ANALYSIS GROUP

The Success of Third-Party Apps on the App Store

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Juliette Caminade, Ph.D.
Markus von Wartburg, Ph.D.

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The conclusions and opinions expressed are exclusively those of the authors.

In recent years, the role of "big tech" in shaping options for developers, content creators, and users in digital spaces has become a hotly debated topic. In this study, we focus on Apple's App Store, examining the following questions: How have the options for developers and content creators to reach consumers changed over time? How have the App Store and its ecosystem grown, and what does this growth reflect? What role do third-party apps play on the App Store?

To answer these questions, we conduct research on digital markets, analyze the App Store ecosystem, review the areas in which Apple offers its own apps, and investigate the availability of third-party alternatives to Apple apps for iPhone users. Our findings are summarized below.

Chapter 1: Platform choices and the growth of digital industries

- **Our research shows there are more ways for developers to reach consumers than ever before.** The availability of many types of connected devices has provided a growing range of options for consumers, developers, and content creators worldwide, fueling **large and sustained growth in digital consumption** across a variety of services. For smartphones specifically, consumers can choose among many different manufacturers. Many digital marketplaces for distributing apps and content allow consumers to download and/or purchase apps and content in a variety of ways.

Chapter 2: The dynamism of the App Store ecosystem

- Publicly available data and our earlier research show that the App Store has grown substantially throughout the years, sustaining an expanding community of developers and content creators and fueling a massive and growing ecosystem. **This growth reflects the dynamism of the App Store, its community, and its ecosystem, which benefits developers, users, and Apple.**
- By providing numerous ways for users to expand and complement their iPhone experiences, **the App Store has benefited users and been central to the continued success of the iPhone.** The App Store is home to about 2 million apps with only about 60 from Apple, meaning that more than 99.99% of apps are third-party apps.

Chapter 3: The popularity and range of third-party apps on the App Store

- Third-party apps are the **only options for consumers for entire types of apps**, such as social networks, dating services, travel planning, and food and drink. For the types of apps for which Apple apps are available, iOS users can choose from many alternatives.
- **Our research shows that alternatives to Apple apps have proliferated, offering more choice and more features to iOS users.** Many popular apps launched around the time or after Apple started its own services.
- Our quantitative analyses of engagement with apps (not merely app downloads) demonstrates that, **across many app types, Apple's own apps are eclipsed in popularity and account for a relatively small share of usage.**
- **In many countries, local players are the most popular across multiple app types.** Many large and successful technology companies such as Google, Amazon, Microsoft, Tencent and Baidu (China), and NAVER and Kakao (Korea), offer popular alternatives to Apple apps.
- **iPhone users often have multiple apps of similar types on their phones** that they use regularly, reflecting how easily they can switch between apps.

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Chapter 1: Platform choices available to consumers, developers, and content creators, and the growth of digital industries

- **Digital devices have created new ways for people to listen to music, watch movies and TV, read news and books, exercise, and play video games, spurring large and sustained growth in digital consumption of those services.**
- **Developers and content producers can reach billions of users on digital marketplaces such as the App Store and others.**

In the last decade, technological progress has driven not only an increase in the number of mobile and connected devices available to consumers, but also a marked improvement in their performance. Smartphones and tablets have become ubiquitous, with more than 1.8 billion active Apple devices and more than 3 billion active Android devices worldwide – together representing nearly half of the global population.[1] Other connected devices such as e-readers, connected consoles, smart speakers, connected watches, and smart and connected TVs are also widely used.

A more detailed discussion of monetization strategies used by developers and content creators on the App Store is available in our 2020 study **"How Large is the Apple App Store Ecosystem?"**

The proliferation of connected devices and the growth of app stores (such as the App Store and Google Play) and other digital marketplaces and platforms (such as game distribution platforms and self-publishing book platforms) have provided an ever-growing range of options, both for consumers and for developers and content creators worldwide. Consumers are now able to stream, play, and download content on several devices, increasing the number of outlets for which developers can produce and distribute software and content to consumers. In addition, developers can use several strategies to monetize their apps, including selling and distributing goods and services through the app in the form of paid app downloads and in-app purchases, selling physical goods and services through apps, selling in-app advertising, and selling companion physical products.

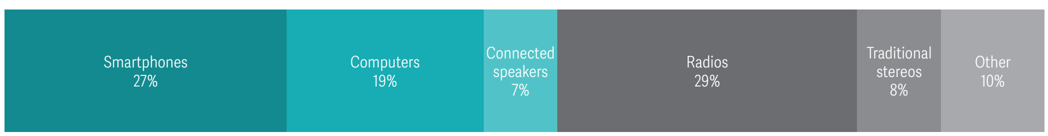
The availability of sophisticated connected devices and digital marketplaces has provided an ever-growing range of options for consumers and developers worldwide.

The continual improvement of connected devices through hardware and software innovation has provided developers and content creators with additional opportunities to create new and innovative apps and services. For instance, the tremendous improvement in smartphone photo-taking capabilities, including the introduction of front-facing cameras, has driven a rapid expansion of video-communication apps such as FaceTime and Snapchat, as well as photo-based and video-based social media apps such as Instagram.[2] The combination of larger and more vibrant mobile device screens with longer phone battery life has paved the way for mobile video streaming. Similarly, the integration of accelerometers with various other device sensors has enabled the development of health and fitness tracking.

