Harvard Business School

9-724-419
NOVEMBER 8, 2023

DAVID B. YOFFIE
SARAH VON BARGEN

Apple Inc. in 2023

Tim Cook, CEO of Apple, had a lot to be proud of in late 2023. Under Cook, Apple became the first trillion dollar market cap company; the first two trillion dollar company; and the first three trillion dollar company. For a decade, iPhone's global share hung around the mid-teens, but since the pandemic, the iPhone grabbed more than half the U.S. market, and more than 20% of the world, making Apple the largest seller of smartphones in 2023. Cook had also successfully diversified the business: new hardware products, such as the Apple Watch and AirPods, along with exploding services revenues, captured almost half of Apple's top line, driving sales to almost $400 billion (See **Exhibit 1**). But Cook was not done. In July 2023, Apple sought to pioneer a new category, when Cook announced the release of their first augmented reality (AR) headset, or spatial computer, known as the Vision Pro.

While Apple's momentum was undeniable, so were Cook's challenges. For its fiscal 2023, Apple had four consecutive quarters of declining sales for the first time in 22 years. Most of Apple's new hardware and services revenues were closely tied to iPhone volume, which also declined. While the iPhone was gaining share, smartphones had become a mature, replacement business in most developed economies. Apple's top line depended on rising prices for iPhones, even though average selling prices were already at a substantial premium. In addition, governments in the U.S., China, and Europe were pressuring Apple to participate in more open standards. Some governments were also investigating Apple and its partners for possible anti-trust violations. Many of Apple's new services, such as Music and TV+ were competing against well-established players in markets with low or negative margins. And potentially new businesses, especially Vision Pro and Apple's rumored entry into the car business, appeared years away from fruition.

With $170 billion in cash and marketable securities on its balance sheet, Apple had the luxury to invest in almost anything it wanted. But Steve Jobs had always taken pride in focus. Spreading bets across many businesses was not the "Apple way." Moreover, since Cook was in his early 60s, he knew that his answers to these headwinds would determine his legacy. Should he stay the course, pushing services and complementary hardware products? Should he adjust Apple's strategy to placate government pressures and consider adopting more open standards? And/or should he make a big push into the new opportunities, such as AR and cars?

Professor David B. Yoffie and Research Associate Sarah von Bargen prepared this case. This case derives from earlier cases, including "Apple Computer, 2006," HBS No. 706-496, by Professor David B. Yoffie and Research Associate Michael Slind; "Apple Inc., 2008," HBS No. 708-480, by Professor David B. Yoffie and Research Associate Michael Slind; "Apple Inc. in 2010," HBS No. 710-467, by Professor David B. Yoffie and Research Associate Renee Kim; "Apple Inc. in 2012," HBS No. 712-490, by Professor David B. Yoffie and Research Associate Penelope Rossano; "Apple Inc. in 2015," HBS No. 715-456, by Professor David B. Yoffie and Research Associate Eric Baldwin; "Apple Inc. in 2018," HBS No. 718-439, by Professor David B. Yoffie and Research Associate Eric Baldwin; and "Apple Inc. in 2020," HBS No. 720-454, by Professor David B. Yoffie and Research Associate Daniel Fisher. This case was developed from published sources. Funding for the development of this case was provided by Harvard Business School and not by the company. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

Apple's History

Steve Jobs and Steve Wozniak, a pair of 20-something college dropouts, founded Apple Computer on April Fool's Day, 1976.[1] Working out of the Jobs family garage in Los Altos, California, they built a computer circuit board that they named the Apple I. Within several months, they had made 200 units and had taken on a new partner—A. C. "Mike" Markkula Jr., who as the experienced businessman on the team, was instrumental in attracting venture capital. Jobs' mission was to bring an easy-to-use computer to market, which led to the release of the Apple II in April 1978. It sparked a computing revolution that drove the personal computer (PC) industry to $1 billion in annual sales in less than three years.[2] Apple quickly became the industry leader, selling more than 100,000 Apple IIs by the end of 1980. In December 1980, Apple launched a successful initial public offering (IPO).

Apple's competitive position changed in 1981 when IBM entered the PC market. The IBM PC, which used Microsoft's disk operating system (DOS) and a microprocessor—also called a central processing unit (CPU)—from Intel, was a relatively "open" system that other producers could clone. Apple, in contrast, practiced horizontal and vertical integration. It relied on proprietary designs and refused to license its software to third parties. IBM PCs not only gained more market share but also emerged as the new standard for the industry. Apple responded by introducing the Macintosh in 1984. The Mac marked a breakthrough in ease of use, industrial design, and technical elegance. However, the Mac's slow processor speed and lack of compatible software limited sales. Apple's net income fell by 62% between 1981 and 1984, sending the company into a crisis. Jobs, who was often referred to as the "soul" of the company, was forced out in 1985.[3] The boardroom coup left John Sculley, the executive whom Jobs had recruited from Pepsi-Cola, alone at the helm.

The Sculley Years, 1985–1993

Sculley pushed the Mac into new markets, most notably in desktop publishing and education. Apple's worldwide market share recovered and stabilized at around 8% (see **Exhibit 3a**). By 1990, Apple had $1 billion in cash and was the most profitable PC company in the world. IBM compatibles narrowed the gap in ease of use in 1990 when Microsoft released Windows 3.0. Still, as one analyst noted, "[T]he majority of IBM and compatible users 'put up' with their machines, but Apple's customers 'love' their Macs."[4] Macintosh's loyal customers allowed Apple to sell its products at a premium price. Top-of-the-line Macs went for as much as $10,000, and gross profit hovered around 50%. However, as IBM-compatible prices dropped, Macs appeared overpriced. As the volume leader, IBM compatibles were attracting the vast majority of new applications. Moreover, Apple devoted 9% of sales to R&D compared with 5% at Compaq and only 1% at many other IBM-clone manufacturers. After taking on the Chief Technology Officer title in 1990, Sculley tried to move Apple into the mainstream by becoming a low-cost producer of computers with mass-market appeal.

Sculley also chose to forge an alliance with Apple's foremost rival, IBM. They worked on two joint ventures, one to create a new PC operating system (OS) and one aimed at multimedia applications. Apple undertook another cooperative project involving Novell and Intel to rework the Mac OS to run on Intel chips that boasted faster processing speed. These projects, coupled with an ambition to bring out new "hit" products every 6 to 12 months, led to a full-scale assault on the PC industry. But profits dropped, and Sculley was replaced by Michael Spindler, the company's President, in June 1993.

The Spindler and Amelio Years, 1993–1997

Spindler's strategy to catch IBM-compatibles was to license a handful of companies to make Mac clones. He slashed costs and pushed for international growth, but nothing worked: A 1995

Computerworld survey found that none of the Windows users would consider buying a Mac, while more than half the Apple users expected to buy an Intel-based PC[5] (see **Exhibit 4** for shipments of PC microprocessors). Moreover, despite high hopes for a new revolutionary OS, Apple and IBM parted ways on their joint ventures in 1995. After spending more than $500 million, neither side wanted to switch to the new technology.[6] Following a $69 million loss in Apple's first fiscal quarter of 1996, the company appointed another new CEO, Gilbert Amelio, who was an Apple board member.[7] Amelio proclaimed that Apple would return to its premium-price differentiation strategy, but Macintosh sales continued to fall. In December 1996, Amelio announced the acquisition of NeXT Software (founded by Jobs after he left Apple) and plans to develop a new OS based on NeXT. Jobs also returned to Apple as a part-time adviser. Despite more restructuring efforts, Apple lost $1.6 billion under Amelio. At one point, insiders believed that Apple was within 90 days of bankruptcy. To save the company, Jobs became the company's interim CEO in September 1997.

Steve Jobs and the Apple Turnaround

Jobs moved quickly to reshape Apple. In August 1997, Apple announced that Microsoft would invest $150 million in Apple and make a five-year commitment to develop core products, such as Microsoft Office, for the Mac. Jobs abruptly halted the Macintosh licensing program. Almost 99% of customers who had bought clones were existing Mac users, cannibalizing Apple's profits.[8] Apple's 15 product lines were slashed to just 4 categories -- desktop and portable Macintoshes, for consumers and professionals. Tim Cook, hired by Jobs in 1998 after a career in operations at Compaq and IBM, was credited with streamlining Apple's supply chain.

Jobs sought to bring a new culture to Apple. While previous CEOs sought to broaden Apple's products, Jobs believed deeply in focus. Apple would soon have one of the narrowest product lines of any company of comparable size. Jobs was especially fanatic about industrial design, simplicity, and product elegance. Jobs also believed in extreme practices of secrecy, including a "closed-door policy" in which key cards accessed only certain areas, and creating dummy positions for new hires until they could be trusted. Everyone knew that violation of confidentiality was grounds for termination.[9]

This approach led to Jobs' first real coup: the iMac, introduced in August 1998. The $1,299 all-in-one computer featured colorful translucent cases with a distinctive eggshell design. Thanks to the iMac, Apple's sales outpaced the industry's average for the first time in years. Following Jobs' return, Apple posted a $309 million profit in its 1998 fiscal year, reversing the previous year's $1 billion loss. Another priority for Jobs was to break away from Apple's tired, tarnished image. Jobs wanted Apple to be a cultural force. He also retained his position as CEO of Pixar, an animation studio that he had bought in 1986. (Jobs sold Pixar to Walt Disney for $7.4 billion in 2006.) Through multimillion-dollar marketing campaigns such as the successful "Think Different" ads and catchy slogans ("The ultimate all-in-one design," "It just works"), Apple promoted itself as a hip alternative to other computer brands. The goal was to differentiate the Macintosh amid intense PC competition.

The Personal Computer Industry

While Apple pioneered the first usable "personal" computing devices, it was IBM that brought PCs into the mainstream in the 1980s. By the early 1990s, a new standard known as "Wintel" (the Windows OS combined with an Intel processor) dominated the industry. Thousands of manufacturers—ranging from Dell Computer to no-name clone makers—built PCs around standard building blocks from Microsoft and Intel. The overall industry boomed through the early 2000s, propelled by Internet demand and emerging markets such as China. But PC shipments hit a high-water mark of 352 million shipments worldwide in 2011.[10] PC sales and average selling prices (ASPs) started to decline in 2012

until the Covid-19 pandemic caused a short-term surge in demand in 2020 and 2021. But in 2022, PC shipments were headed down again to 286 million.[11] Although ASPs also took a big jump during the pandemic, they were expected to start falling again in 2023 by 4% to $852.[12]

Buyers and PC Manufacturers

PC buyers fell into five categories: home, small and medium-sized business (SMB), corporate, education, and government. Home consumers represented the biggest segment, accounting for nearly half of worldwide PC shipments.[13] While all buyers cared about price, especially individual consumers, business buyers usually balanced price with service and support. The PC industry had grown concentrated with the three top PC vendors—Lenovo, Hewlett-Packard, and Dell—accounting for 63.9% of worldwide shipments in the first quarter of 2023, up from 51% five years earlier (see Exhibit 3b for PC manufacturers' market shares). Industry leadership had shifted numerous times in the prior three decades. China-based Lenovo vaulted into the front ranks of PC vendors in 2005 when it acquired IBM's money-losing PC business. While HP retook market share leadership in 2017, Lenovo regained its market leading position in 2018.[14] Dell held the third-largest market share, with 17.7% of PC shipments for 2022.[15] Dell's distinct combination of direct sales and build-to-order manufacturing were especially popular in the corporate market.

Suppliers, Complements, and Substitutes

Suppliers to the PC industry fell into two categories: those that made products with many sources, such as memory chips, disk drives, and keyboards; and those that made products (notably microprocessors and operating systems) that had just a few sources. Products in the first category were widely available at highly competitive prices. Products in the second category were supplied chiefly by two firms: Intel and Microsoft.

