other households. In addition to competing with traditional pay-TV distributors, streaming services like those offered by Netflix, Hulu, and Amazon began offering original exclusive content of their own. From the other side of the content-distribution equation, HBO announced a stand-alone subscription-based streaming service in early 2015, bypassing distribution platforms. Similarly, in late 2014 CBS began offering a subscription streaming service for both its current and classic content.³⁸

With the growth of OTT viewing, the number of Americans subscribing to pay-TV services (cable, satellite, or fiber) fell, albeit slightly, for the first time ever in 2013, declining by 250,000 to about 100 million, with further losses following in 2014.³⁹ Also, the balance in the pay-TV industry had shifted over time with the rise of satellite providers. Wired cable (from cable or telephone companies) had declined from 71% of TV households in 2001 to under 57% in 2015, while satellite alternatives had risen from less than 12% to more than 30% over the same period.⁴⁰

Traditional broadcast, cable, and satellite TV Despite the trend toward cord-cutting, traditional broadcast, cable, and satellite TV remained the dominant way that Americans accessed TV content, with pay-TV companies reaching over 85% of American households in 2014.⁴¹ Traditional viewing, sometimes called linear viewing—watching shows at their scheduled broadcast time—remained the primary mode of watching TV. In late 2014, the average American spent over 141 hours per month watching traditional TV compared to just over 14 hours watching time-shifted TV, under 11 hours watching video on the Internet, and under 2 hours watching video on a smartphone. However, the time spent watching traditional TV was down nearly 10 hours (6%) per month since 2012, whereas time-shifted viewing, Internet video, and smartphone video had all increased slightly.⁴² Although people increasingly valued the convenience of watching TV on mobile devices, 63% preferred watching video programming on the largest screen possible— i.e., their TV set.⁴³

Cable and satellite packages were offering more and more channels, but the number of channels viewers actually watched remained a small fraction of the number available to them. By 2013, the average TV household received 189 channels (up from 129 in 2008) but watched on average only about 17, the same number they had tuned into in 2008.⁴⁴ At the same time, cable prices were increasing rapidly; according to the FCC, the average monthly price of expanded basic cable service

(basic service plus the most subscribed programming service tier) stood at over \$64 per month at the beginning of 2013.⁴⁵ Between 1995 and 2013 cable prices grew at a compound average annual growth rate of 6.1%, more than twice the rate of inflation (2.4%) over the same period.⁴⁶ By early 2014, Comcast, the largest cable provider with over 22 million subscribers, charged customers an average of almost \$79 per month for TV.⁴⁷ Market research firm Frost & Sullivan estimated the average revenue per user for North American pay-TV operators at approximately \$75 per month in 2014.⁴⁸

Cable and satellite providers paid a monthly retransmission fee to each network in its lineup for each subscriber. In 2014, U.S. pay-TV providers collectively paid \$45.6 billion for content.⁴⁹ Fees varied widely: Disney's sports network ESPN was by far the most expensive, charging cable companies \$6.61 per month for each subscriber. Analysts estimated that in 2015, ESPN would take in \$7.5 billion in fees from pay-TV operators while TNT, the second-most expensive at \$2 per month, would take in nearly \$2 billion.⁵⁰ More obscure channels could cost less than 10 cents per subscriber per month. The most popular channels, despite being the most expensive, provided more value to providers, while the pennies per month per subscriber that programmers charged for less popular channels added up, considering there were well over 100 such networks. In 2013, the 35 most-watched cable channels accounted for 66% of cable viewership but only 34% of cable providers' programming costs.⁵¹

Some incumbent players were trying to change the game. Satellite provider Dish Network, for example, began offering an Internet-based streaming service called SlingTV in early 2015. This service included about 20 popular cable networks, including ESPN, TBS, CNN, and A&E, for a price of \$20 per month. Additional packages for sports, news, kids, or lifestyle programming could be added for an extra \$5 per month. The deal marked the first time that a pay-TV company had offered a trimmed-down OTT TV bundle, and significant negotiations were necessary to get programming companies to sign on. Disney, for example, gave Dish the right to distribute both linear and on-demand content from popular Disney channels such as ABC, ESPN, and ESPN2 via SlingTV. In return, Dish agreed to add some of Disney's less popular channels, including its new college football network, to its satellite bundle. As part of the deal, Disney also dropped a lawsuit over Dish's ad-skipping feature, in return for Dish's agreement to disable the service for ABC programming.⁵²

Earnings Earnings across the entertainment and media business industry had increased every year between 2010 and 2014.⁵³ TV advertising remained a big business. According to Nielsen, spending on TV advertising reached \$78 billion in 2013, up from \$64 billion in 2009.⁵⁴ (By comparison, Internet advertising revenue stood at approximately \$42 billion in 2013, according to a PricewaterhouseCoopers survey.⁵⁵) The average cost of a 30-second prime time advertising spot on broadcast and cable had declined from \$8,900 to \$7,800 over the same period, as more advertising dollars went to digital programming.⁵⁶ Pay-TV operators, which charged nearly twice what they paid for programming, achieved an average profit margin of about 40% in 2013. Cable programming networks were nearly as profitable, with margins of about 37%. Satellite TV operators, TV broadcasters, and film/TV production companies were much less profitable, with margins of around 25%, 17%, and 11%, respectively.⁵⁷

The TV industry was rapidly changing and the potential to sell new services to cord-cutters would be an opportunity for someone. Tim Cook's questions had to include: Was TV a distraction or the right opportunity for Apple? Could Apple bring bold disruption to TV? Could Apple build a competitive advantage in content distribution for the living room?