Our research shows that these trends have affected consumers, developers, and content creators across a variety of industries:

- **Music:** Consumers stream and listen to music on a wide array of devices. (See Figure 1.) Radio and traditional stereos, while still popular among older demographics,[3] are declining in usage, and more than half of all music worldwide is now being listened to on digital devices. Music streaming services have grown tremendously and are expected to continue doing so. In addition to those using free services, in 2021, more than 600 million people were paid subscribers to music streaming services worldwide,[4] accounting for more than $23 billion in revenue in 2021, a figure that is expected to grow to more than $36 billion in 2026.[5]

Figure 1: Share of music listening time by device worldwide

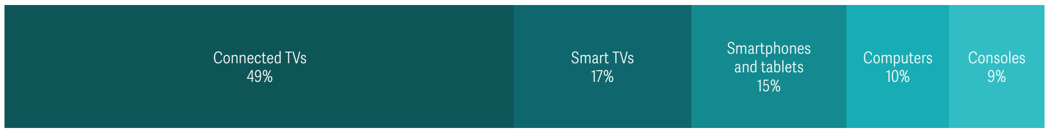


Source: IFPI, Music Listening 2019.

- **Books:** eBooks and audiobooks are providing a steadily growing alternative to physical books. The global eBook market was valued at around $18 billion in 2020, and the global audiobook market at nearly $3 billion in 2019.[6] Many consumers have read eBooks on smartphones (54%), followed by tablets (41%) and dedicated e-readers like the Kindle (32%).[7] In 2019, 20% of adults in the US listened to at least one audiobook.[8] The growth in digital distribution options and their lower costs have resulted in an increase in the prevalence of independently published and self-published books, such that books from independent authors accounted for about 30% of all eBook sales in English-speaking markets in 2020.[9] Comic books and manga can also be produced and distributed digitally, reducing costs and making it easier to reach readers.[10] Worldwide revenue from ePublishing has grown substantially in recent years, with a 24% increase between 2017 and 2021.[11]
- **Video:** Streaming services have expanded outlets available for content producers, connecting them to owners of billions of smartphones, tablets, connected and smart TVs, computers, and consoles worldwide. (See Figure 2.) While many viewers still subscribe to cable TV, more than 60% of households in the US and UK subscribe to

streaming services, with 38% of US households subscribing to both cable TV and at least one streaming service.[12] Streaming video is more popular among younger generations in the US.[13] Video streaming services have grown dramatically: Worldwide revenue in 2021 was more than $129 billion, more than 20 times greater than in 2010 ($6 billion).[14]

Figure 2: Share of video streaming viewing time by device worldwide

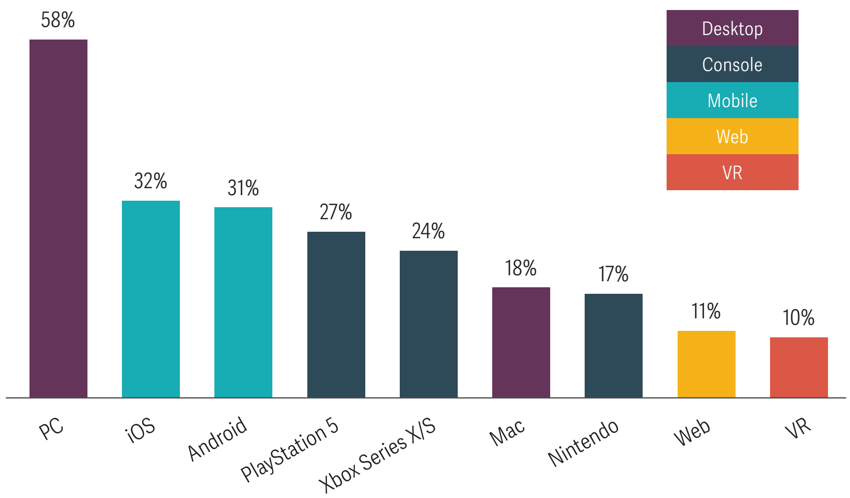


Source: Conviva, State of Streaming Q4 2020.

- **News:** Although news has traditionally been distributed through print media such as newspapers, magazines, and TV networks, today it is distributed largely through websites, apps, podcasts, and online video.[15] For consumers who use online sources, most now access news on their smartphones, primarily from news media and newspaper apps directly, and through social media and search.[16]
- **Fitness:** Until recently, fitness classes and content were mostly provided in person (for example, in gyms or yoga studios). That has changed in recent years: Worldwide revenue from fitness apps has grown substantially, increasing by 20% on average each year between 2015 and 2020.[17] The coronavirus pandemic further accelerated the growth in popularity of fitness websites, apps, videos, and livestreams, and the revenue from fitness apps grew 49% between 2019 and 2020.[18] For instance, the coronavirus pandemic drove significant growth in global health and fitness content engagement on YouTube in 2020, with daily views of home workout videos quadrupling in Korea, Germany, the UK, and Mexico.[19] In addition to app use, fitness trackers and smartwatches are popular devices to track activity and health metrics. Between 2016 and 2020, worldwide shipments of fitness trackers increased by 50% and shipments of smartwatches grew by 211%.[20]
- **Video games:** Video games were originally distributed to users via physical media (such as cartridges and discs) for dedicated game consoles and desktop computers. Today, they are largely distributed digitally to consoles and computers, as well as smartphones and tablets. Improvements in smartphone technology have enabled an increase in the reach of video games, as well as new genres such as casual and hyper-casual games, which are quick and easy to play.[21] Smartphone gaming is a

global phenomenon, with 2.8 billion mobile users worldwide.[22] In the US, for example, two-thirds of the entire population play video games on mobile devices. More than half of all users play games on more than one device,[23] with developers creating games across multiple devices. (See Figure 3.) Worldwide revenue from digital games has grown substantially in recent years, increasing by more than 50% from 2016 to 2020, with mobile games accounting for most of the growth.[24]

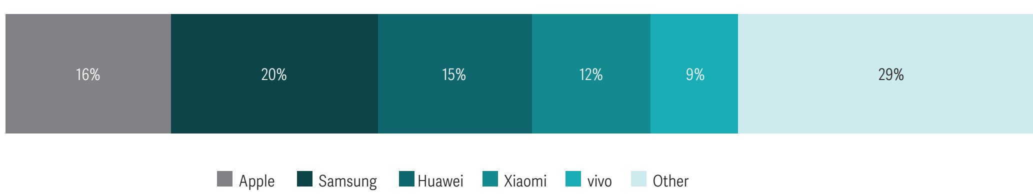
Figure 3: Share of video game developers currently developing for particular platforms



Source: GDC, 2021 State of the Game Industry Report.