Microprocessors Microprocessors, or CPUs, were the hardware "brains" of a PC. Intel had held the majority of the PC CPU market since the 1980s. Historically, its leading-edge technology, manufacturing scale, and a powerful brand, distanced Intel from the competition. Missteps by Intel in 2018-20 allowed its biggest competitor, Advanced Micro Devices (AMD), to make substantial inroads in CPUs, capturing close to 40% market share in PCs in 2023.[16] In 2015, a few firms began shipping PCs with ARM, a low-power and lower-priced CPU that was used in smartphones. Although ARM lacked compatibility with most PC software, ARM captured 17% share in 2022.[17]

Operating systems An OS was the software that managed a PC's resources and supported its applications. Microsoft dominated this market since the IBM PC in the 1980s, and about 78% of PCs ran a version of Microsoft Windows in 2023.[18] Microsoft's big hit in the new millennium was Windows XP. Introduced in October 2001, 17 million copies of XP were sold in its first eight weeks of sales. Developed at a cost of $1 billion, XP initially garnered for Microsoft between $45 and $60 in revenue per copy.[19] By 2023, Microsoft was selling its latest versions of Windows for roughly $150 per license. While still dominant, Microsoft was facing its first competition in decades: Apple, Linux, and Google's ChromeOS, were grabbing share.[20]

Alternative technologies Since the early 2000s, consumer electronics (CE) products, ranging from cell phones to game consoles, started to encroach on the functionality that was once the sole purview of the PC. The most widely used alternatives were smartphones and tablets. With billions of smartphones and hundreds of millions of tablets being sold, PC sales suffered.[21] While several industry insiders worried about the impact of digital devices on the PC industry, Jobs viewed all of these devices as part of an integrated strategy to deliver breakthrough user experiences.

The Macintosh and Apple's "Digital Hub" Strategy

In 2001, marking Apple's 25th anniversary, Jobs presented his vision for the Macintosh. He believed that the Macintosh had a real advantage for consumers who were becoming entrenched in a digital lifestyle, using digital cameras, portable music players, and digital camcorders, not to mention mobile phones. The Mac could be the preferred "digital hub" to control, integrate, and add value to these devices. Jobs viewed Apple's control of both hardware and software as a unique strength. Apple subsequently revamped its product line to offer machines that could deliver a cutting-edge, tightly integrated user experience. The company's greatest strength lay in the premium-priced PC category; 91% of PCs priced above $1,000 in the U.S. market were sold by Apple.[22] Globally, Apple's market share rose steadily since 2004, hitting 8.6% in Q2, 2023.[23]

Changing the Macintosh To accomplish his vision, Jobs made three important changes in the Macintosh. First, and perhaps most important, Apple introduced a new OS in 2001, the first fully overhauled platform released since 1984. Analysts estimated that OS X cost Apple roughly $1 billion to develop. Second, since the early 1990s, Apple had built Macs with an IBM CPU called PowerPC. In 2006, Jobs made a large investment to shift Apple to Intel chips. By the next year, the entire Macintosh line ran on Intel, helping Apple to produce thinner, lighter laptops as well as more powerful computers. (This strategy ended almost a decade after Jobs' death, when the company replaced Intel with its own ARM-based M1 CPU in the Macintosh in 2020).

The final piece of the puzzle was a new distribution strategy. The first Apple retail store opened in McLean, Virginia, in 2001. Jobs wanted consumers not only to look at the eye-catching Macintosh designs, but also to experience Apple's products. Most analysts believed that the popularity of media products were critical to bringing consumers into the stores and exposing them to the Mac. By July 2023, the retail division had over 500 stores in 25 countries,[24] and the Apple Store's sales of over $5,500 per square foot, far surpassed those of any other retailer.[25] Observers viewed Apple's retail strategy as a huge success: one analyst said that the company had become "the Nordstrom of technology."[26]

Moving Beyond the Macintosh

iPod Jobs's vision of an explosion of new digital devices led to the debut of the iPod in 2001, followed by the iPhone in 2007, then the iPad in 2010. While the prospects for the Macintosh business improved, it was the iPod that set Apple on its explosive growth path. Jobs' focus for the iPod was simplicity: he said that "to make the iPod really easy to use—and this took a lot of arguing on my part—we needed to limit what the device itself would do. Instead, we put functionality in iTunes on the computer. . . So by owning the iTunes software and the iPod device, that allowed us to make the computer and the device work together, and it allowed us to put the complexity in the right place."[27]

Apple's approach to developing and marketing the iPod became, over the initial and strenuous opposition of Jobs, more open than its strategy for the Macintosh. The iPod could initially sync only with a Mac. Jobs reportedly declared that Windows users would get iPods "over my dead body."[28] Apple's executive team pushed Jobs to change his mind, and he ultimately relented. Opening the iPod to the 90+% of the market for Windows users produced an explosion in iPod sales in 2003. Within two years, iPod sales were roughly 50% of company revenues.[29]

The iPhone

At the January 2007 Macworld, Jobs introduced the iPhone, saying, "Every once in a while a revolutionary product comes along that changes everything. Today, we're introducing three

revolutionary products of this class. The first one is a widescreen iPod with touch controls. The second is a revolutionary mobile phone. And the third is a breakthrough Internet communications device. . . . These are not three separate devices, this is one device, and we are calling it iPhone."[30] Hailed as Time magazine's "Invention of the Year," the iPhone represented Apple's bid to "reinvent the phone."[31] Two and a half years of development efforts had been devoted to the phone, guarded under intense secrecy, even among the company's own employees. The estimated development cost was around $150 million.

Entry into mobile phones might have been a risky move for Apple. At the time, the industry was dominated by Nokia, Motorola, and Samsung, with a roughly 60% market share. The iPhone, however, changed the rules. A revolutionary 3.5-inch touch-screen interface placed commands at the touch of users' fingertips without a physical keyboard. The iPhone ran on an adapted version of Apple's OS X called iOS. Above all, users found it intuitive to use. Apple initially gave the iPhone to only one network operator in most countries. AT&T, the exclusive U.S. operator for the iPhone when it launched, did not provide a subsidy, contrary to the usual practice in the industry. Instead, AT&T agreed to an unprecedented revenue-sharing agreement, which gave Apple control over distribution and pricing.

The first-generation iPhone sold about 6 million units over five quarters. Over the next six years, Apple released new phones that were thinner, bigger, faster, and more intelligent. More important, Apple revamped its pricing model. Carriers provided a subsidy on the phone in exchange for dropping the revenue-sharing agreement, and some subsidies were $400 per phone or higher. With the release of the iPhone 4 in October 2011, Apple introduced Siri, a voice-activated technology that Apple bought in 2010. With Siri, the user could dictate texts, ask questions, and send emails using voice commands.[32] The introduction of the iPhone 5s in 2013 saw the introduction of Touch ID, which enabled users to unlock their phones using their fingerprint. The iPhone 6 and 6 plus, released in September 2014, had a 4.7-inch and a 5.5-inch screen, respectively, matching the best-selling Android phones. The 2022-3 version, the iPhone 14, introduced upgraded features such as car crash detection, with prices ranging from $799 to $1600. The 2023-24 version, the iPhone 15, also ranged from $799 to $1599 and had a USB-C port, a titanium case, and an upgraded camera. The iPhone 15 also contained an upgraded action button, which could be programmed to perform additional functions such as launching apps.[33]

Apple's relationship with carriers changed, too. In most countries, Apple moved from a single carrier to multiple carriers selling iPhones. When Apple added new carriers, it had a reputation as a very tough negotiator: when Sprint, for example, signed its first four-year, $15 billion deal for the iPhone, Apple demanded that Sprint guarantee sales of at least 24 million phones.[34]

Apple was able to capture the majority of the profits in the smartphone industry, taking an estimated 85% in the first quarter of 2023.[35] This was in large part because iPhones were so expensive: the price of the base model iPhone 14, for instance, was more than triple the ASP of Android smartphones ($261).[36] Falling component costs and design improvements also helped to reduce the iPhone's cost. One study showed that the bill of materials for the $1099 iPhone 14 Pro Max was around $460.[37] However, Apple's drive to keep its costs down was often controversial. Apple had become one of the largest customers of Foxconn, a Taiwanese company that largely manufactured in China. After several worker suicides at Foxconn, Apple discovered "serious and pressing" violations of the Fair Labor Association's code of conduct.[38] Cook promised quick action. Following another investigation in 2019, Apple found that Foxconn had broken Chinese labor rules and promised again to resolve the issue.[39] In early 2023, Foxconn and Apple broke ground on three new manufacturing plants in India. After supply chain disruptions during the pandemic, Apple wanted to diversify its production.[40]

App Store One key driver behind the iPhone sensation was the Apple App Store, which Jobs only reluctantly supported. Jobs initially wanted Apple to develop all the apps for the phone, a stance

consistent with his preference for closed platforms and total control. Jobs eventually relented, and the App Store launched in July 2008. Apple's App Store was the first outlet that made it easy to distribute, access, and download applications directly onto the mobile phone. Apple reserved the right to approve all applications and kept a 30% cut of the developer's app sales. The popularity of the App Store was stunning. In the first 18 months, 4 billion applications had been downloaded worldwide. By 2023, there were just under two million apps available.[41] Mobile apps had also become a key source of revenue, producing an estimated $86.8 billion in gross revenues (excluding payments to developers) in 2022.[42] Apple charged most developers a 30% fee on app sales and all in-app purchases.

In April 2021, Apple introduced a privacy service known as App Tracking Transparency (ATT), which required app developers to request users' permission for being tracked. This permission made the collection of IDFA, or Identifier for Advertisers, more complex, thereby preventing cross-app user tracking.[43] However, developers found ways around ATT, such as "fingerprinting," where trackers collected smartphone-level data which appeared harmless but in fact acted like IDFA. This resulted in an enforcement problem for Apple; as one researcher stated, "It's a bit of a cat-and-mouse game."[44]

Competitors Competition was fierce in the smartphone industry. The iPhone's greatest competition came from Android, an open source and free platform developed by Google (see **Exhibit 6** for a market share comparison by region). As more manufacturers entered the market, innovation on the Android platform exploded. More variety, lower prices, and a comparable set of applications powered Android phones to capture more than 85% of smartphone shipments before the pandemic.[45] Apple's share was in the low teens, while other competitors like Blackberry exited the market. During the pandemic, Apple gained significant share. By early 2023, Apple captured more than half the U.S. market and 27.6% of the global operating system market, compared to Android's 71.7%.[46]

Among handset manufacturers, Samsung and Huawei were Apple's biggest competitors (see **Exhibit 7** for top 5 smartphone vendors). Samsung was a conglomerate that made chips, displays, PCs, TVs, and appliances as well as phones. It was a relatively late entrant into the smartphone segment, but it became the volume leader in 2011 with the introduction of its Android-based Galaxy handset. It remained the leader until December 2022, when Apple grabbed 24.1% of global smartphones compared to Samsung's 19.4%.[47]

Founded in 1987 in Shenzhen, Huawei share of the handset market had grown steadily since releasing its first smartphone in 2009, despite having virtually no presence in the U.S. On May 15th, 2019, U.S. sales of their products were banned due to concerns that Huawei was using its technology to spy on other nations. Apple had two additional Chinese competitors: Xiaomi (11%) and OPPO (8.4%). Xiaomi followed a business model built on selling low-priced phones with high-end specifications, while OPPO had grown primarily by selling low-cost phones in China and India, though it had recently begun a rapid push into European markets.[48]

Google's competitor to Apple's App Store, called Play Store, launched in late 2008. In 2014, the number of Android apps surpassed the number available from Apple for the first time, and by June 2023, the Play Store had 2.6 million apps available for download.[49] Despite fewer downloads, though, Apple's App Store generated roughly double the revenue of Play Store.[50] While Google had fewer restrictions than Apple,[51] software developers had to write numerous versions of their applications to make them compatible with the wide variety of Android phones.