An Apple Car?

If Apple wanted new markets to conquer, another obvious candidate was cars. Annual vehicle sales reached an estimated \$1.6 trillion worldwide in 2014 (compared to \$400 billion and \$266 billion for smartphones and PCs, respectively).⁵⁸ The automotive sector appeared to be on the cusp of two potential revolutions: the electric car, championed by Tesla, and the self-driving car. Both trends were in their infancy, which made the sector a potentially more appealing target. In March 2015, Cook was twice asked about rumors that Apple was considering an acquisition of electric-car maker Tesla. Tesla CEO Elon Musk admitted that he had had conversations with Apple, though he downplayed any suggestion of an acquisition or partnership.

Rumors that Apple was pursuing its own car project had first appeared in the *Financial Times* and the *Wall Street Journal* in February. The papers, citing unnamed sources, said that Apple had begun an electric-car project, code-named Titan, which employed hundreds of workers in a skunkworks project near Apple's main Cupertino campus. The project was reportedly being led by Apple veteran Steve Zadesky, who had led teams developing the original iPod and iPhone, and who had been an engineer at Ford before coming to Apple.⁵⁹

Apple marketing head Phil Schiller testified in 2012 that Apple had discussed building a car as far back as 2007, while board member Mickey Drexler claimed that Steve Jobs had wanted to build a car. However, the idea of Apple building a car was greeted with considerable skepticism in 2015. Steve Wilhite, who served as Apple VP of Global Marketing from 1999–2000, between stints in the auto industry, said that Apple would never adapt to the three- to five-year product lifecycles of the auto industry and insisted that “the idea of them building a complete Apple-branded car is pretty far-fetched.” Similarly, Bob Lutz, General Motors’ former head of product development, stated that “Apple can enter the automobile business in multiple ways. Do I think they are going to work with vehicles? Yes. Do I think they intend to produce entire cars? No.”⁶⁰

Car Industry Challenges

Reasons for skepticism were not hard to find. The auto business was a mature industry with a lot of entrenched players, including OEMs (the automakers themselves), suppliers, regulators, unions, and dealers, who could complicate the entry of new players. The engineering challenges in developing a car went beyond anything Apple had taken on before, and auto manufacturing raised safety concerns that simply did not exist in Apple’s PC and consumer electronics’ businesses. Even long-established players with decades of experience in the automotive industry, including giants like Toyota and General Motors, still faced quality-control problems that could lead to costly recalls and fines. In addition, carmakers typically faced lower margins than Apple was used to seeing in its existing businesses. In 2014, profit (EBITDA) margins in the industry averaged about 8%, with the best performers—Toyota, Honda, and Volkswagen—reporting margins between 13% and 15%.⁶¹ (See **Exhibit 5** for select automotive industry performance data.) The sales and distribution model in the United States also posed barriers to entry. Tesla, for instance, was facing difficulties selling its cars in numerous American states due to existing regulations that required cars to be sold through licensed dealers. As of early 2015, 25 U.S. states banned the direct sale of cars, which meant that, while consumers could view Tesla’s vehicles in company showrooms in those states, they could not take test drives, discuss pricing, or purchase cars. If individuals wanted to buy a Tesla, they had to purchase one online and have it delivered.⁶² Apple would face the same limitations in any attempt to sell cars directly to consumers in the U.S.

Tesla, founded in 2003 in Palo Alto, illustrated the challenges Apple might face. Tesla was attempting to become the first new U.S. entrant in the automobile mass market since World War II. After 12 years in operation, success was still uncertain. Although sales of its Model S sedan had risen from under 5,000 in 2012 to over 31,500 in 2014, it remained a niche vehicle in the automobile industry, with less than 0.04% of the market. In 2014, there were 17 carmakers worldwide that sold at least 1 million vehicles, and the top five automakers—Toyota, Volkswagen, General Motors, Renault-Nissan, and Hyundai—collectively sold nearly 47 million vehicles in 2014, accounting for nearly half of sales.⁶³ (See **Exhibit 6** for automotive market share.) As of 2015, Tesla had lost nearly \$1.5 billion over the previous 10 years and did not expect to break even until 2020.⁶⁴ (See **Exhibit 7** for Tesla financials.)

Electric and Self-Driving Cars

Electric cars were a tiny, albeit growing, fraction of the total market. The Nissan Leaf was the leading seller, and it had taken three years to sell its first 100,000 vehicles. In 2014, electric vehicles represented less than 120,000 of the 16.5 million cars sold in the U.S.⁶⁵ Globally, sales of electric vehicles had risen from 190,000 in 2013 to over 300,000 in 2014, still a tiny percentage of the total of 87 million vehicles sold worldwide. In addition, although electric cars remained the primary alternative to the traditional gasoline-powered car, vehicles powered by hydrogen fuel cells were emerging as competitors in the zero-emission vehicle category. Some automakers, including Honda and Toyota, were emphasizing hydrogen fuel cell vehicles over electric vehicles.⁶⁶

The emergence of autonomous driving technologies also had the potential to dramatically alter the car industry and the driving experience. By early 2015, prototypes of self-driving cars, of which Google's effort was only the most well-known, had logged millions of test miles. While fully autonomous production vehicles were at least a decade away, some autonomous driving features had become relatively common by 2015 and were slated to be rolled out more widely over the next few years. Autonomous driving or advanced driver assistance systems (ADAS) used cameras, radar, and other sensor technologies to perceive and interpret a vehicle's surroundings and respond accordingly. Such systems had evolved from simply warning drivers of a dangerous situation (such as an impending front-end collision or another car in the vehicle's blind spot) to the ability to take control of the vehicle if necessary, automatically applying the vehicle's brakes to avoid a collision, or nudging the car back into its lane if it was about to drift off the road. Some systems enabled cars to automatically adjust speed to maintain a safe following distance in highway driving or could take over start-and-stop driving in a traffic jam. Hands-free highway driving was expected as early as late 2015 or 2016, with autonomous driving on country roads to follow. City driving would be the most challenging application and was not expected for a number of years.⁶⁷