For smartphones specifically, consumers have the choice among many different manufacturers. iPhone, which runs on iOS, accounted for 16% of all worldwide smartphone shipments in 2020, while nearly all of the remaining 84% were Android devices. Popular Android smartphone manufacturers include Samsung, Huawei, Xiaomi, vivo, Oppo, Lenovo, and LG. (See Figure 4.)

Figure 4: Share of smartphone shipments by device worldwide in 2020



Source: IDC.

To create smartphone apps, developers and content creators can rely on native apps, as well as web apps, which work through a device's internet browser.[25]

Chapter 2: The dynamism of the App Store ecosystem

- **The continued growth of the App Store reflects the dynamism of the App Store, its community, and its ecosystem, which benefits developers, users, and Apple.**
- **By providing various ways for users to expand and complement their iPhone experiences, the App Store has benefited users and been central to the continued success of the iPhone.**

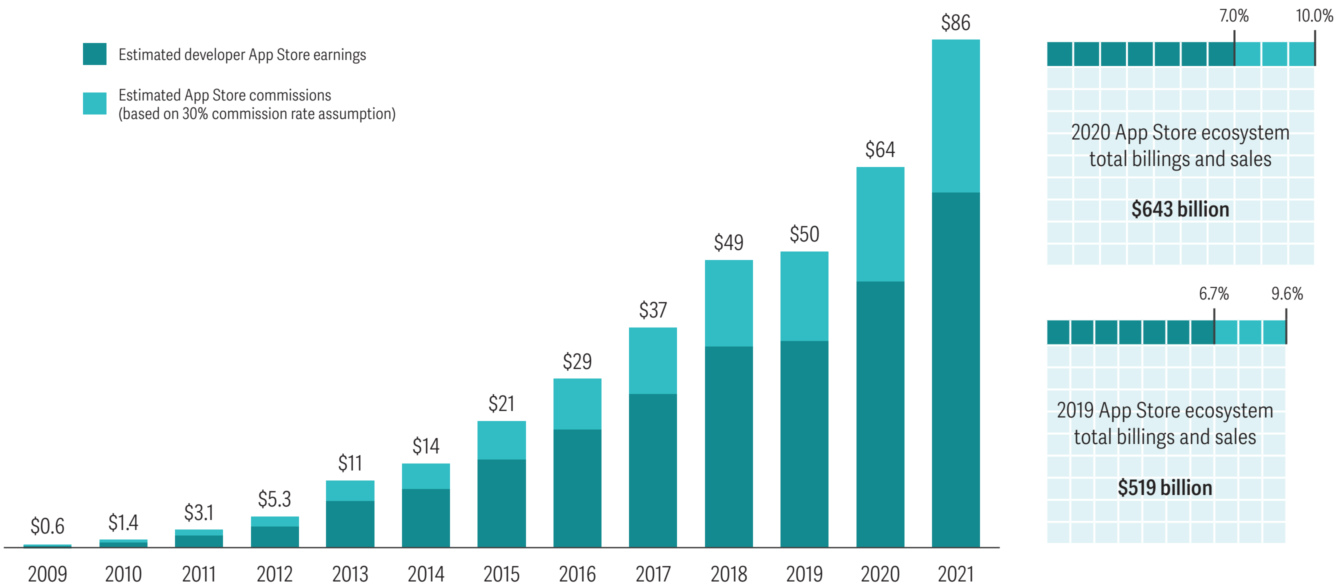
The dynamism of the App Store and its ecosystem

The App Store has grown substantially throughout the years. It is now the home of an estimated 2 million apps from third-party developers, and it quadrupled in size between 2015 and 2021, as measured by estimates of total billings of third-party developers. (See Figure 5.) Such growth is all the more notable given that during the same period, iPhone sales were relatively flat, with the exception of an uptick in 2021.[26]

From an economic perspective, however, App Store billings are only a small piece of the App Store ecosystem as a whole. Third-party apps on the App Store are at the center of a massive, and growing, ecosystem. In an earlier white paper, we estimated that in 2020, the App Store facilitated $643 billion in third-party billings and sales, 24% more than in 2019.[27] As shown in Figure 5 below, estimated App Store billings constitute less than 10% of estimated total billings and sales facilitated by the App Store in both 2019 and 2020.

Such continued and substantial growth reflects the dynamism of the App Store and its ecosystem. It also reflects how developers have been able to create and distribute new products on a global scale and find new channels for their existing products. Additionally, it reflects how users have benefitted from new apps of many types. Apple benefits as well, when the ecosystem it established expands and grows, either directly through App Store commissions or indirectly as the value users get from their iPhones increases. (See Figure 5.)

Figure 5: Estimated App Store billings and App Store ecosystem size ($ billion)



Notes: **The numbers in this exhibit are estimates only.** Total App Store billings before 2013 are based on Evercore estimates, and we estimate Apple commissions by assuming a commission rate of 30%. Billings starting in 2013 are estimated based on approximate cumulative developer earnings announcements from Apple press releases between 2012 and 2021, which we use to estimate approximate yearly developer earnings. We estimate an upper bound on Apple commissions by assuming an average commission rate of 30%. We calculate the estimated App Store billings as the sum of developer earnings and the upper bound on Apple commission. While we expect the actual App Store billings to be lower by some amount, any trend will be comparable.
Sources: Apple press releases on cumulative approximate developer earnings (2012-2021); Evercore, "Monetizing the Thin-Client Candy Store: Opportunities to Leverage Apple Apps & Google Play," December 2013 (for App Store billings before 2013); Borck, et al., "A Global Perspective on the Apple App Store Ecosystem: An Exploration of Small Businesses within the App Store Ecosystem," June 2021 (for estimated App Store ecosystem size).