Suppliers The supplier base was structurally different in smartphones than in PCs. The supplier that captured most of the value in smartphones was Qualcomm, which largely controlled CDMA (3G) and LTE (4G)—two of the most important protocols for wireless service. Except in China, Qualcomm earned 3.5%–5.0% royalties on the wholesale price of almost every CDMA and LTE phone sold in the

world. The CPU business was also structurally different: the vast majority of CPUs in smartphones were based on designs by ARM Holding. ARM historically licensed its core design for about 1% on each CPU, which sold for roughly $15–$20. Three companies dominated the ARM CPU business in smartphones in the second quarter of 2023: Qualcomm had 40%, Apple 33%, and MediaTek 16%.[52] Dating back to the early days of Apple, Jobs always preferred to control the critical technologies that would drive Apple's differentiation. To grab greater control of mobile devices, Jobs bought two ARM microprocessor companies between 2008 and 2010.[53] Its first in-house processor powered the first-generation iPad and the iPhone 4, both launched in 2010. Until 2013, Apple's chips were manufactured by Samsung, when Apple awarded production rights to Taiwan Semiconductor Manufacturing Company. In 2019, Apple purchased Intel's cellular modem business for $1 billion and aimed to have its own 5G modems in iPhones by 2022.[54] Apple, however, fell behind schedule for making its own modems, which led the company to give Qualcomm a contract for 5G modems through 2026.

Pricing and Demand After peaking at 1.47 billion smartphone shipments in 2017, unit volumes dropped to 1.2 billion units in 2022.[55] Industry analysts noted that developed markets appeared to be saturated, and smartphone tech innovation slowed, making the prospect of an upgrade less exciting to consumers.[56] Apple's iPhone sales did not always follow the industry. Apple generally introduced new models every September. When an exciting new model was launched, sales were often faster than the average, and 79% of U.S. Gen Z buyers chose iPhones over their competitors.[57]

Moving Beyond the iPhone: The iPad

The iPhone's spectacular success may have satisfied many CEOs, but not Steve Jobs. In 2010, he saw another opportunity to make a bold move to redefine computing with the launch of the iPad. "Some people say, 'Give the customers what they want,'" said Jobs, "but that's not my approach. Our job is to figure out what they're going to want before they do."[58] That was what he did with the iPad. Apple's release of the iPad on March 2, 2010, defined a new device category that Jobs described as "even more intuitive and easier to use than a PC, and where the software and the hardware and the applications need to be intertwined in an even more seamless way than they are on a PC."[59] Before the iPad, global tablet sales were trivial. When the iPad launched, market demand was uncertain at best. But doubters were quickly silenced, as sales of the new device took off. More than 450,000 iPads were sold during its first week on the market. By the end of 2014, Apple had built another $30 billion business, cumulatively selling nearly 240 million iPads.[60]

Apple's business model for the iPad was slightly different from the iPhone. Apple earned an estimated 25% gross margin on its entry-model iPad by using its own CPU, giving the channel a lower margin and leveraging its scale in purchasing. Apple had lower costs than most competitors, which could only make 15% gross margin at the same retail price.[61] Yet despite Apple's formidable lead, at least 20 major manufacturers launched tablets over the next few years, driving down Apple's once-commanding market share. In the second quarter of 2023, Apple remained the market leader with a 37% share, followed by Samsung, Huawei, and Lenovo.[62]

Saturation? Lack of innovation? After tremendous growth in their first three years, tablet sales began to lose momentum in 2013 – the peak for iPad sales. Tablets got a little thinner, with more memory, but there was little innovation in the category. iPad sales trended downward over the next nine years (excluding a surge during the pandemic), producing $29 billion in revenue in 2022.[63]

New Revenue: Wearables and/or Services?

Apple under Steve Jobs had revolutionized four industries: PCs, music, cellphones, and tablets. Shortly before Steve Jobs died in the fall of 2011, he appointed his chief deputy, Tim Cook, to take the helm. While Jobs' passion was industrial design and marketing, Cook had been the mastermind behind Apple's global supply chain and operations. Although Steve Jobs legacy was pervasive at Apple, it became Tim Cook's job to grow the company and take Apple to the next level.

When iPhone volumes starting to decline in 2016, it became obvious to Cook and his team that Apple would need to diversify its revenue stream beyond smartphones. If the company wanted to continue to grow, it would need to identify new markets, where Apple could leverage its considerable advantages. Cook attacked several new markets, including wearables, new services, and virtual reality.

Complementary iPhone Services – A $70B Segment

Services related largely to the iPhone grew rapidly under Cook. In 2022, Apple's services generated $71.5 billion in revenue, with a 71.5% gross margin.[64] In total, Apple had more than 900 million paid subscriptions across its services.[65] Apple did not break down its revenue from services in its earnings reports, but the two largest contributors were likely the App Store and licensing fees. In 2022, Apple product users spent approximately $85 billion on apps, subscriptions, and in-app purchases.[66] The bulk of Apple's licensing revenue came from Google, which reportedly paid $26.3 billion in 2021 and a little over $20 billion in 2022 to be the default search engine on "most smartphones and browsers."[67]

Apple's push into services included Apple Music as well as several new services launched in 2019, including Apple Arcade, Apple TV+, Apple News+ and an Apple Pay-branded credit card. Facing large, entrenched competitors in each category, Apple services highlighted privacy features, carefully-curated content, and sleek user interfaces. Additionally, Apple invested billions into 9 data centers throughout the United States (5), Denmark (3), and China (1). In their Maiden, North Carolina data center alone, Apple invested approximately $3 billion.

Early Apple Services: AppleCare, iCloud, iTunes Apple had started offering complementary services as early as 1996 with the introduction of AppleCare for the Mac. By 2023, Apple Care included service parts sales, a collection of extended warranties, protection plans, and other forms of coverage for Apple products, for which customers could pay a single upfront fee or a monthly subscription, which varied depending on the product. Under Steve Jobs, Apple had also launched two other services: iCloud, for cloud storage, and iTunes for digital downloads. One analyst estimated AppleCare revenue in 2022 was approximately $12 billion, or 16% of total services revenue, while iCloud was $3.9 billion, or 5% of total services revenue, and iTunes was $10.2 billion, or 13%.[68]

Apple Music One of Apple's highest profile services was Apple Music, which had its roots in Beats Music, a music streaming service that Apple acquired from Beats Electronics in a $3.2 billion deal in 2014. Beats remained Apple's largest acquisition ever.[69] Apple's biggest competitor was Spotify, a music streaming service founded in Sweden in 2006. Spotify monetized by running ads and selling monthly subscriptions for ad-free listening. Despite being persistently unprofitable, Spotify was regularly criticized by the music industry for failing to fairly compensate musicians and record companies.[70] The service reached 1 million subscribers by 2011 and launched in the U.S. the same year; in 2018, it went public with 71 million subscribers.[71] By March 2023, Spotify had more than 210 million premium subscribers and 317 million monthly active users (MAUs).[72]

As of 2022, Apple Music had more than 85 million subscribers,[73] and one analyst predicted it would hit 110 million paying subscribers by 2025.[74] Apple overtook Spotify to become the most popular music

streaming service in the United States in April 2019.[75] Subscriptions had grown quickly. One estimate put Apple's gross Music profit (revenue minus payments to music artists) at around $1 billion, making Music much lower margin than other services.[76] During an interview in 2018, Cook commented, "We're not in it for the money…, [artists] have to be funded."[77]

Apple Pay Cook introduced Apple Pay, Apple's new mobile payment system, in late 2014.[78] Most of the nation's largest banks and credit card companies had signed on to support it, and retailers quickly pledged to accept the new payment system in their stores. To set it up, users added the information for a credit or debit card to Apple Pay on their iPhone, which allowed them to make payments by holding their iPhone or Apple Watch near a wireless payment terminal. Not surprisingly, Apple faced stiff competition from banks, credit card companies, PayPal, and Samsung and Google, which launched their own mobile payment systems. Like with other products and services, Apple touted privacy features like TouchID authentication. In 2023, Apple Pay's users made up 54% of U.S. mobile payment users, ahead of Google (38%) and Samsung (16%).[79] According to one estimate, Apple Pay revenues had grown from $11 million in 2015 to $1.9 billion in 2022.[80]

In 2018, Apple entered a partnership with Goldman Sachs to launch an Apple Pay-branded credit card.[81] Users could make payments through Apple Pay and receive 2% cash back or, if mobile payments were not an option, use a physical card.[82] Instead of plastic, the Apple Card was titanium and as an added security feature, did not have a credit card number printed on it. In July 2023, Goldman Sachs suggested that it was planning to part ways with Apple, citing "strategic alternatives" for GS' consumer arm, and that they were in talks with American Express to take over their deal with Apple.[83]

Apple TV+ Apple announced in August 2017 that it would invest $1 billion in original content over the next year. Apple officially launched Apple TV+ in November 2019. Original content boasted a lineup from Steven Spielberg, J.J. Abrams, and Oprah Winfrey. In 2022, Apple invested around $6 billion in new shows and movies, far below Amazon's $16.6 billion on Prime and Netflix's $16.7 billion in content spending.[84] As a result, Apple TV+ ranked 7th in the U.S. market, with a 6% share,[85] and roughly 25 million subscribers.[86] Most streaming services (other than Netflix) lost money, and Apple was probably no exception. In 2023, it doubled prices to $9.99 per month.[87] Apple was facing other headwinds with TV+, including a dispute with Jon Stewart over his plans to produce shows on China and AI.[88] Unlike competitors such as Netflix, Apple relied heavily on China for manufacturing and sales. Management wanted to avoid conflict with China, leading Apple to part ways with Stewart.

Complementary iPhone Accessories

Starting in the late 2000s, Apple expanded its complementary hardware ecosystem beyond the iPhone, reaching across multiple sectors. Some of the more prominent accessories included AirPods, the Apple Watch, and AirTags. Other devices were complementary to Apple's services but did not gain significant traction, even after multiple generations. AppleTV, for example, was introduced in 2006, but never became a major player in the TV space. Roku, Amazon and Google served almost 90% of streaming users in the US, with Apple a distant fourth. The majority of Apple's accessory strength was generated from wearables and hearables. Some analysts estimated that 58% of iPhone owners also had an Apple Watch,[89] and 47% owned AirPods.[90]

Indeed, Cook claimed that Apple's Wearables business, which included the Apple Watch and the wireless AirPods earbuds, was the size of a Fortune 200 company in terms of revenue (See **Exhibit 8** for a breakdown of the wearables market).[91] Apple reported $41.2 billion in revenue from Wearables, Home and Accessories in 2022, and Apple's Services segment generated approximately $78.1 billion in revenue, which would place it comfortably in the Fortune 500 list.[92]

Apple Watch and Apple Watch Ultra With iPod sales disappearing, and iPad sales under pressure, Cook announced his first new major product initiative in September 2014: the Apple Watch. The Apple Watch supported a variety of applications including iMessage and X (Twitter), and it included features like a "taptic engine," which communicated notifications to users by tapping out different patterns on their wrist. Reviewers generally reacted positively to the device, but they also noted a steep learning curve and high price ($349 for a base model, or up to $17,000 for an 18-karat "Edition" model).[93] The New York Times one-sentence review was: "[It] may not be for you—but someday soon, it will change your world."[94]

Apple sold 12 million Watches in the first year after launch. This was double first-year iPhone sales, but a disappointing number compared to the over 200 million iPhones sold that year.[95] The manufacturing costs for the $349 base version of the Apple Watch was around $84, giving it a cost/price ratio of 24%, which was significantly lower than other Apple devices.[96] Sales for subsequent versions of the Watch, which boasted new features like faster processors and the ability to make and receive calls, were much stronger: the iPhone attach rate was around 50%, and Apple captured a 30% share of smartwatches in 2022.[97] Samsung held only 10.0% and Huawei 5.3%. [98] One shadow overhanging this business was the U.S. International Trade Commission's decision to ban most Watch imports, starting in December 2023.[99] Apple violated blood-oxygen sensors patents of a U.S. tech firm, called Masimo. Unless it won on appeal, settled with Masimo, or re-engineered the technology, most Watch sales in the U.S. could disappear.