The combination of electric and autonomous driving technologies meant that the automotive industry was experiencing its most rapid change in a century. Moreover, there was no question that Apple had the resources to develop a new product. Tesla, for instance, had spent a total of about \$1.3 billion on research and development between 2010 and 2014, which represented less than 1% of Apple's annual revenue. Apple also had shown that it could generate higher margins than its competitors in low-margin businesses. For instance, Apple captured over 80% of the profits in the smartphone industry in 2014, despite having less than 15% of unit sales volume.⁶⁸

While an Apple car seemed farfetched to some, Elon Musk told *Bloomberg* that Apple was offering \$250,000 bonuses to try to lure away his engineers.⁶⁹ In 2014, Apple hired renowned industrial designer Marc Newson, whose past work included designing a concept car for Ford. It had also hired the former head of Mercedes-Benz Research and Development North America, a battery engineer

from Ford, and a former engineer at the auto supplier Autoliv.⁷⁰ In February 2015, A123 Systems, a maker of lithium ion batteries for electric cars, filed suit against Apple, alleging that Apple had poached its employees, intending to build a competing battery business aided by their expertise (and in violation of noncompete clauses). The firm's suit also claimed that Apple had hired engineers involved in battery technology from Samsung, LG, Panasonic, and Toshiba.⁷¹

CarPlay and Android Auto

When asked about the rumors, Cook refused to comment and emphasized that Apple was focused on CarPlay, which integrated users' iPhones with automakers' onboard systems, allowing users to access phone, text, music, and navigation apps on the vehicles' built-in screen. Cook made it clear that Apple recognized that the car was important to its future, saying in February 2015, "We've taken iOS and extended it into your car, into your home, into your health. All of these are really critical parts of your life and none of us wants to have different platforms in different parts of our lives."⁷² Apple had introduced CarPlay at the Geneva Car show in March 2014, and it had appeared in its first production vehicle (a Ferrari) later in the year. Several automakers were planning to release cars equipped with CarPlay in 2015. Google had developed a competing platform, called Android Auto. Google had also initiated the creation of the Open Auto Alliance, a partnership among technology firms and carmakers to develop and implement the platform, and several automakers were planning to introduce vehicles supporting the Android Auto platform in 2015.

With both CarPlay and Android Auto, user connected their smartphone to their car's onboard system, and a limited number of apps were displayed on the car's built-in screen to allow for quick access to specific functions: phone, text, music, and navigation/maps. As with Apple Watch, the goal was to provide access to the phone's relevant capabilities, without distracting the driver.⁷³ Significantly, carmakers insisted on retaining control over the human-machine interface, including how drivers would operate CarPlay or Android Auto. Volvo's implementation of CarPlay included a touch screen similar to an iPhone or iPad, while Mercedes insisted there would be no touch screen.⁷⁴ The implementation in Mercedes' C-class for 2015 included a scroll wheel mounted on the center console with which the user scrolled apps and menu items.

While many automakers had developed their own proprietary systems for navigation, phone integration, and audio, it seemed likely that most would adopt Apple and/or Android to achieve superior integration between the phone and the car. In addition, Apple and Google had expertise in developing workable voice-recognition technologies, an area that had long been a weak spot in cars' onboard systems, but one that was essential to their use.⁷⁵ Most automakers, recognizing the need to appeal to both Apple and Android users, committed to offering both platforms in their vehicles, rather than forcing buyers to choose one when buying their cars. In the words of Ford's executive director for connected vehicles and services, "We don't want people to have to make a vehicle choice based on which mobile phone they have. We want to accommodate all customers and their devices."⁷⁶ Similarly, car audio system makers Alpine and Pioneer had released aftermarket systems that integrated both CarPlay and Android Auto. Some analysts saw CarPlay as a foothold for Apple in the car, from which it could expand to take on more of the control of the onboard systems, manage the human-machine interface, and exert some influence over the interior design of a vehicle, even if it stopped short of developing its own car. Apple seemed to take a first step in this direction when it announced in June 2015 that CarPlay would support apps from automakers that allowed users to control various features of the car, such as adjusting the climate control, from within the CarPlay interface.⁷⁷

Entry into the car business, beyond CarPlay, would be a multibillion-dollar bet for Apple. Compared to early investments to develop Apple Stores or even the iPhone, which required only between \$100 million and \$150 million, an “Apple Car” was a much higher risk. The question for Cook was whether such an investment would bring a commensurate return. Was CarPlay the right strategic thrust for Apple in cars, or should Apple strive to play a much bigger role?