Apple supports a dynamic App Store by providing developers with tools and technologies

The App Store aims to facilitate interactions between hundreds of thousands of developers of all sizes and the users of more than 1.8 billion active Apple devices. Like other two-sided platforms that connect two groups of users, the App Store ecosystem becomes more valuable when developers create new, diverse, and innovative apps that iPhone users want to use.

In a previous study, we evaluated the ways in which the App Store supports the growth of developers. We found that Apple encourages the development of new and innovative third-party apps and continuously invests in providing developers and content creators with many tools and technologies, all of which contributes to the dynamism of the App Store. The App Store itself offers developers a platform to distribute their apps to more than 1 billion iPhones worldwide. Apple also offers developers a large set of technical tools and resources, as well as educational programs and support, to help them develop and market new apps.

For more information on tools and technologies that Apple provides to help developers create and market apps, see part 3 of our report, "**A Global Perspective on the Apple App Store Ecosystem.**"

Consumers can choose from millions of apps on the App Store, expanding and complementing their iPhone experiences

As early as 2009, a year after the App Store's launch, it became clear to many that its ecosystem and the apps developed by third-party developers offered a way for iPhone users to expand the functionality of their devices in novel and unanticipated ways. For instance, the slogan "There's an app for that" reflected the belief that apps offered new functionality to iPhone users in many areas.[28] Since then, by providing many ways for iPhone users to expand and complement their iPhone experience, the App Store has been central to the continued success of the iPhone.[29]

As of 2021, iOS users could choose from about 2 million apps developed both by Apple and third parties:

- A small number of apps (approximately 60, less than 0.01% of iOS apps) have been developed and are available from Apple. Apple apps support many smartphone features, including communication (Messages, Phone, and FaceTime), photos (Camera and Photos), and mapping (Apple Maps). Some Apple apps also support additional services from Apple, such as eBook purchases with the Apple Books app, and music and video streaming services with Apple Music and Apple TV+. For the Apple Watch, Apple offers specific apps, including the heart-monitoring apps Heart Rate and ECG and the sleep-tracking app Sleep.
- More than 99.99% of apps on the App Store have been developed by third parties. These apps provide consumers with many types of services and content across areas of interest and genres. Over the years, third-party apps have been downloaded hundreds of billions of times by users and have become central to how iPhone users use and rely on their devices.

> *By providing many ways for users to expand their iPhone experience, the App Store has been central to the continued success of the iPhone.*

Research shows that apps have become a huge part of consumers' lives. Worldwide, smartphone users spend between 50 and 110 hours per month using apps on their devices, with younger demographics using apps the most.[30] Numerous users rely on apps for many, if not most, aspects of their daily experiences. The role of apps and the App Store grew further when the coronavirus pandemic upended the world in early 2020. iPhone users turned to the App Store to download apps to work, attend school, make purchases, and stay connected, entertained, fit, and healthy.[31]

Chapter 3: The popularity and range of third-party apps on the App Store compared to Apple apps

- **The available choices for many apps have proliferated in recent years, providing numerous and varied alternatives to Apple Apps.**
- **Successful developers on the App Store include large technology companies with worldwide popularity, as well as smaller developers with local and regional footprints.**
- **Our quantitative analyses show that, across many app types, Apple's own apps are rarely the most popular of a particular type, and account for a small share of app usage.**

Third-party apps are the only options within some types of apps

For some types of apps, third-party apps are the only options available to users, as no Apple app exists. For example, social media apps — such as TikTok, Twitter, and NAVER Café (Korea) — are only available from third-party developers. Similarly, there is no Apple app that offers dating services (Bumble, Tantan), travel planning (Kayak, Google Flights), or food and drink content (NYT Cooking, BBC Good Food Magazine).

Third-party apps have proliferated, providing numerous and varied alternatives to Apple apps

For the types of apps for which Apple does offer apps, our research finds that users can choose among many alternatives, some popular worldwide and others regionally, some appealing to a broad audience and others offering niche content. We found that the available choices for many apps and app features have proliferated in recent years, especially for music streaming, video streaming, communication, health and fitness, news, and games. (See Appendix B.)

> *Third-party apps have proliferated, offering more choice and more features to consumers.*

For example, we found that users have many alternatives to Apple Music, ranging from globally popular apps like Spotify, Pandora, and Amazon Music to successful regional players like Deezer in France, BBC Sounds in the UK, and Melon and Genie in Korea. Similarly, we found that iPhone users can choose from many alternatives to Apple's

Phone, Messages, and FaceTime apps, including global apps like WhatsApp and Facebook Messenger, as well as regional apps like WeChat in China, LINE in Japan, and KakaoTalk in Korea, or more specialized options like the encrypted message app Telegram.

Across many app types, Apple's own apps are rarely the most popular app of a particular type, and account for a small share of app usage

The findings presented below are based on a quantitative analysis of the extent to which iPhone users engage with apps. The methodology we use is described in detail in Appendix A. We measure engagement based on time spent in the app or by the number of daily active users, depending on the app's purpose and functionality and data availability.[A] We do not measure engagement using app downloads, because most Apple apps are pre-installed and therefore do not need to be downloaded, and because an app can be downloaded or already preinstalled but rarely (or never) used. We believe that using measures of time spent in app and/or daily active users allows for more reliable estimates of app popularity and engagement. The detailed results of those quantitative analyses are presented in Appendix B.

Apple apps are often eclipsed by third-party apps for many app types

We found that Apple's own apps, while used by many, are rarely the most popular of a given type and are eclipsed in popularity by third-party apps for nearly every country and app type we considered.