AirPods Apple introduced the wireless AirPods alongside the iPhone 7, the first iPhone without a standard 3.5 mm headphone jack, in 2016. The response from some was vociferous and highly critical: *The Verge*, for instance, suggested that the announcement was "representative of the trademark Apple arrogance, indicative of a company culture in which doing what's logical and consumer-friendly is often conflated with doing what Apple executives think is best…standards be damned."[100] Regardless, Apple quickly sold out its entire stock of the new $159 earbuds after releasing them in December 2016. Running a custom-designed low-power chip, AirPods won praise for ease of use and long battery life, integration with the iPhone, and innovative features (such as automatically stopping music playback if a user took one of the earbuds out and restarting when he or she replaced it). In 2022, it sold approximately 100 million pairs, and was projected to sell as many as 120 million pairs in 2024,[101] with an iPhone attach rate of 47%. By 2023, Apple's AirPods lineup had also expanded to include a $200 pair with a wireless charging case, and the $249 AirPods Pro, which were noise canceling and water resistant. The highest price point item in this line was the AirPods Max, a headphone-shaped hearable with a price tag of $549. AirPods' share of the "hearables" (i.e., wireless in-ear devices) market was approximately 28%, followed by Samsung's 9%.[102]

HomePod Apple entered the smart speaker market with the HomePod in early 2018. To differentiate itself from the competitors like Amazon Echo and Google Home, Apple focused on sound quality, touting the speaker's powerful subwoofer and its "custom array of seven beam-forming tweeters."[103] Reviewers, however, were mostly disappointed with Siri, the virtual assistant on the device, which struggled to perform the same tasks available on other smart speakers.[104] Facing weak sales, Apple dropped the price of the HomePod from $349 to $299 in 2019, leaving it about three times as expensive as Amazon's standard Echo speaker and ten times the price of Amazon's Echo Dot.[105] In 2020, Apple released the HomePod mini for $100, and sales surged. By 2022, HomePod had captured 21% of the U.S. smart speaker market, but it remained a distant third behind Amazon and Google.[106]

AirTags In 2021, Apple introduced AirTags, the newest addition to their Find My ecosystem. AirTags could be used to locate items attached to the plastic and metal fob using the Find My app, and Apple included features such as a built-in speaker, and a removeable cover for easily replacing the

battery. As of December 2022, Apple reported sales of over $1 billion, or 55 million units, from AirTags since their launch in April 2021.[107] In Spring 2023, AirTags sales in the U.S. exploded, mainly fueled by increased travel in the post-pandemic era.[108]

Non-iPhone Innovations and Platforms for 2024 and Beyond

Apple was at the cutting edge of many technologies, and Cook's next move was to keep this edge by focusing on the next set of innovations which would propel Apple into the future. However, this was not an easy task, and placing a wrong bet on a high-profile new technology might sully Apple's brand. Nonetheless, Cook was investing in new, emerging fields, including virtual reality (VR), augmented reality (AR), and self-driving cars.

Vision Pro In June 2023, Apple announced that it would release in 2024 its first "spatial" computer, an AR headset which had the same features of an iPhone and Macbook, in the form of a wearable, portable headset. Users engaged with the device by using their fingers mid-air to perform similar functions as their phones/laptops, such as moving screens and scrolling. Apple's main competitor in the VR/AR headset space was Meta, which announced their VR/AR headset just four days before Vision Pro's pre-order launch. Apple initially expected to sell around 1 million units of the $3499 Vision Pro, with analysts estimating sales of only around 500,000 units. By July 2023, Apple announced it would develop a second version of the initial headset, made of less expensive parts and costing less than the $3499 price tag for the first version. Apple also adjusted its production estimate to 400,000 units, citing difficulty in finding manufacturers who could build the complicated design.[109] During the Apple Event on September 15th, 2023, Apple announced that Vision Pro would soon become a vital part of the Apple ecosystem. The iPhone 15 Pro and Pro Max were designed to film spatial video which could later be replayed on the Vision Pro for a fully immersive experience. Additionally, Vision Pro was capable of syncing with AirPods Pro for a clearer audio experience.[110]

Self-driving Cars Apple began hiring battery experts and other automotive engineers into a skunkworks project code-named "Project Titan" near Apple's headquarters in Cupertino in 2014. Cook confirmed in a June 2017 interview, "We're focusing on autonomous systems. It's a core technology that we view as very important." Cook also called the effort to develop self-driving technology "the mother of all AI projects."[111] By 2020, Apple was already in talks with major car manufacturers, including Hyundai and Nissan, and the high-powered chip which powered the car was expected to be manufactured by TSMC. While Apple's ambitions for their self-driving car were high, they faced setbacks along the way. High employee turnover plagued Project Titan, including Doug Field, Apple's VP of Special Projects who left to join Ford in 2021, after spending time at both Tesla and Apple. At one point, analysts reported that the Apple Car team "had been dissolved for some time," and needed to be reassembled in 2023 in order to launch the new car by 2025. Another setback for Apple was the technical aspects of its autonomous car. In 2020, Apple's road tests, which measured indicators such as distance traveled without a disengagement, were improving, but Apple cars were still performing significantly below competitors like Waymo. However, 26% of potential car owners said they would consider buying an Apple Car and 50% of Tesla owners said they would likely switch.[112]

Apple and AI

From 2016-2020, Apple was the largest acquirer of AI companies, with a total of 25 companies purchased, compared to 35 acquisitions by Google, Microsoft, and Facebook combined. Many of Apple's acquisitions were focused on improving Siri, which had been widely criticized when compared

with Google and Amazon's Alexa. Some of the most prominent acquisitions included Indictiv for data analysis, Xnor.ai for edge-based AI, and AI Music for building personalized soundtracks.[113]

In 2023, Apple created a large language model (LLM) called Ajax GPT, which was trained on 200 billion parameters and worked similarly to OpenAI's ChatGPT. For internal use only, Apple had not shared plans to release Ajax GPT to the public yet. This was partly due to the unreliability and hallucinations of chatbots, prompting Apple to prohibit employees from using ChatGPT internally.[114] Additionally, it was reported in 2023 that Apple was investing "millions of dollars a day" into AI development, including conversational AI, Visual Intelligence, and multimodal AI. These investments were designed to improve user experiences with Siri, create images, and "recognize and produce images or video as well as text."

Potential Shadows over Apple's Future

Anti-trust Investigations Even for a consistently ground-breaking company like Apple, the environment was not always friendly. Apple faced numerous anti-trust lawsuits in both the U.S. and Europe. Starting in 2019, the U.S. Department of Justice (DOJ) began investigating Apple for potential anti-trust behaviors, including building an ecosystem which made it difficult or even impossible to use complimentary products and services. One example was Tile, Inc. Shortly before Apple released AirTags in 2021, iPhone users were regularly asked if they wanted to be tracked by Tile devices in the 2019 iOS update, but were not asked for permission to be tracked by Apple. As Kristen Daru, the general counsel for Tile, stated "The practical reality is that this is a prime example of Apple using consumer privacy as a shield to place third-party apps at a competitive disadvantage."[115] In 2023, the DOJ accelerated their investigation into Apple's potential anti-trust behavior, suggesting the department would file a lawsuit in the near future.[116]

The European Commission launched an anti-trust investigation into Apple in 2020 after Spotify filed complaints about Apple's practices, and how they stifled competition in various ways, including through fees in their App Store.[117] In 2022, the European Union passed a law stating that all portable devices must have a USB-C charger by the end of 2024 (or the end of 2026 for computers). According to the EU, utilizing a common charger across all brands' devices would save consumers money and diminish electronics waste resulting from multiple types of chargers. In response, Apple released the iPhone 15 in 2023, with all versions having the USB-C charging ports. Greg Joswiak, Apple's worldwide marketing chief stated, "Obviously [we will] have to comply…we've no choice", adding that the EU's approach would stifle innovation.[118]

The European Commission was also in the process of implementing the Digital Markets Act (DMA), which named six of the largest tech companies, including Apple, Google and Microsoft as "gatekeepers." Under the DMA, Europe could force Apple to open up its app store, prevent Apple from "self-preferencing," and require interoperability of key services, such as iMessage.[119]

There was also a risk that Apple could be one of the casualties of the DOJ's 2023 Google anti-trust case. The DOJ claimed that Google blocked innovative competitors from entering the search engine space by negotiating exclusivity deals with Apple and Samsung.[120] If the DOJ won its case, one potential remedy was to prevent Google from paying Apple over $20 billion to become the search default.

Ban in China In September 2023, China reportedly prohibited all government officials from using iPhones and other foreign phones at work, in "the latest step in Beijing's campaign to cut reliance on foreign technology and enhance cybersecurity…"[121] This report was challenged by the Chinese

Ministry of Foreign Affairs, which stated that there was no ban on foreign phones, including the iPhone. They also stated that government security was of "great importance" and "[China] noticed that there have been many media reports about security incidents concerning Apple phones."[122]

The White House expressed concern, saying Beijing's move was retaliatory after the United States "limited exports of advanced chipmaking equipment to China, citing fears that such technology will help equip the Asian nation's military." The move was also believed to be in retaliation for the U.S. 2019 ban on Huawei imports.[123] In response to the alleged Chinese iPhone ban, Apple's market cap dropped by $200 billion (6%) in the first two days following the news.[124]

Apple Inc. in the Next Decade?

Most CEOs on the planet would have loved to be in Tim Cook's position: Apple was fabulously profitable, with the best brand on the planet. The company had one of the strongest balance sheets, with the cash to do almost anything it wanted. Customers loved its hardware, and they were often willing to pay substantial premiums over its competitors' products. Yet Cook knew that Apple in 2030 would have to look very different from the Apple of 2023. Cook needed to answer: Should he stay the course, pushing services and complementary hardware products? If he followed this path, how would he differentiate many of his services and continue to grow, especially if the iPhone stopped growing? Apple also remained a walled garden, more closed than almost any other successful tech company in the world. Should he adjust Apple's strategy to placate government pressures and consider adopting more open standards? The walled garden had definite advantages as well as drawbacks. Or should he use his big balance sheet to make a big push into AR, cars, or other new businesses? Capital was not the constraint: it would be creative strategy with great execution.