Exhibit 1 Apple Inc., Selected Financial Information, FY 2010–2014 (\$ millions, except for number of employees and stock-related data)

	2010	2011	2012	2013	2014
Net sales	\$65,225	\$108,249	\$156,508	\$170,910	\$182,795
Cost of sales	39,541	64,431	87,846	106,606	112,258
Research and development	1,782	2,429	3,381	4,475	6,041
Selling, general, and administrative	7,299	10,028	10,040	10,830	11,993
Operating income (loss)	18,385	33,790	55,241	48,999	52,503
Net income (loss)	14,013	25,922	41,733	37,037	39,510
Total cash, cash equivalents, and marketable securities	51,011	81,570	121,251	146,761	155,239
Accounts receivable, net	9,924	11,717	18,692	20,641	27,219
Inventories	1,051	776	791	1,764	2,111
Net property, plant, and equipment	4,768	7,777	15,452	16,597	20,624
Total assets	75,183	116,371	176,064	207,000	231,839
Total liabilities	27,392	39,756	57,854	83,451	120,292
Total shareholders' equity	47,791	76,615	118,210	123,549	111,547
Cash dividends paid	--	--	2,488	10,564	11,126
Number of employees	46,600	60,400	72,800	80,300	92,600
International sales/sales	56%	61%	61%	61%	62%
Gross margin	39%	41%	44%	38%	39%
R&D/sales	3%	2%	2%	3%	3%
SG&A/sales	9%	7%	6%	6%	7%
Return on sales	22%	24%	27%	22%	22%
Return on assets	19%	22%	24%	19%	18%
Return on equity	35%	42%	43%	31%	34%
Stock price low	\$27.18	\$315.32	\$58.43	\$55.68	\$70.51
Stock price high	\$46.67	\$422.24	\$100.72	\$100.01	\$119.75
P/E ratio at period-end	14.7	10.4	15.1	12.1	15.6
Market value at period-end	\$295,455.3	\$376,357.2	\$499,821.0	\$504,476.5	\$647,506.9

Source: Compiled from Capital IQ data and Thomson ONE.

Note: Share price data reflect calendar-year results and also reflect retroactive application of 7:1 stock split that took effect in June 2014.

Exhibit 2 Worldwide Smartwatch Sales, 2013–2014 (thousands of units, millions \$USD)

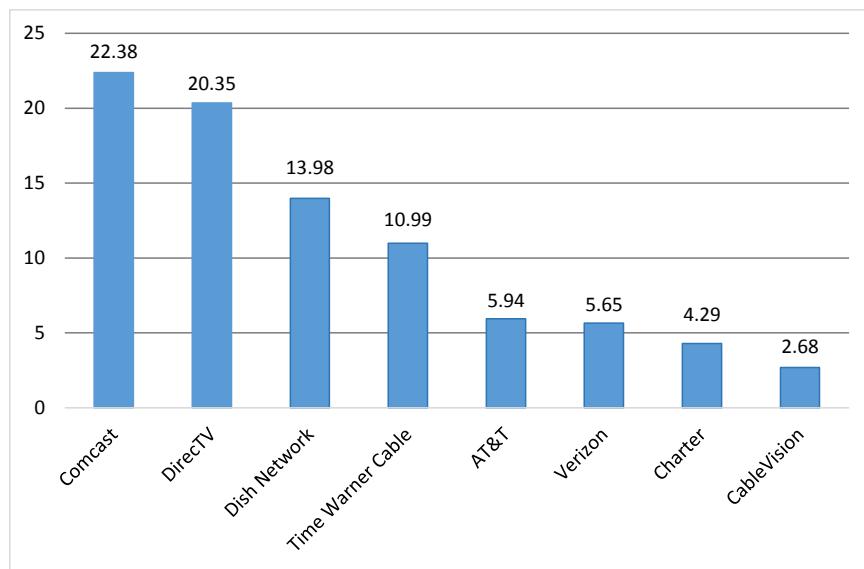
	2013			2014		
	Units Shipped	Revenue	Mkt Share (Revenue)	Units Shipped	Revenue	Mkt Share (Revenue)
Samsung	800	240	33.8%	1,200	300	23%
Lenovo/Motorola	--	--	--	500	125	10%
LG	--	--	--	420	97	7%
Pebble	300	45	6.3%	700	91	7%
Garmin	200	60	8.4%	400	88	7%
Sony	250	50	7.0%	550	83	6%
Fitbit	450	59	8.2%	600	72	6%
Others	1,150	258	36.2%	1,625	283	34%

Source: Adapted from "Top 10 Smartwatch Companies 2013 (Sales)," Smartwatch Group, <http://www.smartwatchgroup.com/top-10-smartwatch-companies-sales/>; and "Top 10 Smartwatch Companies 2014 (Sales)," Smartwatch Group, <http://www.smartwatchgroup.com/top-10-smartwatch-companies-sales-2014/>, accessed March 22, 2015.

Exhibit 3 Select Smartwatch Manufacturers and Brands (2014–2015)

Manufacturer	Models	Operating System	U.S. Retail Price (\$US)
Samsung	Gear 2	Tizen	\$299
	Gear S	Tizen	\$349
	Gear Live	Android Wear	\$199
LG	G Watch	Android Wear	\$229
	G Watch R	Android Wear	\$249
	G Watch Urbane	Android Wear	\$349
Lenovo/Motorola	Moto 360	Android Wear	\$249
Asus	Zen Watch	Android Wear	\$199
Pebble	Pebble	Proprietary	\$99
	Pebble Steel	Proprietary	\$199
Sony	Watch3	Android Wear	\$249

Source: Casewriter.