Using this methodology, Figure 6 shows the two third-party apps most popular among iPhone users in each of five types of apps (Communication, Music, Maps, TV, and Reading) in eight geographic regions (US, UK, France, Germany, Australia and New Zealand, China, Japan, and Korea), comparing their popularity with that of the Apple app. Several notable patterns emerge emerge from our research and quantitative analyses:

- For the five types of apps considered, the Apple app is rarely the most popular app in the regions considered. Our analyses show that third-party apps are frequently several times more popular. This is the case even though the Apple apps are pre-installed and do not require the user to download them.
- Highly popular apps include some developed by large and successful technology companies that offer multiple types of apps. These apps include Google's Google Maps, Tencent's WeChat, Amazon's Amazon Prime Video and Kindle, and NAVER's LINE and Wattpad.
- In some cases, we found that users prefer local alternatives to Apple's app. For example, KakaoTalk and WeChat are the most popular communication apps in Korea and China, respectively. Deezer is as popular as Apple Music in France, and Piccoma is many times more popular than Apple Books in Japan.

A We use daily active iPhone users for Communication, Maps, and TV and movie streaming; and average time spent per day in the iOS app for Music streaming and Reading, except where noted in specific figures.

- Our analyses show that, in the US, UK, France, Germany, and Australia and New Zealand, third-party apps are many times more popular than Apple apps for most app types. Spotify is the most popular music streaming app in all of these regions, with some local alternatives, such as Pandora Music, BBC Sounds, and Deezer. Netflix and Amazon Prime Video are many times more popular than Apple TV+, and NAVER's Wattpad and Amazon's Kindle are many times more popular than Apple Books. The exception is for communication apps, as Apple's Messages and Phone are the most popular communication apps in many countries, followed by Facebook's apps WhatsApp and Messenger. In Germany and the UK, WhatsApp is more or as popular as Apple's apps.
- We found that in China, Japan, and Korea, regional apps – in particular, those from large developers Tencent, NAVER, and Kakao – tend to be the most popular. For instance, local apps WeChat (Tencent), LINE (NAVER), and KakaoTalk are all more popular than Apple's Messages and Phone apps. In Japan, Piccoma and NAVER's LINE Manga is many times more popular than Apple Books. And in China and Korea, regional mapping apps are the most popular.

Figure 6: Top apps across types of apps

	Communication		Music streaming		Maps		TV & movie streaming		Reading	
United States	Snapchat	0.4x > Apple	Spotify	1.6x > Apple	Google Maps	1.5x > Apple	Netflix	17x > Apple	Wattpad (NAVER)	5.5x > Apple
	Messenger (Facebook)	0.3x	Pandora Music*	0.7x	Waze (Google)	0.3x	Hulu	3.2x	Kindle (Amazon)	4.5x
United Kingdom	WhatsApp	1.0x > Apple	Spotify	2.3x > Apple	Google Maps	2.2x > Apple	Netflix	1291x > Apple	Wattpad (NAVER)	3.6x > Apple
	Messenger (Facebook)	0.4x	BBC Sounds*	0.3x	Waze (Google)	0.3x	Amazon Prime Video	325x	Kindle (Amazon)	1.9x
France	WhatsApp	0.6x > Apple	Spotify	1.6x > Apple	Google Maps	1.9x > Apple	Netflix	35x > Apple	Wattpad (NAVER)	3.5x > Apple
	Messenger (Facebook)	0.5x	Deezer*	1.0x	Waze (Google)	1.1x	Amazon Prime Video	5.0x	NAVER Webtoon	1.2x
Germany	WhatsApp	1.5x > Apple	Spotify	1.9x > Apple	Google Maps	2.1x > Apple	Netflix	835x > Apple	Wattpad (NAVER)	1.4x > Apple
	Instagram	0.6x	Amazon Music	0.2x	Komoot*	0.1x	Amazon Prime Video	274x	Kindle (Amazon)	0.8x
Australia and New Zealand	Messenger (Facebook)	0.6x > Apple	Spotify	3.6x > Apple	Google Maps	2.6x > Apple	Netflix	16x > Apple	Wattpad (NAVER)	1.7x > Apple
	Instagram	0.5x	SoundCloud	0.2x	Waze (Google)	0.2x	Amazon Prime Video	2.0x	Kindle (Amazon)	1.2x
China	WeChat* (Tencent)	1.1x > Apple	[Data unavailable, but Apple Music is small]		Amap*	1.0x > Apple	[Apple TV+ not available]		[Apple Books not available]	
	QQ (Tencent)	0.1x	Kugou (Tencent)	QQ Music (Tencent)	Baidu Maps*	0.4x				
Japan	LINE* (NAVER)	2.2x > Apple	Spotify	0.4x > Apple	Google Maps	4.7x > Apple	Amazon Prime Video	407x > Apple	Piccoma	15x > Apple
	Instagram	0.8x	LINE Music* (NAVER)	0.2x	Yahoo! MAP*	0.3x	Netflix	256x	LINE Manga (NAVER)	10x
Korea	KakaoTalk*	1.1x > Apple	Melon*	6.0x > Apple	NAVER Map*	7.7x > Apple	[Apple TV+ only launched in November 2021]		[Apple Books only public domain books]	
	Instagram	0.4x	Genie*	1.9x	KakaoMap*	5.0x				

Notes: "#x" indicates relative popularity of a local app compared to an Apple app in terms of daily active users or time spent in the app (for Music streaming and Reading). Minutes for Music streaming not available in China. In Korea, these services are either relatively new (Apple TV+) or offer only limited choices (Apple Books), while in China they are not available. * indicates regionally popular apps.