Exhibit 1a Apple Inc., Selected Financial Information, FY2007–FY2022 (in millions of dollars, except for number of employees and stock-related data)

	2009	2011	2013	2015	2017	2018	2019	2020	2021	2022	2023
Net sales	42,905	108,249	170,910	233,715	229,234	265,595	260,174	274,515	365,817	394,328	383,285
Cost of sales	25,683	64,431	106,606	140,089	141,048	163,756	161,782	169,559	212,981	223,546	214,137
Research and development	1,333	2,429	4,475	8,067	11,581	14,236	16,217	18,752	21,914	26,251	29,915
Selling, general, and administrative	4,149	7,599	10,830	14,329	15,261	16,705	18,245	19.916	21,973	25,094	24,932
Operating income (loss)	11,740	33,790	48,999	71,230	61,344	70,898	63,930	66,288	108,949	119,437	114,301
Net income (loss)	8,235	25,922	37,037	53,394	48,351	59,531	55,256	57,411	94,680	99,803	96,995
Total cash, cash equivalents, and marketable securities	33,992	81,570	146,761	205,666	268,895	237,100	205,898	191,830	190,516	161,109	162,099
Accounts receivable, net	3,361	5,369	13,102	16,849	17,874	23,186	22,926	16,120	26,278	28,184	29,508
Inventories	455	776	1,764	2,349	4,855	3,956	4,106	4,061	6,580	4,946	6,331
Net property, plant, and equipment	2,954	7,777	16,597	22,471	33,783	41,304	37,378	45,336	49,527	52,534	43,715
Total assets	47,501	116,371	207,000	290,345	375,319	365,725	338,516	323,888	351,002	352,755	352,583
Total liabilities	15,861	39,756	83,451	170,990	241,272	258,578	248,028	258,549	287,912	302,083	290,437
Total shareholders' equity	31,640	76,615	123,549	119,355	134,047	107,147	90,488	65,339	63,090	50,672	62,146
Total dividends paid	-	-	-10,564	-11,561	-12,769	-13,712	-14,119	-14,081	-14,467	-14,841	-15,025
Number of employees	36,800	63,300	84,400	110,000	123,000	132,000	137,000	147,000	154,000	164,000	161,000
International sales/sales	48%	61%	61%	65%	63%	63%	55%	55%	58%	57%	58%
Gross margin	40%	41%	38%	40%	39%	38%	38%	38%	42%	43%	44%
R&D/sales	3%	2%	3%	3%	5%	5%	6%	7%	6%	7%	8%
SG&A/sales	10%	7%	6%	6%	7%	6%	7%	7%	6%	6%	7%
Return on sales	27%	31%	29%	30%	27%	27%	25%	24%	30%	30%	30%
Return on assets	17%	22%	18%	18%	13%	16%	16%	18%	27%	28%	28%
Return on equity	26%	34%	30%	45%	36%	56%	61%	88%	150%	197%	156%
Stock price low	2.79	9.95	13.95	24.07	26.43	38.37	35.55	54.70	108.77	130.06	125.02
Stock price high	6.63	14.77	23.98	33.25	41.04	57.09	58.02	134.18	156.69	182.01	196.45
P/Diluted EPS ratio at period-end	20.1	14.6	12.1	12.5	16.7	18.5	18.4	34.3	26.2	24.6	27.9
Market capitalization at period-end	163,370	374,823	438,577	654,159	796,065	1,090,308	988,887	1,920,273	2,428,612	2,417,523	2,676,736

Source: Apple's 10-K, Capital IQ, Refinitiv, and WSJ historical stock prices, https://www.wsj.com/market-data/quotes/AAPL/historical-prices.

Notes: Share pricing is based on Apple's fiscal year data, not accounting for stock splits. Diluted EPS includes all common stock, plus convertible securities which could be diluted as common stock. This provides a more thorough understanding of Apple's profitability per share, and this ratio excludes extraordinary events applicable to Apple's common stock.

Exhibit 1b Apple's Net Sales by Product Category, 2015–2022 (in millions of dollars)

	2015	2016	2017	2018	2019	2020	2021	2022
iPhone	155,041	136,700	139,337	164,888	142,381	137,781	191,973	205,489
iPad	23,227	20,628	18,802	18,380	21,280	23,724	31,862	29,292
Mac	25,471	22,831	25,569	25,198	25,740	28,622	35,190	40,177
iPod	-	-	-	-	-	-	-	-
Services	19,909	24,348	32,700	39,748	46,291	53,768	68,425	78,129
Wearables, Home, and Accessories	10,067	11,132	12,826	17,381	24,482	30,620	38,367	41,241
Total net sales	**233,715**	**215,639**	**229,234**	**265,595**	**260,174**	**274,515**	**365,817**	**394,328**

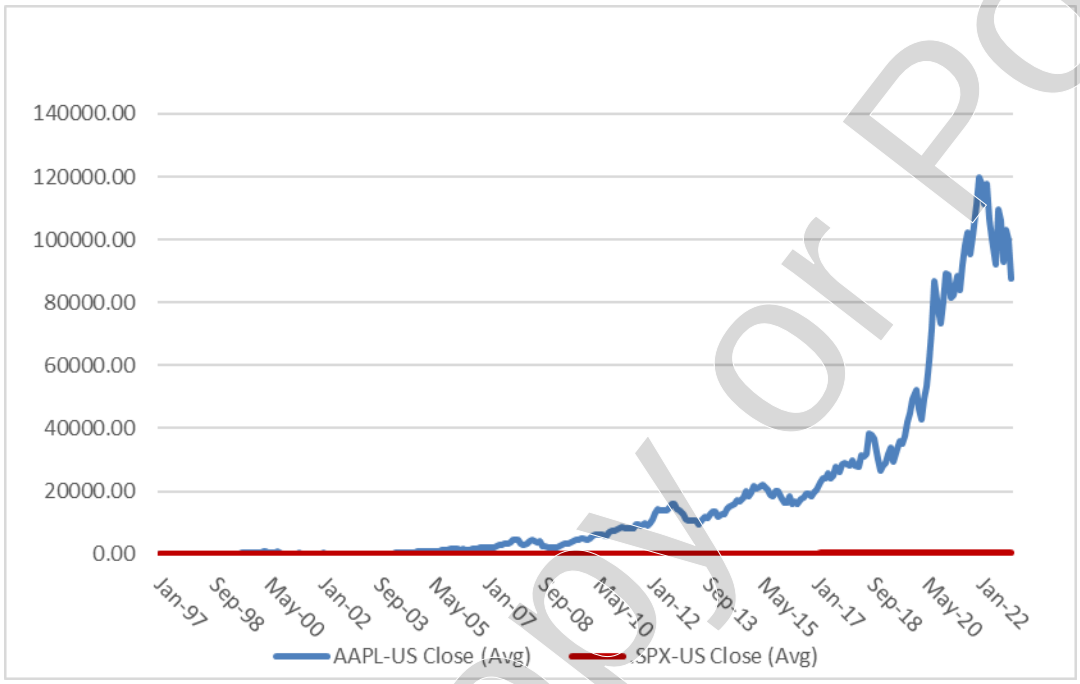
Source: Compiled from analyst reports published by Wedbush and data from Apple's financial statements.

Exhibit 1c Apple Product Unit Sales, 2015-2022 (in thousands of units)

	2015	2016	2017	2018	2019	2020	2021	2022
Macs	**20,587**	**18,484**	**19,251**	**18,210**	**19,100**	**22,455**	**25,727**	**26,176**
Net sales per unit sold	*$1,237*	*$1,235*	*$1,342*	*$1,385*	*$1,250*	*$1,275*	*$1,368*	*$1,535*
iPads	54,856	45,590	43,753	43,540	49,170	53,200	57,800	61,700
Net sales per unit sold	*$423*	*$452*	*$439*	*$422*	*$435*	*$446*	*$551*	*$651*
iPods	-	-	-	-	-	-	-	-
Net sales per unit sold	-	-	-	-	-	-	-	-
iPhone	231,218	211,884	216,756	217,720	180,020	206,100	233,900	225,300
Net sales per unit sold	*$671*	*$645*	*$652*	*$757*	*$761*	*$669*	*$821*	*$912*

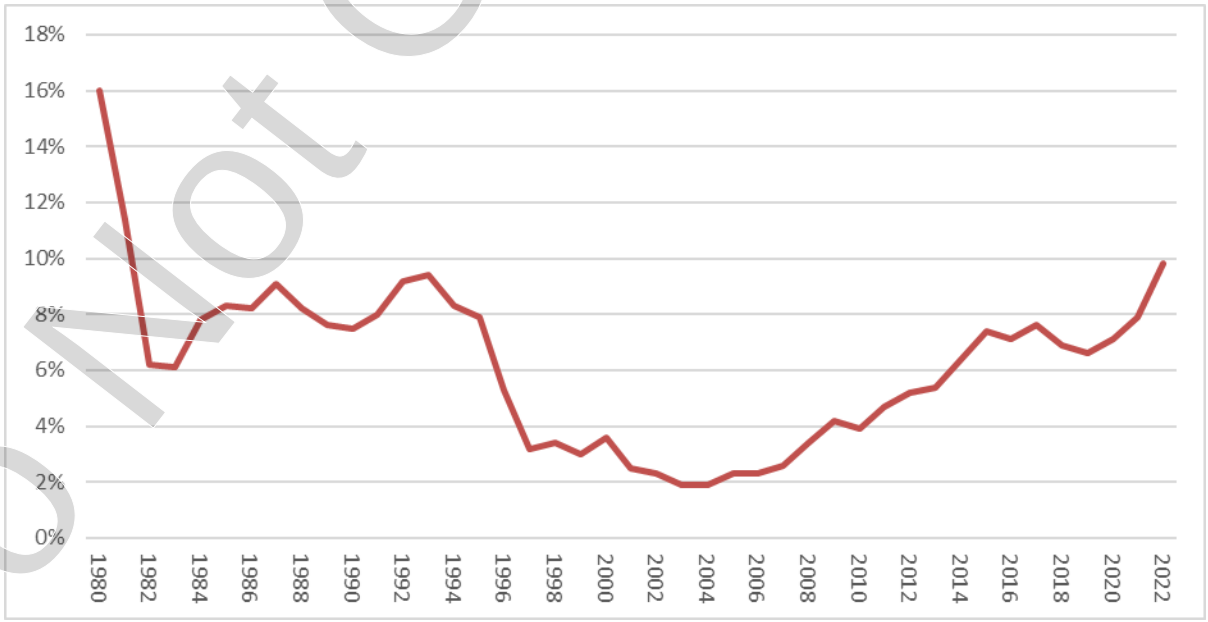
Source: Data from Apple's financial statements and analyst reports published by Canaccord Genuity, Gartner, and IDC.

Exhibit 2 Apple's Share Price vs. S&P 500 Index, 1997-2022 (December 31, 1997 = 100)



Source: Created by casewriter using data from ThomsonOne, accessed March 2020.

Exhibit 3a Apple's Worldwide PC Market Share, 1980-2022



Source: Adapted from InfoCorp., International Data Corp., Gartner Dataquest, and Merrill Lynch data.

Exhibit 3b PC Manufacturers: Worldwide Market Shares, 2014–2022

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Hewlett-Packard	18.4%	19.4%	20.9%	22.7%	23.1%	23.6%	21.7%	21.3%	19.6%
Dell	13.5%	14.2%	15.7%	16.1%	17.0%	17.5%	16.5%	17.6%	17.7%
Lenovo[a]	19.2%	20.8%	21.3%	21.1%	23.1%	24.3%	24.6%	24.4%	24.6%
Acer	7.8%	7.0%	6.8%	6.8%	6.9%	6.4%	6.3%	6.8%	6.6%
Toshiba	-	-	-	-	-	-	-	-	-
ASUS	7.2%	7.0%	7.4%	6.6%	-	5.6%	5.8%	6.4%	7.4%
Apple	6.4%	7.4%	7.1%	7.6%	6.9%	6.6%	7.8%	8.1%	8.9%
Total shipments (in millions)	**308.6**	**275.8**	**260.2**	**259.5**	**259.6**	**266.7**	**309.1**	**341.7**	**286.2**

Sources: Statista, "PC Market Records Modest Gains During Fourth Quarter of 2010, According to IDC," IDC press release, January 12, 2011; "PC Market Stumbles on HDD Shortage While U.S. Market Sees Worst Annual Growth Since 2001, According to IDC," IDC press release, January 11, 2012; "PC Leaders Continue Growth And Share Gains as Market Remains Slow," IDC press release, January 12, 2015; "PC Market Stabilizes with Solid Fourth Quarter Shipments Despite Component Shortages," IDC press release, January 11, 2017; "PC Market Achieves First Positive Holiday Quarter Shipment Growth in Six Years," IDC press release, January 11, 2018; Apple Inc. annual financial reports; and casewriter estimates; "Traditional PC Volumes Close Out an Impressive 2019," IDC, January 13, 2020. (For 2010, http://www.securityweek.com/idc-reveals-data-global-pc-shipments-q4-2010; for 2012, http://www.zdnet.com/article/idc-hp-is-still-top-pc-vendor-worldwide-amid-soft-q4-sales/.)