Exhibit 4 Largest Pay-TV Services in the U.S., 2014 (millions of subscribers)

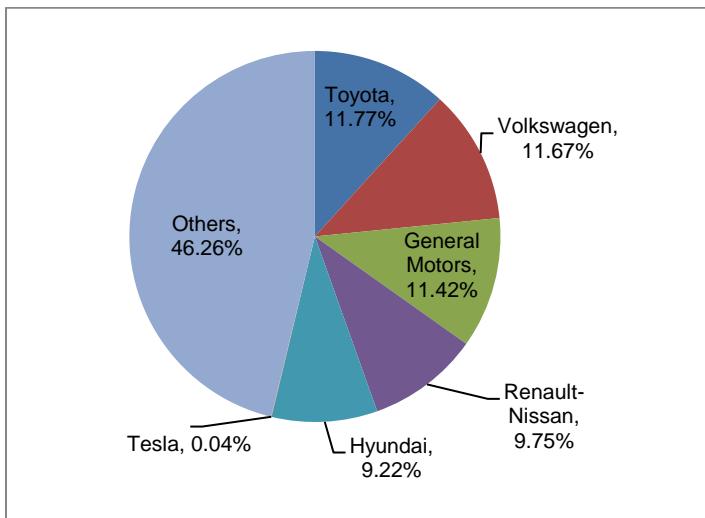
Source: Adapted from "Pay TV providers ranked by the number of subscribers in the United States in Q4 2014," Statista, <http://www.statista.com/statistics/251793/pay-tv-providers-with-the-largest-number-of-subscribers-in-the-us/>, accessed May 27, 2015.

Note: Includes cable (Comcast, Charter, Time Warner, Cablevision), telephone companies (ATT, Verizon), and satellite (DirecTV, Dish).

Exhibit 5 Select Financial Results of Major Automobile Manufacturers, 2014 (\$ millions)

	Toyota	Volkswagen	General Motors	BMW
Revenues	249,472.4	244,984.9	155,929.0	97,289.5
Operating Income	22,935.7	10,603.7	1,650.0	10,733.2
Net Income	18,122.5	13,126.7	2,786.0	7,015.9
Gross Margin	19.0%	18.2%	10.8%	26.3%
EBITDA Margin	14.5%	13.4%	6.3%	20.8%
Return on Assets	4.8%	3.7%	2.9%	4.2%
Return on Equity	13.7%	12.7%	7.5%	16.0%

Source: Created by casewriter using data from Thomson ONE, accessed May 2015.

Exhibit 6 Global Automotive Market Share, 2014

Source: Adapted from Shwetha Surender, "Outlook of the Global Automotive Industry in 2015," Frost & Sullivan, April 1, 2015, p. 13; and Alan Ohnsman, "Tesla Rises after Model S Sales in 2013 Exceed Forecast," *Bloomberg Businessweek*, January 15, 2014, <http://www.bloomberg.com/news/articles/2014-01-14/tesla-delivered-6-900-cars-in-fourth-quarter-executive-says>.

Exhibit 7 Tesla, Select Financial Data, 2010–2014 (\$ millions)

	2010	2011	2012	2013	2014
Revenues	116.7	204.2	413.3	2,013.5	3,198.4
Cost of sales	86.0	142.7	383.2	1,451.2	2,311.7
R&D	93.0	209.0	274.0	232.0	464.7
SG&A	84.6	104.1	150.4	285.6	603.7
Operating Income (loss)	(146.8)	(251.5)	(393.3)	(61.3)	(186.7)
Net Income (loss)	(154.3)	(254.4)	(396.2)	(74.0)	(294.0)
Total Assets	386.1	713.4	1,114.2	2,416.9	5,849.3
Total Liabilities	179.0	489.4	989.5	1,749.8	4,937.5
Total Shareholder Equity	207.0	224.0	124.7	667.1	911.7
Gross Margin	26.3%	30.2%	7.3%	22.7%	27.6%
R&D/Sales	79.7%	102.4%	66.3%	11.5%	14.5%
SG&A/Sales	72.5%	51.0%	36.4%	14.9%	18.9%
Return on Equity	(63.6%)	(118.0%)	(227.2%)	(18.7%)	(37.3%)
Return on Invested Capital	(50.8%)	(64.9%)	(72.3%)	(5.6%)	(9.8%)
Market Value	2,527.4	2,985.4	3,868.4	18,516.4	27,954.2

Source: Created by casewriter using data from Thomson ONE, accessed May 2015.

Endnotes

¹ Quoted in "The Seed of Apple's Innovation," *Bloomberg BusinessWeek*, October 12, 2004, http://www.businessweek.com/print/bwdaily/dnflash/oct2004/nf20041012_4018_db083.htm?chan=gl, accessed May 28, 2015.

² Quoted in Rosie Swash, "Apple Watch: did the fashion team get it right?" *The Guardian*, September 9, 2014, <http://www.theguardian.com/fashion/2014/sep/09/apple-watch-angela-ahrendts-burberry-wearable-tech>, accessed March 12, 2015.

³ Tim Cook, interview by Charlie Rose, September 12, 2014, transcript at Sam Colt, "Tim Cook Gave His Most In-Depth Interview To Date—Here's What He Said," *Business Insider*, September 20, 2014, <http://www.businessinsider.com/tim-cook-full-interview-with-charlie-rose-with-transcript-2014-9>, accessed April 13, 2015.

⁴ Bill Wasik, "Why Wearable Technology will be as Big as the Smartphone," *Wired*, December 17, 2013, <http://www.wired.com/2013/12/wearable-computers/>, accessed April 15, 2015.

⁵ Wasik, "Why Wearable Technology will be as Big as the Smartphone."

⁶ See David Pierce, "iPhone Killer: The Secret History of the Apple Watch," *Wired*, April 2015, <http://www.wired.com/2015/04/the-apple-watch/>, accessed May 7, 2015.

⁷ Pierce, "iPhone Killer."