Apple's own apps account for a relatively small share of app usage

Because users can choose among many different types of apps, and because many third-party apps are popular with users, Apple's own apps account for a relatively small share of total app usage, despite the fact that most are preinstalled. Our comparisons are shown in Figure 7.[B] (Appendix A provides further methodological details.) We find that:

- For some app types, the usage share of the Apple app is negligible. For example, Apple's usage share among TV and movie streaming apps is never more than 4% in the countries considered.
- For many countries and app types, the Apple app accounts for 20 to 30% of total app usage. This reflects that while the Apple apps are widely used, third-party apps are used more frequently.
- There is only one country and one type of app considered for which the Apple app accounts for more than half of app usage: Music streaming in Japan (55%).

> *Across many app types, Apple's own apps are eclipsed in popularity by third-party apps in nearly every country and account for a small share of app usage.*

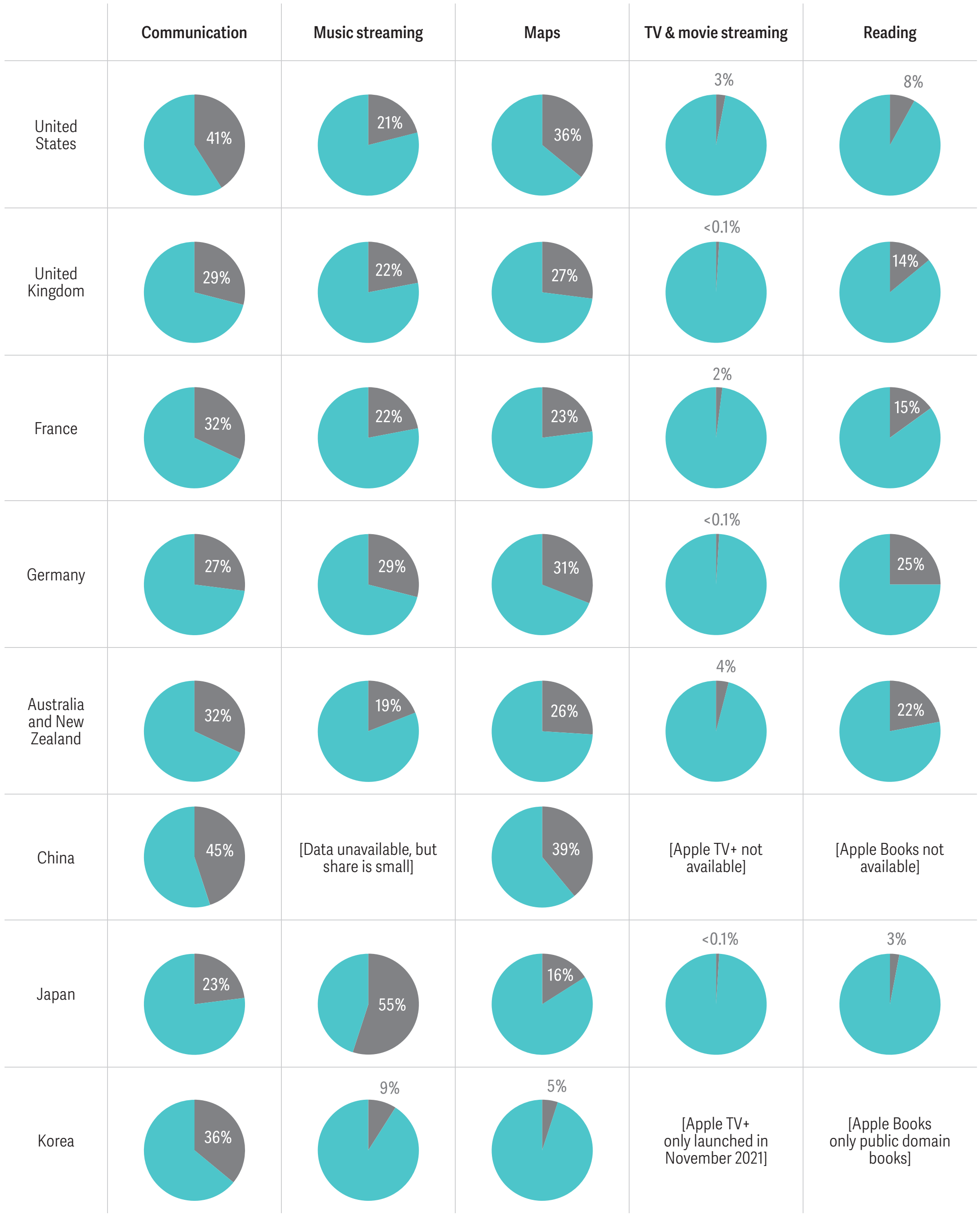
Users can easily switch between Apple and third-party apps

In some cases, iPhone users consistently rely on multiple apps in the same category, reflecting how easy it is to download and try an app before deciding whether to use it regularly. The ease of downloading is particularly salient for new apps, which can grow quickly when released.

Not only do users have multiple choices among apps, they also switch between them regularly. For instance, users often consume news from both social media apps and dedicated newspaper apps. Or they may use multiple communication apps, fitness apps, and TV streaming apps. Moreover, iPhone gamers typically play on more than one gaming app.

B We computed the app usage share of the Apple app of a given type in a country based on daily active users (for Communications, Maps, and TV and movie streaming) or average time spent per day (for Music streaming and Reading). For communication apps, Apple offers two complementary apps, Messages and Phone, while third-party apps integrate calling and messaging in the same app. To avoid double counting Apple apps users, we therefore used the maximum number of users across Messages and Phone.

Figure 7: Apple apps' share among top apps, across countries and types of apps



Notes: The top apps were identified by researching the most popular apps within each app type and country. Data is for iPhone users between July 2020 and June 2021 for Communications, Music streaming, Maps, and TV and movie streaming apps, and for iPhone and iPad users between July 2020 and June 2021, or over shorter periods depending on data availability, for Reading apps.
Source: data.ai data for iPhone and iPad users.