Note: The sampling of market shares comes mainly from annual listings of the top five PC makers, as measured by IDC and Gartner/Statista. Absence of a figure indicates that a company placed below the top five in a given year.

[a] Lenovo acquired IBM's PC business in mid-2005.

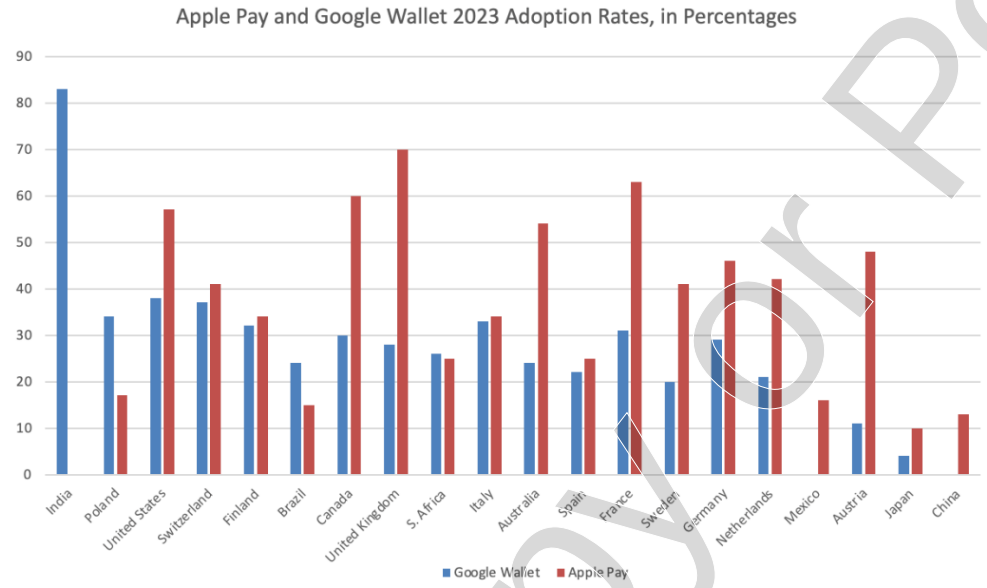
Exhibit 4 Shipments and Installed Base of Intel Architecture Microprocessors (in millions of units)

Total Shipments	2002	2004	2006	2008	2010	2012	2014	2016	2017	2018	2019
Intel Architecture CPUs Shipped	126	170	230	287	315	344	322	290	284	278	275
Installed Base of Wintel PCs	1,111	1,281	1,505	1,782	2,067	2,364	2,619	2,824	3,004	3,160	3,294
Mac units shipped	-	-	5.7	9.9	14.4	17.1	19.6	18.4	19.3	18.2	19.1
Intel-Mac installed base	-	-	5.7	15.6	30	47.1	66.7	85.1	104.4	122.2	141.1

Source: Adapted from Gartner Dataquest, InfoCorp., IDC, Merrill Lynch, Credit Suisse data, and company data.

Notes: Between 5% and 10% of total microprocessor shipments went into non-PC end products. In any given year, as much as 60% of microprocessors in the total installed base involved older technologies that were probably no longer in use. The figures for PowerPC shipments included microprocessors destined for Sony PlayStation and Xbox 360 machines. Figures for "Mac units shipped" over Macintosh calendar-year sales.

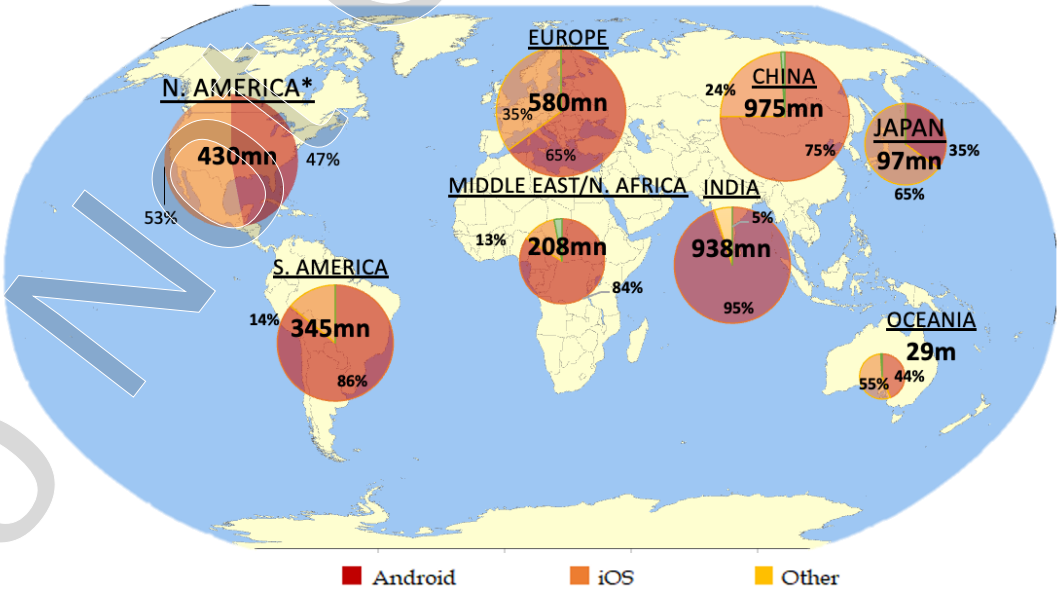
Exhibit 5 Apple Pay and Google Wallet 2023 Adoption Rates by Country, in Percentages



Source: Made by the casewriter using data from Statista Consumer Insights, Insider Intelligence, and Google Support.

Note: Apple Pay is not available in India, and as of June 2023, Apple and India are in talks to introduce the payment system. Google Wallet is not available for payments in China, according to the Google Support website.

Exhibit 6 iOS v. Android Market Share by Geography (as of September 2022)



Source: Made by casewriter based on data from Statcounter, World Bank Open Data and eMarketer. Image is from: https://commons.wikimedia.org/wiki/File:Blank_map_of_the_world_(Robinson_projection)_(10E).svg

Exhibit 7 Top 5 Worldwide Smartphone Market Shares by Vendor, 2016–2022

	2016	2017	2018	2019	2020	2021	2022
Samsung	21.1%	21.6%	20.8%	21.6%	19.5%	19.8%	21.0%
Apple	14.6%	14.7%	14.9%	13.9%	15.0%	17.0%	18.3%
Huawei	9.5%	10.4%	14.7%	17.6%	12.8%	-	-
OPPO	6.8%	7.6%	8.1%	8.3%	8.5%	10.0%	9.8%
Xiaomi	3.6%	6.3%	8.5%	9.2%	11.0%	13.8%	12.3%
Total shipments (millions)	**1,473.4**	**1,472.4**	**1402.6**	**1371.0**	**1,403.5**	**1,354.8**	**1,205.4**

Source: Counterpoint Research, "Smartphone shipments' share worldwide by vendor from 1st quarter 2015 to 2nd quarter 2023," counterpointresearch.com, August 2023.

Note: Although estimates for Huawei's 2022 market share varied, most analysts calculated around 4%.

Exhibit 8 Worldwide Smartwatch Unit Shipments and Market Share, 2016–2022 (millions of units)

	2016		2018		2020		2022	
	Units	Market Share	Units	Market Share	Units	Market Share	Units	Market Share
Fitbit	22.5	22.0%	-	-	-	-	-	-
Apple	10.7	10.5%	47.1	26.5%	142.0	32.0%	145.1	29.5%
Samsung	-	-	11.6	6.5%	40.0	9.0%	49.2	10.0%
Huawei	-	-	8.0	4.5%	54.5	12.25%	26.1	5.3%
Other	43	42.0%	111.2	62.5%	208	46.8%	271.58	55.2%
Total	**102.4**	**100%**	**177.9**	**100%**	**444.6**	**100%**	**492**	**100%**

Source: (2018-2022 data) Counterpoint Research and Statista, "Quarterly smartwatch unit shipment share worldwide from 2018-2023, by vendor". (2016 data) IDC press release, "Holiday Quarter Woes Contribute to a Full-Year Decline in Shipments of Wearable Devices, According to IDC Tracker," IDC.com, March 7, 2023.

Endnotes

[1] This discussion of Apple's history is based largely on Jim Carlton, *Apple: The Inside Story of Intrigue, Egomania, and Business Blunders* (New York: Times Business/Random House, 1997); David B. Yoffie, "Apple Computer—1992," HBS No. 792-081 (Boston: Harvard Business School Publishing, 1992); and David B. Yoffie and Yusi Wang, "Apple Computer—2002," HBS No. 702-469 (Boston: Harvard Business School Publishing, 2002). Unless otherwise attributed, all quotations and all data cited in this section are drawn from those two cases.

[2] Carlton, *Apple,* p. 10.

[3] "Steve Jobs Takes Another Bite at Apple," *The Independent*, January 6, 1997.

[4] Yoffie, "Apple Computer—1992."

[5] David B. Yoffie, "Apple Computer—1996," HBS No. 796-126 (Boston: Harvard Business School Publishing, 1996).

[6] Charles McCoy, "Apple, IBM Kill Kaleida Labs Venture," *Wall Street Journal,* November 20, 1995.

[7] Louise Kehoe, "Apple Shares Drop Sharply," *Financial Times,* January 19, 1996.

[8] David Kirkpatrick, "The Second Coming of Apple," *Fortune,* November 9, 1998.

[9] David Gebler, "Illuminating Apple's Culture of Secrecy," Portofolio.com, April 17, 2012, http://www.portfolio.com/companies-executives/2012/04/17/david-gebler-on-how-apple-can-shed-its-culture-of-secrecy#ixzz1u5HXYOz7, accessed May 2012.

[10] "IDC reports 11% PC growth in Asia-Pacific region," ETMAG.com, February 23, 2012, via Factiva, accessed February 11, 2020.

[11] Thomas Alsop, "Personal computer (PC) shipments worldwide from 2006 to 2022." *Statista*, April 4, 2023, accessed August 20, 2023.

[12] Michael Kan, "Time to Buy? PC Prices Fall Amid Decreasing Demand." *PC Mag*, June 14, 2023, accessed August 20, 2023.

[13] Thomas W. Smith, "Computers: Hardware," Standard & Poor's Industry Surveys, October 22, 2009, p. 18.

[14] "Market Overview – United States – Q4 2017," BMI Industry, October 16, 2017, via Factiva, accessed February 5, 2020.

[15] "PC Market Achieves First Positive Holiday Quarter Shipment Growth in Six Years," IDC press release, January 11, 2018, accessed February 2018.

[16] Thomas Alsop, "Distribution of Intel and AMD x86 computer central processing units (CPUs) worldwide from 2012 to 2023, by quarter." *Statista,* August 14th, 2023, accessed September 5, 2023.

[17] Monica J. White, "In just three years, 30% of PCs may be built on ARM architecture." *Digitaltrends,* November 18, 2022, accessed August 12, 2023.

[18] "Desktop Operating System Market Share Worldwide." *StatCounter*, accessed August 8, 2023.

[19] David B. Yoffie, Dharmesh M. Mehta, and Rudina I. Suseri, "Microsoft in 2005," HBS Case No. 705-505 (Boston: Harvard Business School Publishing, 2006).

[20] Leo Wong de Quan, "Windows Rapidly Losing Market Share in the US, Market Share Drops to Historic Low of 57 Percent." *GizmoChina,* March 7, 2023, accessed August 8, 2023.

[21] See "Gartner Says Worldwide Sales of Smartphones Grew 7 Percent in the Fourth Quarter of 2016," Gartner press release, February 15, 2017, https://www.gartner.com/newsroom/id/3609817, accessed November 2017; and "Tablet Market Woes Continue as Growth in Detachable Tablets Takes Its First Vacation During the Holiday Season," IDC press release, February 2, 2017, https://www.idc.com/getdoc.jsp?containerId=prUS42272117, accessed November 2017.