⁸ Brad Stone and Adam Satariano, "Tim Cook Interview: The iPhone 6, the Apple Watch, and Remaking a Company's Culture," *Bloomberg Businessweek*, September 18, 2014, <http://www.bloomberg.com/bw/articles/2014-09-17/tim-cook-interview-the-iphone-6-the-apple-watch-and-being-nice>, accessed April 10, 2015.

⁹ Rohit Deshpande, Karol Misztal, and Daniela Beyersdorfer, "The Swatch Group," HBS No. 512-052 (Boston: Harvard Business School Publishing, 2012), p. 2.

¹⁰ See Deshpande, Misztal, and Beyersdorfer, "The Swatch Group"; Ryan Rafaelli, "Jean-Claude Biver (A): The Re-Emergence of the Swiss Watch Industry," HBS No. 415-031 (Boston: Harvard Business School Publishing, 2014); and Jason Biggs, "How The Watch Industry Will Save Itself," *TechCrunch*, January 19, 2015, <http://techcrunch.com/2015/01/19/how-the-watch-industry-can-save-itself/>, accessed May 19, 2015.

¹¹ Sulab Madhwal, "Soaring Swiss Franc Worsens Outlook for Volatile Watch Sales," *Euromonitor*, January 30, 2015.

¹² Data from Euromonitor International, accessed May 2015.

¹³ See "Apple Watch Success Needed for a Smartwatch Mega Boom, New IHS Report Says," IHS press release, May 7, 2015.

¹⁴ Gareth Beavis, "Android Wear: everything you need to know," *TechRadar*, May 28, 2014, <http://www.techradar.com/us/news/wearables/google-android-wear-what-you-need-to-know-1235025>, accessed June 1, 2015.

¹⁵ For reviews, see Samuel Gibbs, "Android Wear 5.1 review: simple, useful and the best—for now," *The Guardian*, May 13, 2015, <http://www.theguardian.com/technology/2015/may/13/google-android-wear-5-1-watch-review-simple-useful-best-for-now>, accessed June 2, 2015; and Geoffrey A. Fowler, "LG Watch Urbane Review: Why Android Trails Apple," *Wall Street Journal*, May 26, 2015, <http://www.wsj.com/articles/lg-watch-urbane-review-why-android-trails-apple-1432670527>, accessed June 2, 2015.

¹⁶ See "Top 10 Smartwatch Companies 2014 (Sales)," Smartwatch group, <http://www.smartwatchgroup.com/top-10-smartwatch-companies-sales-2014/>, accessed March 1, 2015.

¹⁷ See Scott Stein, "Pebble Steel Review: The First Great Smartwatch of 2014 is Still the Best," *CNET*, November 19, 2014, <http://www.cnet.com/products/pebble-steel/2/>, accessed May 20, 2015. See also Pebble's website, <https://getpebble.com>, and Kickstarter funding page, <https://www.kickstarter.com/projects/597507018/pebble-time-awesome-smartwatch-no-compromises>.

¹⁸ Ramon T. Llams, "U.S. Wearables Ownership, Usage, and Desired Brands Survey," IDC #254472 (March 2015), p. 6.

¹⁹ Astrid Wendlandt, "Tag Heuer, Intel Challenge Apple Android Smartwatch," *Reuters*, March 19, 2015.

²⁰ Pierce, "iPhone Killer."

²¹ See Matt Swider, "Apple Watch release date, price and features," TechRadar, May 10, 2015, <http://www.techradar.com/us/news/wearables/apple-iwatch-release-date-news-and-rumours-1131043>, accessed May 11, 2015.

²² According to a breakdown by IHS Technology; see Adrian Kingsley-Hughes, "Apple Watch costs under \$85 to make," ZDNet, April 30, 2015, <http://www.zdnet.com/article/apple-watch-costs-under-85-to-make/>, accessed May 5, 2015.

²³ Hayley Tsukayama, "In Debut, Apple Watch Appears to Sell Out Pre-orders," *Washington Post*, April 10, 2015. See also Daisuke Wakabayashi and Lorraine Luk, "Faulty Part Slows the Apple Watch—Defects with 'taptic' engine component prompted Apple to limit Availability," *Wall Street Journal*, April 30, 2015, p. B1.

²⁴ Philip Elmer-DeWitt, "How many Watches will Apple sell in 2015? A Fortune survey," *Fortune*, March 2, 2015, <http://fortune.com/2015/03/02/how-many-watches-will-apple-sell-in-2015-a-fortune-survey/>, accessed May 14, 2015.

²⁵ Bill Rigby, "Exclusive: Six percent of U.S. adults plan to buy Apple Watch - Reuters/Ipsos poll," Reuters, April 15, 2015, <http://www.reuters.com/article/2015/04/15/us-apple-watch-idUSKBN0N628820150415>, accessed May 14, 2015.

²⁶ Jaimee Minney, "Watching and Waiting: Only 22 Percent Apple Watches Shipped First Weekend," Slice Intelligence, April 26, 2015, <http://intelligence.slice.com/watching-and-waiting-only-22-percent-apple-watches-shipped-first-weekend/>, accessed May 15, 2015.

²⁷ Wakabayashi and Luk, "Faulty Part Slows the Apple Watch—Defects with 'taptic' engine component prompted Apple to limit Availability."

²⁸ David Gianatasio, "Apple Watch Gets Its First Advertising With a Stylish 12-Page Spread in Vogue," *Adweek*, February 26, 2015, <http://www.adweek.com/adfreak/apple-watch-gets-its-first-advertising-stylish-12-page-spread-vogue-163155>, accessed May 15, 2015.