Large and successful technology companies offer many popular app options

While many successful third-party apps that provide alternatives to Apple apps are developed by specialized developers, such as music streaming app Spotify or video streaming app Netflix, some of the largest and most successful technology companies in the world – including Google, Amazon, Microsoft, Tencent, Baidu, Kakao, and NAVER – have used their resources to develop apps across many genres. Many of the apps developed by those companies overlap with multiple Apple apps and services and provide options to customers. (See Appendix C.) For example, all companies offer cloud services apps; all but Microsoft offer music streaming, video streaming, and eBooks apps; and all but Baidu offer communication apps. In some cases, these companies offer more than one alternative to Apple's app. For example, Tencent operates three popular music apps and NAVER operates four communication apps.

In some cases, these large technology companies launched their apps before Apple's. Examples include Tencent's music streaming apps Kuwo and QQ, and Amazon's Prime Video, Kindle, and Audible apps. Other examples launched at the same time or after Apple's, such as NAVER's music streaming services, LINE Music and VIBE.

Additionally, some of these companies provide complete suites of apps for customers, which may entice iPhone users to consider other devices. For instance, Google – the developer of the mobile operating system Android, which is used on more than 80% of mobile devices shipped in 2020 (see Figure 4) – provides many alternative app options popular with iOS users. As those users become familiar with the Google ecosystem, they may more often consider switching to an Android ecosystem.

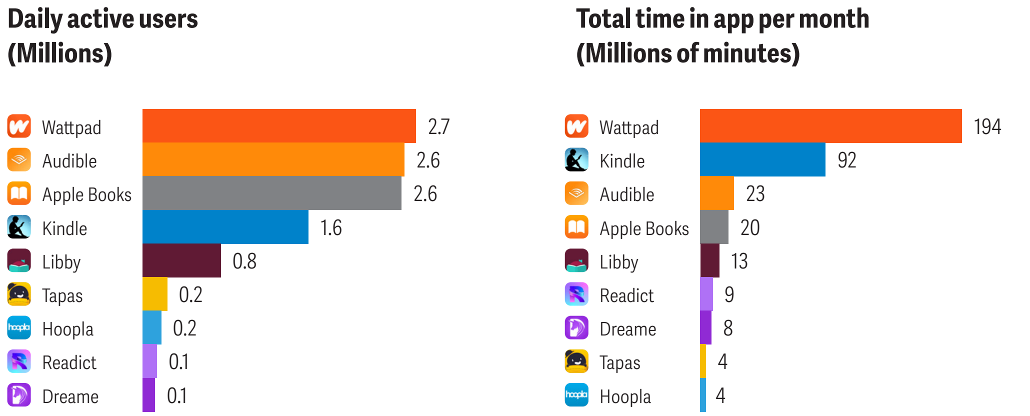
In sum, large technology companies besides Apple offer consumers popular and well-regarded options in many app categories and have done so for a long time. As shown in Appendix A, these apps, as well as those offered by more specialized companies, are often many times more popular than Apple's apps of the same type. In our estimation, it is likely that these large companies' apps will continue to remain popular options for users in the future.

Appendix A: Methodology: Measuring the success of third-party apps on the App Store

We rely on outcome-based engagement metrics to analyze the success of third-party apps on the App Store. Engagement with apps can be measured in different ways:

- The number of **downloads** can be useful for measuring how often users try out an app. However, this measure cannot be directly used to compare the success of third-party and pre-installed Apple apps.
- Usage measures can be helpful for measuring how often and how much users engage with apps. Usage can be measured based on **time spent** in the app or by the number of **active users**, which can be calculated across different intervals of time (typically a day or a month). However, a monthly active users metric tends to be too aggregated for apps that are used frequently. Therefore, we typically rely on an app's daily active users rather than monthly active users.
    - **The appropriate engagement measure depends on the app's purpose and functionality.** For example, time spent in app is a particularly relevant engagement metric for reading apps, music and video streaming apps, and ad-based businesses.
    - In some cases, different usage measures can present very different pictures. For example, the ranking of most popular reading apps on iPhone in the US differs substantially depending on whether one uses the number of daily active users or the time spent on an app as the relevant metric. (See Figure 8.) Wattpad, Audible, and Apple Books have similar numbers of daily active iPhone users, and approximately 60% more daily active users than Kindle. By time spent in the app, however, Wattpad is used by far the most, and the Kindle app is the second-most used reading app.
- To avoid capturing seasonal or transitory effects, we measure engagement over a full year or more – between July 2020 and June 2021 for time spent and daily active users, and between July 2019 and June 2021 for the number of downloads.
- For privacy reasons, Apple has limited visibility into usage data. We therefore obtained data on downloads, daily active users, and time spent in app from data.ai (formerly App Annie), a third-party provider of mobile device app use data. We also use other publicly available information, including industry reports, news articles, and developer websites.

Figure 8: Comparison of usage measures of iPhone reading apps in the US



Note: Average number of daily active iPhone users (in millions) and average daily minutes spent in app (in millions) between July 2020 and June 2021.
Source: data.ai data for iPhone users.

App comparisons are more meaningful when done within app type. For instance, ranking the most used apps in the entire App Store ignores app purpose and functionality; comparing engagement between a calculator app, such as Apple's Calculator, and a video streaming app, such as YouTube, is not meaningful. In addition, as explained above, the most relevant metric to measure engagement may differ across app types, and comparing across all app types will therefore lead to results that are difficult to interpret.

Nuance is needed to interpret any comparison between apps when users "multi-app." Since many apps are entirely free to use, users often use multiple apps in the same app type. For instance, a user may rely on a combination of Messages, WhatsApp, Snapchat, and Telegram for communication. Multi-app use is also relevant for apps that are not free to use. For example, a user may subscribe to Netflix and Apple TV+, and also have access to Amazon Prime Video through an Amazon Prime membership. To measure multi-app use, we rely on the proportion of users in a country who are monthly active users for multiple apps in the same type of apps.