[22] "Windows 7 Release May Test Apple's Winning Streak," Reuters, October 14, 2009, via Factiva, accessed March 2010.

[23] Rohan Goswami, "Apple's Mac market share jumped even though PC sales fell for the sixth consecutive quarter." *CNBC*, July 11, 2023, accessed August 7, 2023.

[24] Stefan Campbell, "How Many Apple Stores Are There In The US & World In 2023?" *The Small Business Blog*, accessed August 12, 2023.

[25] Deb Mukherjee, "The Retail Guide to Utilizing Sales Per Square Foot to Grow Your Store." *Shopify*, September 7, 2022, accessed August 12, 2023.

[26] Katie Hafner, "Inside Apple Stores, a Certain Aura Enchants the Faithful," *New York Times*, December 27, 2007, p. C1, via Factiva, accessed December 2007.

[27] Isaacson, *Steve Jobs*, p. 389.

[28] Isaacson, *Steve Jobs*, p. 405.

[29] See Apple Inc., Form 10-K, 2006.

[30] Isaacson, *Steve Jobs*, p. 474.

[31] Donna Fuscaldo and Mark Boslet, "Jobs Says Apple to Rename Itself Apple Inc.," Dow Jones News Service, January 9, 2007, via Factiva, accessed March 2010.

[32] Darrell Etherington, "iPhone 4S: Siri's international limitations," GigaOm, October 14, 2011, http://gigaom.com/apple/iphone-4s-siris-international-limitations/, accessed April 2012.

[33] Sareena Dayaram and Mike Sorrentino, "What's New in the iPhone 14: Everything Apple Changed Since iPhone 13." *CNET*, September 12, 2022, accessed August 12, 2023.

[34] "Sprint's commitment to Apple might be less than expected," S4GRU, February 28, 2012, http://s4gru.com/index.php?/topic/339-sprints-committment-to-apple-might-be-less-than-expected/, accessed May 2012.

[35] https://www.counterpointresearch.com/apples-smartphone-revenue-operating-profit-hit-june-quarter-records-q2-2023/#:~:text=Apple%20was%20the%20single%2Dlargest,the%20same%20quarter%20last%20year, accessed September 12, 2023.

[36] "Global average selling price of smartphones from 2010 to 2019," https://www.statista.com/statistics/484583/global-average-selling-price-smartphones/, accessed January 15, 2020.

[37] Hanish Bhatia, "Apple Posts Revenue Growth Despite 'Cocktail of Headwinds'." *Counterpoint Research*, July 29, 2022, accessed Aug 10, 2023.

[38] "Fair Labor Association Begins Inspections of Foxconn," Apple press release, February 13, 2012, http://www.apple.com/pr/library/2012/02/13Fair-Labor-Association-Begins-Inspections, accessed May 2012.

[39] Samuel Axon, "Apple Foxconn caught breaking Chinese labor laws while making iPhones," September 9, 2019, https://arstechnica.com/gadgets/2019/09/apple-foxconn-caught-breaking-chinese-labor-laws-while-making-iphones/, accessed January 15, 2020.

[40] "Why Apple is Manufacturing the iPhone 15 in India," August 17, 2023. https://www.forbes.com/sites/irenebenedicto/2023/08/17/why-apple-is-manufacturing-the-iphone-15-in-india/?sh=2db24b921afe, accessed October 17, 2023.

[41] Jack Nicas and Keith Collins, "How Apple's Apps Topped Rivals in the App Store it Controls," *New York Times*, September 9, 2019, https://www.nytimes.com/interactive/2019/09/09/technology/apple-app-store-competition.html, accessed January 15, 2020.

[42] Mansoor Iqbal, "App Revenue Data (2023)." *Business of Apps,* May 2, 2023, accessed August 10, 2023.

[43] Natasha Lomas, "Study of Apple's ATT impact highlights competition concerns." *TechCrunch,* April 8, 2022, accessed August 11, 2023.

[44] Sara Morrison, "The winners and losers of Apple's anti-trackign feature." *Vox,* April 29, 2022, accessed August 11, 2023.

[45] "Smartphone Market Share," January 20, 2020, https://www.idc.com/promo/smartphone-market-share/os, accessed February 26, 2020.

[46] Federica Laricchia, "Global smartphone shipments worldwide from 2007 to 2022, by vendor." *Statista, IDC and Gartner,* March 7, 2023, accessed August 14, 2023.

[47] Nabila Popal and Ryan Reith, "Worldwide Smartphone Shipments Continue to Decline with 6.8% Drop in the Second Quarter, According to IDC Tracker." *IDC,* August 11, 2023, accessed August 14, 2023.

[48] "Chinese smartphone maker OPPO eyes more European markets," *Reuters,* February 28, 2019, https://www.reuters.com/article/us-telecoms-mobileworld-oppo/chinese-smartphone-maker-oppo-eyes-more-european-markets-idUSKCN1QH1YI, accessed February 24, 2020.

[49] "Number of available applications in the Google play Store from December 2009 to December 2019," https://www.statista.com/statistics/266210/number-of-available-applications-in-the-google-play-store/, accessed February 24, 2020.

[50] See Ranger, "iOS versus Android"; "Number of apps available in leading app stores as of March 2017"; and Motek Moyen, "Why Apple iTunes App Store Has Double The Sales Of Google Play Store," *Seeking Alpha*, May 23, 2017, https://seekingalpha.com/article/4075648-apple-itunes-app-store-double-sales-google-play-store, accessed November 2017.

[51] David B. Yoffie, Juan Alcacer, and Renee Kim, "HTC Corp. in 2012," HBS No. 712-423 (Boston: Harvard Business School Publishing, May 2012).

[52] Team Counterpoint, "Infograhic: Q2 2023 | Semiconductors, Foundry Share and Smartphone AP Share." *Counterpoint Research,* September 12, 2023, accessed September 13, 2023.

[53] Erika Brown, Elizabeth Corcoran, and Brian Caulfield, "Apple Buys Chip Designer," *Forbes*, April 23, 2008, via Factiva, accessed April 2010; and Ashlee Vance and Brad Stone, "Apple Buys Intrinsity, a Maker of Fast Chips," *New York Times*, April 27, 2010.

[54] Mark Sullivan, "Apple is hustling to get its own 5G modem in 2022's iPhones," *Fast Company*, October 11, 2019, https://www.fastcompany.com/90416100/apple-wants-its-own-5g-modem-in-2022s-iphones-but-itll-be-a-squeaker, accessed February 24, 2020.

[55] IDC press release, "Apple Takes Top Spot in Q4 2019 Worldwide Smartphone Market While Huawei Rises to Number 2 Globally for 2019, According to IDC," January 30, 2020, https://www.idc.com/getdoc.jsp?containerId=prUS45964220, accessed February 24, 2020; Jake Swearingen, "We're No Longer in Smartphone Plateau. We're in the Smartphone Decline," *New York*, December 4, 2018, https://nymag.com/intelligencer/2018/12/global-u-s-growth-in-smartphone-growth-starts-to-decline.html, accessed February 24, 2020.

[56] Jake Swearingen, "We're No Longer in Smartphone Plateau. We're in the Smartphone Decline," *New York*, December 4, 2018, https://nymag.com/intelligencer/2018/12/global-u-s-growth-in-smartphone-growth-starts-to-decline.html, accessed February 24, 2020.

[57] Anurag Rana and Andrew Girard. "Smartphone Study Shows Apple Clear Favorite of Gen Z," *Bloomberg,* Feb. 23, 2023, accessed July 12, 2023.

[58] Isaacson, *Steve Jobs*, p. 567.

[59] Isaacson, *Steve Jobs*, p. 527.

[60] See Apple Inc., Form 10-K, 2012 and 2014.

[61] A. M. (Toni) Sacconaghi Jr., Pierre Ferragu, Alberto Moel, and Stacy A. Rasgon, "Let's Talk Tablets: A Form Factor Revolution?," Bernstein Research, June 2011, p. 13, accessed May 2012.

[62] IDC press release, "Worldwide Tablet Shipments Continue to Decline in Q4 2019, According to IDC," January 30, 2020, https://www.idc.com/getdoc.jsp?containerId=prUS45959420, accessed February 26, 2020; Emil Protalinski, "IDC: Tablet shipments decline for 13th straight quarter, Amazon overtakes Samsung for second place," *VentureBeat,* February 5, 2018, https://venturebeat.com/2018/02/05/idc-tablet-shipments-decline-for-13th-straight-quarter-amazon-overtakes-samsung-for-second-place/, accessed February 19, 2018.

[63] Federica Laricchia, "Revenue of Apple from iPad sales worldwide from 3rd quarter 2010 to 3rd quarter 2023." *Statista,* August 8, 2023, accessed August 10, 2023.

[64] Kif Leswing, "Apple's services slowdown is potential concern for investors focused on profit margins." *CNBC,* July 28, 2022, accessed Aug 10, 2023.

[65] David Anders, "Apple Services Tallied 900 Million Paid Subscriptions in 2022." *CNET*, January 10, 2023, accessed August 10, 2023.

[66] Kif Leswing, "Apple's App Store growth is slowing down." *CNBC,* January 10, 2023, accessed August 11, 2023.

[67] Richard Waters, "Google paid $26.3bn for search default deals in 2021, executive testifies." *Financial Times*, October 27, 2023, accessed October 29, 2023.

[68]Amit Daryanani, et. al, "Apple Inc."*Evercore ISI*, August 2, 2023, accessed August 31, 2023.

[69] Janko Roettgers, "Apple May Finally Shutter iTunes, But the iTunes Era Ended Long Ago," *Variety*, June 1, 2019, https://variety.com/2019/digital/news/apple-shutting-down-itunes-era-1203230851/, accessed February 26, 2020.

[70] David Lidsky, "The definitive timeline of Spotify's critic-defying journey to rule music," *Fast Company*, August 6, 2018, https://www.fastcompany.com/90205527/the-definitive-timeline-of-spotifys-critic-defying-journey-to-rule-music, accessed March 3, 2020.

[71] Mike Snider, "Spotify goes public: What you need to know about the music streamer and its IPO," USA Today, April 3, 2018, https://www.usatoday.com/story/tech/talkingtech/2018/04/03/spotify-goes-public-what-you-need-know-music-streamer-and-its-ipo/480318002/, accessed March 3, 2020

[72] Marie Charlotte Gotting, "Number of Spotify ad-supported monthly active users (MAUs) worldwide from 1st quarter 2015 to 2nd quarter 2023." *Statista,* September 25, 2023, accessed September 26, 2023.

[73] David Curry, "Apple Music Revenue and Usage Statistics (2023)." *Business of Apps,* accessed August 13, 2023.

[74] Eamonn Forde, "Forecast: Apple Music To Hit 110 Million Subscribers By 2025." *Forbes,* June 14, 2022, accessed August 13, 2023.

[75] Anne Steele and Tripp Mickle, "Apple Music Overtakes Spotify in Paid U.S. Subscribers," *Wall Street Journal*, April 5, 2019, https://www.wsj.com/articles/apple-music-overtakes-spotify-in-u-s-subscribers-11554475924, accessed February 26, 2020.

[76] Shira Ovide (op-ed) citing UBS, "Not All Apple Services, or Profits, Are Created Equal," *Bloomberg,* April 10, 2019, https://www.bloomberg.com/opinion/articles/2019-04-10/apple-s-bullish-investment-thesis-has-deep-flaws, accessed March 3, 2020.

[77] Robert Safian, "Why Apple Is the World's Most Innovative Company," Fast Company, February 21, 2018, https://www.fastcompany.com/40525409/why-apple-is-the-worlds-most-innovative-company, accessed March 3, 2020.