²⁹ Veronique Hyland, "The Apple Watch Is Being Advertised in the Most Analog Possible Way," *The Cut, New York Magazine*, February 26, 2015, <http://nymag.com/thecut/2015/02/apple-watch-meets-old-media-advertising-model.html>, accessed May 15, 2015.

³⁰ Luke Villapaz, "Apple Inc. Is Already Dominating The Smart Watch Market, New Data Shows," *International Business Times*, May 7, 2015, <http://www.ibtimes.com/apple-inc-already-dominating-smart-watch-market-new-data-shows-1912624>, accessed May 15, 2015.

³¹ Quoted in Hayley Tsukayama, "Jobs's final plan: an 'integrated' Apple TV," *Washington Post*, October 21, 2011, http://www.washingtonpost.com/business/technology/jobss-final-plan-an-integrated-apple-tv/2011/10/21/gIQAvhUl3L_story.html, accessed May 15, 2015.

³² Cook interview by Charlie Rose, September 12, 2014.

³³ Sarah Perez, "HBO's New Streaming Service, HBO Now, Exclusive To Apple At Launch," TechCrunch, March 9, 2015, <http://techcrunch.com/2015/03/09/hbos-new-streaming-service-hbo-now-exclusive-to-apple-tv-at-launch/#.yxvnxe:kl51>, accessed April 25, 2015.

³⁴ Patrick Seitz, "Apple's Five TV Market Challenges; Low-Margin Business; Can tech giant redefine television as it did the smartphone industry?" *Investor's Business Daily*, May 4, 2012, p. A1.

³⁵ Daisuke Wakabayashi, "Behind Apple's Move to Shelve TVs," *Wall Street Journal*, May 19, 2015, p. B1.

³⁶ For a comparison of these devices, see David Katzmaier and Matthew Moskovciak, "Roku vs. Apple TV vs. Chromecast vs. Amazon Fire TV: Which streamer should you buy?" CNET, March 9, 2015, <http://www.cnet.com/news/chromecast-vs-apple-tv-vs-roku-3-which-media-streamer-should-you-buy/>, accessed May 26, 2015.

³⁷ See Hagey Keach, Shalini Ramachandran, and Daisuke Wakabayashi, "Apple Plans Web TV Service in Fall," *Wall Street Journal*, March 17, 2015.

³⁸ Nielson, "The Total Audience Report - Q4 2014," The Nielsen Company, 2015, pp. 3-6. For total number of Netflix subscribers, see Trefis Team, "Netflix Q1 Earnings: The Stock Soars As Subscriber Numbers Impress," *Forbes*, April 17, 2015, <http://www.forbes.com/sites/greatspeculations/2015/04/17/netflix-q1-earnings-the-stock-soars-as-subscriber-numbers-impress/>, accessed June 4, 2015.

³⁹ Edmund Lee, "TV Subscriptions Fall for First Time Ever as Viewers Cut the Cord," *Bloomberg Businessweek*, March 19, 2014, <http://www.bloomberg.com/news/articles/2014-03-19/u-s-pay-tv-subscriptions-fall-for-first-time-as-streaming-gains>, accessed May 4, 2015; and "Major PayTV Provider Lost about 125,000 Subscribers in 2014," March 3, 2015, Leichtman Research Group, <http://www.leichtmanresearch.com/press/030315release.html>, accessed May 27, 2015.

⁴⁰ See "National ADS, Wired-Cable & Over-The-Air Penetration Trends," TVB Local Media and Marketing Solutions, <http://www.tvb.org/research/184839/4729/72512>, accessed May 26, 2015.

⁴¹ Nielsen, "The Total Audience Report, Q4 2014," The Nielsen Company, p. 18.

⁴² Nielsen, "The Total Audience Report, Q3 2014," The Nielsen Company, p. 12.

⁴³ Nielsen, "Screen Wars: The Battle for Eye Space in a TV-Everywhere World," The Nielsen Company, March 2015, p. 5.

⁴⁴ Nielsen, "Advertising & Audiences: State of the Media," May 2014, The Nielson Company, p. 14.

⁴⁵ Federal Communications Commission, "Report on Cable Industry Prices," DA- 14-672 (Washington, DC: FCC), May 16, 2014, p. 3, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0516/DA-14-672A1.pdf.

⁴⁶ Federal Communications Commission, "Report on Cable Industry Prices."

⁴⁷ Lee, "TV Subscriptions Fall."

⁴⁸ Avni Rambhia, "Overview of Average Revenue per User for Global Pay TV and Broadband," Frost & Sullivan No. 9849-70, March 10, 2015, p. 7.

⁴⁹ James Bradshaw, "Streaming wars: How disruptors are shaking up the TV business," *Globe and Mail*, April 17, 2015, <http://www.theglobeandmail.com/report-on-business/streaming-trouble-the-traditional-and-digital-tv-worlds-clash/article24015722/>, accessed June 4, 2015.

⁵⁰ Lucas Shaw and Scott Moritz, "Verizon Ushers in the Era of 'Skinny Cable,'" *Bloomberg Businessweek*, April 30, 2015, <http://www.bloomberg.com/news/articles/2015-05-01/verizon-ushers-in-the-era-of-skinny-cable->, accessed May 1, 2015.

⁵¹ Alex Sherman, "Bundled Cable TV Withstands Consumer Opposition," *Bloomberg Business*, November 14, 2013, <http://www.bloomberg.com/bw/articles/2013-11-14/2014-outlook-cable-bundling-and-higher-bills-wont-stop-soon>.