[78] Mike Isaac, "With Apple Pay, a Push Into Mobile Payments," *New York Times*, September 9, 2014, https://www.nytimes.com/2014/09/10/technology/apples-ambitious-bet-beyond-the-devices.html, accessed January 14, 2020

[79] "Mobile payment: Apple Pay users in the United States." *Statista,* September 2023, accessed September 18, 2023.

[80] Telis Demos and Dan Gallagher, "Apple Pay's Long Road to Paying Off Is Getting Shorter." *Wall Street Journal,* April 21, 2023, accessed August 17, 2023.

[81] Emily Flitter and Jack Nicas, "Goldman Sachs and Apple Plan to Offer a New Credit Card," *New York Times,* May 10, 2018, https://www.nytimes.com/2018/05/10/business/apple-goldman-sachs-credit-card.html, accessed January 14, 2020.

[82] Emily Flitter and Jack Nicas, "Goldman Sachs and Apple Plan to Offer a New Credit Card," *New York Times,* May 10, 2018, https://www.nytimes.com/2018/05/10/business/apple-goldman-sachs-credit-card.html, accessed January 14, 2020

[83] Chance Miller, "Apple Card continues to be a consumer hit despite Goldman Sachs turmoil." *9to5Mac,* August 17, 2023, accessed August 30, 2023.

[84] Anna Nicolaou, "Apple splashed $6bn on new shows in streaming wars," *Financial Times*, August 19, 2019, https://www.ft.com/content/4f7f4326-c2bf-11e9-a8e9-296ca66511c9, accessed February 6, 2020; Brandon Katz, "How Much Does It Cost to Fight in the Streaming Wars?," *Observer*, October 23, 2019, https://observer.com/2019/10/netflix-disney-apple-amazon-hbo-max-peacock-content-budgets/, accessed February 6, 2020.

[85] Filipe Esposito, "Apple TV+ growth slows in the US while Netflix loses first place." 9to5Mac, April 13, 2023, accessed August 15, 2023.

[86] Romain Dillet, "Apple partners with Canal+ to bring Apple TV+ content to all subscribers." *TechCrunch*, April 14, 2023, accessed August 15, 2023.

[87] Todd Spangler, "Apple Raising Prices for Apple TV+, Music Services for the First Time." *Variety*, October 24, 2022, accessed August 15, 2023.

[88] Benjamin Mullin, John Koblin, and Tripp Mickle, "Jon Stewart's Show on Apple is Ending." *New York Times*, October 19, 2023, accessed October 24, 2023.

[89] Andrew Orr, "Mac is less popular among Apple customers than iPhone, iPad, Apple Watch." *AppleInsider*, February 8, 2023, accessed September 7, 2023.

[90] Anurag Rana and Andrew Girard, "Smartphone Study Shows Apple Clear Favorite of Gen Z." *Bloomberg*, February 23, 2023, accessed July 12, 2023.

[91] Lisa Eadicicco, "Apple says products like the Apple Watch and Airpods are doing so well, its wearables business is as big as a Fortune 200 company," *Business Insider,* April 30, 2019, https://www.businessinsider.com/apple-q2-2019-earnings-apple-watch-airpods-sales-2019-4, accessed January 15, 2020.

[92] "Fortune Global 500," *Fortune*, https://fortune.com/ranking/global500/2023/search/, accessed October 2, 2023.

[93] Farhad Manjoo, "Apple Watch Review," *New York Times*, April 8, 2015, https://www.nytimes.com/2015/04/09/technology/personaltech/apple-watch-bliss-but-only-after-a-steep-learning-curve.html, accessed January 10, 2020; Mark Sullivan, "12 things I don't like about the Apple Watch," *Venture Beat*, April 29, 2015, https://venturebeat.com/2015/04/29/12-things-i-dont-like-about-the-apple-watch/, accessed January 10, 2020

[94] Farhad Manjoo, "Apple Watch Review," *New York Times*, April 8, 2015, https://www.nytimes.com/2015/04/09/technology/personaltech/apple-watch-bliss-but-only-after-a-steep-learning-curve.html, accessed January 10, 2020; Mark Sullivan, "12 things I don't like about the Apple Watch," *Venture Beat*, April 29, 2015, https://venturebeat.com/2015/04/29/12-things-i-dont-like-about-the-apple-watch/, accessed January 10, 2020

[95] Hilary Brueck, "At One Year Old Is Apple's Watch a Flop? Not Exactly," *Fortune*, April 25, 2016, https://fortune.com/2016/04/25/apple-watch-first-year-sales/, accessed January 10, 2020; Andrew Nusca, "The numbers are in: Apple is No. 2 in wearables," *Fortune*, August 27, 2015, https://fortune.com/2015/08/27/apple-wearables-market-share/, accessed January 13, 2015.

[96] Nathan Olivarez-Giles, "What Makes the Apple Watch Tick; Research firm estimates parts and labor are $83.70, or 24% of retail price," *Wall Street Journal*, April 30, 2015, via Factiva, accessed March 2, 2020

[97] Grace Donnelly, "Apple Is Officially Taking Over the Watch Business," *Fortune*, February 20, 2018, https://fortune.com/2018/02/20/apple-watch-sales-smartwatch/, accessed January 10, 2020; Don Reisinger, "Apple Watch Series 4 Outsold Every Other Smart Watch in 2018—in Just One Quarter," *Fortune*, June 25, 2019, https://fortune.com/2019/06/25/apple-watch-smartwatch-sales-2018/, accessed January 10, 2019.

[98] Federica Laricchia, "Quarterly smartwatch unit shipment share worldwide from 2018 to 2023, by vendor." *Statista*, September 27, 2023, accessed September 28, 2023.

[99] Eileen McDermott, "Apple Loses at ITC with Apple Watch Import Ban," IPWatchdog, https://ipwatchdog.com/2023/10/29/apple-loses-itc-apple-watch-import-ban/id=168819/, accessed November 1, 2023.

[100] Nick Statt, "Apple says it took 'courage' to remove the headphone jack on the iPhone 7," *Verge*, September 7, 2016, https://www.theverge.com/2016/9/7/12838024/apple-iphone-7-plus-headphone-jack-removal-courage, accessed January 13, 2020.

[101] Benjamin Mayo, "Analyst estimates Apple sold 3 million AirPods over Black Friday / Cyber Monday weekend," December 2, 2019, https://9to5mac.com/2019/12/02/apple-airpods-pro-big-hit-black-friday-cyber-monday/, accessed January 13, 2020; Jesse Pound, "AirPods were a $6 billion business for Apple this year and will be even bigger next year, top analyst says," CNBC, December 20, 2019, https://www.cnbc.com/2019/12/20/airpods-a-6-billion-business-for-apple-will-be-bigger-next-year.html, accessed January 13, 2020.

[102] Federica Laricchia, "Market share of the leading truw wireless stereo (TWS) vendors as of 2nd quarter 2022." accessed August 17, 2023.

[103] Ben Fox Rubin, "Apple's new HomePod smart speaker brings Siri home," June 5, 2017, CNET, https://www.cnet.com/news/apples-new-homepod-smart-speaker-brings-siri-home/, accessed January 13, 2019.

[104] Brian X. Chen, "Apple's HomePod Has Arrived. Don't Rush to Buy It.," *New York Times*, February 6, 2018, https://www.nytimes.com/2018/02/06/technology/personaltech/apple-homepod-review.html, accessed January 13, 2019; Jeff Dunn, "Apple's HomePod: Paying $350 for a speaker that says 'no' this much is tough," *Ars Technica,* February 14, 2018, https://arstechnica.com/gadgets/2018/02/review-apples-homepod-is-a-fun-apple-music-accessory-and-thats-it/, accessed January 13, 2019.

[105] Chaim Gartenberg, "Apple drops HomePod price down to $299," *Verge*, April 4, 2019, https://www.theverge.com/2019/4/4/18295084/apple-homepod-price-cut-299-smart-speaker, accessed January 13, 2020

[106] Alexander Kunst, "Smart speaker ownership by brand in the U.S. as of June 2023." *Statista*, August 30, 2023, accessed September 7, 2023.

[107] Caleb Naysmith, "Apple AirTags and Bluetooth Trackers Are Officially a Billion-Dollar Industry – Here's What To now, Trends, and the Best Ways To Invest," *Benzinga*, Dec. 28, 2022, accessed August 15, 2023.

[108] Filipe Esposito, "More people buying AirTag and item trackers in US s travel increases." *9to5Mac,* April 24, 2023, accessed August 15, 2023.

[109] Anurag Rana and Andrew Girard, "Apple Mixed-Reality Adoption Likely to Take Years." *Bloomberg Intelligence*, July 3, 2023, accessed July 12, 2023.

[110] Mark Gurman, "Apple Uses iPhone 15 Event to Begin Pivot Toward a Vision Pro Future." *Bloomberg*, September 13, 2023, accessed September 13, 2023.

[111] Alex Webb and Emily Chang, "Tim Cook Says Apple Focused on Autonomous Systems in Cars Push," Bloomberg, June 13, 2017, https://www.bloomberg.com/news/articles/2017-06-13/cook-says-apple-is-focusing-on-making-an-autonomous-car-system, accessed November 2017.

[112] Peter Cohan and Sam Hariharan,. "Apple's Electric Vehicle," *Babson College case study*, June 2023.

[113] Juli Clover, "Apple Bought the Most AI Companies From 2016 to 2020." *MacRumors*, Mar 25, 2023, accessed Sept 21, 2023.

[114] Monica Chin, "Apple is reportedly spending 'millions of dollars a day' training AI." *The Verge,* Sept 6, 2023, accessed September 23, 2023.

[115] Aaron Tilley, "U.S. Escalates Apple Probe, Looks to Involve Antitrust Chief." *Wall Street Journal*, Feb 15, 2023, https://www.wsj.com/articles/u-s-escalates-apple-probe-looks-to-involve-antitrust-chief-2fa86ddf, accessed October 3, 2023.

[116] Lauren Feiner, "DOJ reportedly accelerates Apple antitrust investigation." *CNBC*, Feb. 2, 2023, https://www.cnbc.com/2023/02/15/doj-accelerates-apple-antitrust-investigation-report.html, accessed Oct 3, 2023.

[117] James Vincent, "EU says Apple breached antitrust law in Spotify case, but final ruling yet to come." *Wall Street Journal,* Feb 28, 2023, https://www.theverge.com/2023/2/28/23618264/eu-antitrust-case-apple-music-streaming-spotify-updated-statement-objections, accessed October 2, 2023.

[118] Siladitya Ray, "'We've No Choice': Apple Says iPhones Will Switch Over to USB-C Chargers To Comply With New EU Law," *Forbes,* Oct 26, 2022, accessed Sept 23, 2023.

[119]https://www.computerworld.com/article/3705911/apple-and-microsoft-challenge-regulatory-scope-of-eu-s-digital-markets-act.html, accessed November 8, 2023.

[120] Dara Kerr, "United States takes on Google in biggest tech monopoly trial of 21st century." *NPR*, September 12, 2023, accessed September 15, 2023.

[121] Yoko Kubota, "China Bans iPhone Use for Government Officials at Work." *Wall Street Journal,* September 6, 2023, accessed Sept. 14, 2023.

[122] Mengchen Zhang and Donald Judd, "China says it hasn't issued any ban on Apple's iPhone." *CNN*, September 13, 2023, accessed September 15, 2023.

[123] Jenny Leonard, Mark Gurman, and Airielle Lowe, "China's Apple iPhone Ban Appears to Be Retaliation, US Says." *Bloomberg*, September 13, 2023, accessed Sept. 15, 2023.

[124] Mariko Oi and Chris Vallance, "Apple shares slide after China government iPhone ban reports." *BBC,* September 8, 2023, accessed Sept. 17, 2023.