⁵² Liana B. Baker and Varun Aggarwal, "Dish eyes Internet TV services in landmark Disney Deal," Reuters, March 4, 2014, <http://www.reuters.com/article/2014/03/04/us-dish-disney-idUSBREA22A720140304>.

⁵³ Nielsen, "Advertising and Audiences: State of the Media, May 2014," The Nielsen Company, 2014.

⁵⁴ Nielsen, "Advertising and Audiences: State of the Media, May 2014," p. 8.

⁵⁵ Internet Advertising Bureau and PricewaterhouseCoopers, "IAB internet advertising revenue report," April 2014, http://www.iab.net/media/file/IAB_Internet_Advertising_Revenue_Report_FY_2013.pdf, accessed April 29, 2015.

⁵⁶ Nielsen, "Advertising and Audiences: State of the Media, May 2014," p. 9.

⁵⁷ EY, "Spotlight on profitable growth, Vol. VII, Media & Entertainment," September 2014, p. 6.

⁵⁸ Morgan Stanley North America Insight, "Apple Auto: World's Most Valuable Company Meets Most Disruptable Industry," Morgan Stanley Research, February 24, 2015, p. 1.

⁵⁹ See Daisuke Wakabayashi and Mike Ramsey, "Apple Secretly Gears Up to Create Car," *Wall Street Journal*, February 14, 2015, p. A1; and Tim Bradshaw and Andy Sharman, "Apple Hiring Automotive Experts To Work in Secret Research Lab," *Financial Times*, February 14, 2015.

⁶⁰ See Gabe Nelson, "What's in it for Apple? 'Project Titan' represents an opportunity to revolutionize the automobile, without ever selling one," *Automotive News*, February 23, 2015.

⁶¹ See Henry Kallstrom, "Intense competition leads to low profit margins for automakers," MarketRealist, February 5, 2015, <http://marketrealist.com/2015/02/intense-competition-leads-low-profit-margins-automakers/>, accessed May 4, 2015.

⁶² See "Where Can Tesla Sell Cars?" *Mojo Motors Blog*, updated March 19, 2015, <http://www.mojomotors.com/blog/where-can-tesla-sell-cars/>, accessed May 18, 2015.

⁶³ Shwetha Surender, "Outlook of the Global Automotive Industry in 2015," Frost & Sullivan, April 1, 2015, p. 13. See also Alan Ohnsman, "Tesla Rises After Model S Sales in 2013 Exceed Forecast," *Bloomberg Business*, January 15, 2014, <http://www.bloomberg.com/news/articles/2014-01-14/tesla-delivered-6-900-cars-in-fourth-quarter-executive-says>.

⁶⁴ David Welch and Dana Hull, "Apple's electric car dreams come with challenges," *Chicago Daily Herald*, February 22, 2015.

⁶⁵ "Tesla's not as Disruptive as You Think," *Harvard Business Review* (May 2015): 23.

⁶⁶ Welch and Hull, "Apple's electric car dreams come with challenges."

⁶⁷ See David B. Yoffie, "Mobileye: The Future of Driverless Cars," HBS No. 715-421 (Boston: Harvard Business School Publishing, 2015); and Alex Davies, "Self-Driving Cars will Make Us Want Fewer Cars," *Wired*, March 9, 2015, http://www.wired.com/2015/03/the-economic-impact-of-autonomous-vehicles/?mbid=synd_slate.

⁶⁸ See Morgan Stanley, "Apple Auto," p. 13.

⁶⁹ Tim Higgins and Dana Hull, "Want Elon Musk to Hire You at Tesla? Work for Apple," *Bloomberg Businessweek*, February 5, 2015, <http://www.bloomberg.com/news/articles/2015-02-05/want-elon-musk-to-hire-you-at-tesla-work-for-apple>, accessed May 5, 2015.

⁷⁰ Tim Higgins and Adam Satariano, "Silicon Valley Emerges as Transportation Hub with Apple Car," *Chicago Daily Herald*, February 22, 2015, <http://www.dailyherald.com/article/150229982/>, accessed August 5, 2016.

⁷¹ See John D. Stall, "Apple Sued for Poaching A123 Employees," *Wall Street Journal*, February 19, 2015, <http://www.wsj.com/articles/apple-sued-for-poaching-a123-employees-1424325473>; and Hugh Langley, "Apple's next big project is better batteries, possibly for the iCar," *TechRadar*, February 19, 2015, accessed April 23, 2015, <http://www.techradar.com/us/news/car-tech/apple-s-next-big-project-is-better-batteries-possibly-for-the-icar-1285294>.

⁷² Quoted in Bradshaw and Sharman, "Apple Hiring Automotive Experts to Work in Secret Research Lab."

⁷³ See Aaron M. Kessler and Brian X. Chen, "A Fight for the Dashboard," *New York Times*, February 23, 2015, p. B1.

⁷⁴ John R. Quain, "Battle of the Dash: Tech Companies Try to Get their Apps in a Row," *New York Times*, March 30, 2014.

⁷⁵ See Kessler and Chen, "A Fight for the Dashboard."

⁷⁶ Don Butler, quoted in Kessler and Chen, "A Fight for the Dashboard."

⁷⁷ Kelly O'Brien, "Apple releases new details about its infotainment system CarPlay," Boston.com, June 8, 2015, http://www.boston.com/cars/news-and-reviews/2015/06/08/apple-releases-new-details-about-its-infotainment-system-carplay/81qD0xJXAoub7zrdNTCntN/story.html?s_campaign=8315, accessed June 9, 2015.