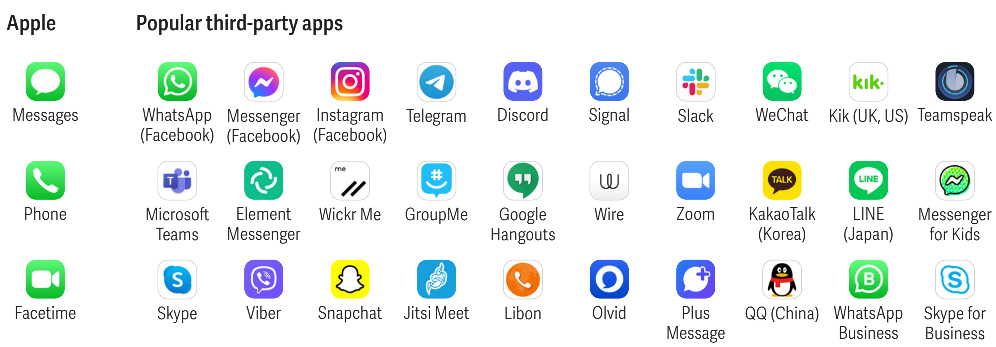
App comparisons may be more meaningful within a country or a region. Some apps are popular across multiple regions or worldwide – such as Facebook's WhatsApp and Messenger, Snapchat, and Apple's Messages – while others are popular in certain regions, such as LINE in Japan or KakaoTalk in Korea. A global comparison of communication apps would understate the importance of regional apps. Similarly, an analysis of popular apps within the US (or any other single region) would ignore apps that that are popular in other areas. We therefore identify apps that are popular within many different countries or regions, including the US, Europe, China, Japan, Korea, and Australia and New Zealand.

Appendix B: App choice and popularity across selected app types

This section provides an in-depth analysis of app choice and popularity for eight app types, as summarized in Chapter 3. Our findings are based on research, as well as quantitative analyses relying on the methodology described in Appendix A.

Communication

Over the last decade, communication apps have proliferated and offered an increasing number of features. Our analyses show that consumers use both globally and locally popular apps, and often use multiple apps together, reflecting how easily they can switch between apps.

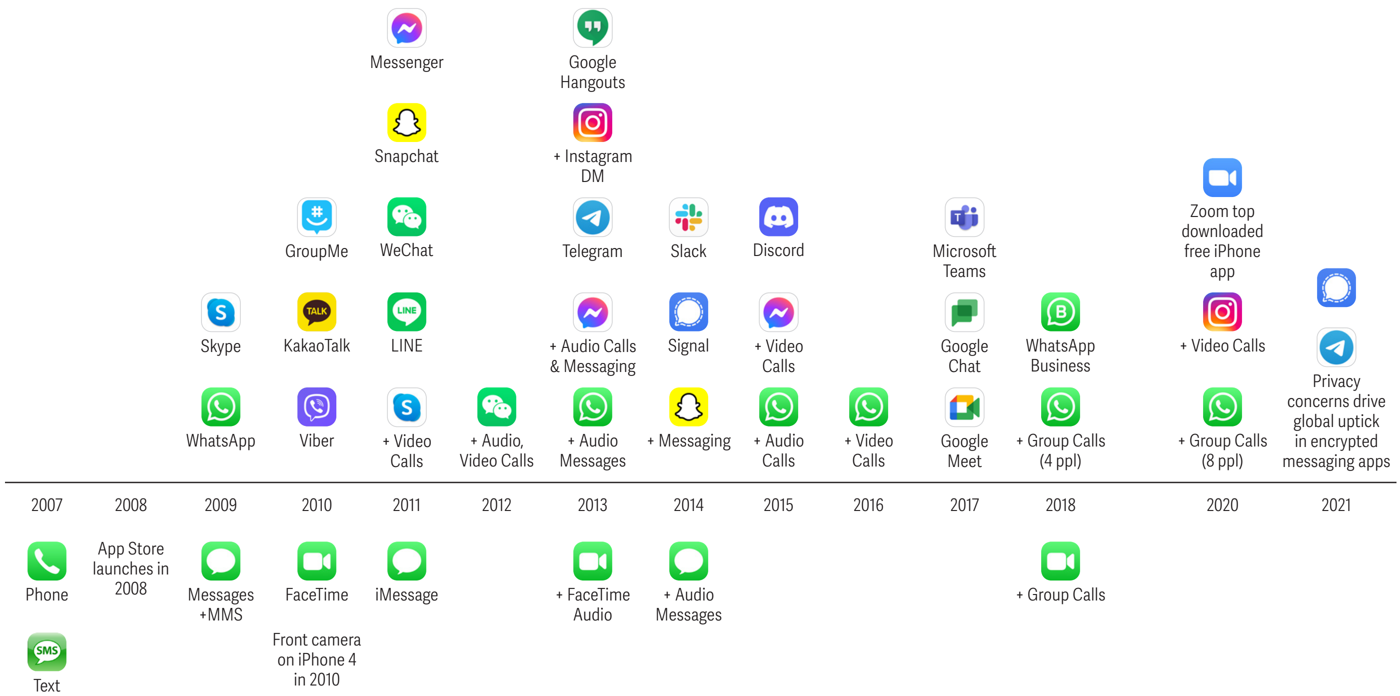


Consumers rely on a combination of phone calls (with or without VoIP), messages (SMS, MMS, or over internet), audio messages, and video calls to suit their professional and social needs and preferences. Popular communication apps offer most of these features and provide users with alternatives to Apple's built-in communication apps.

Since the iPhone was released in 2007, communication options available to consumers have proliferated. During this time period, we found that apps have added new features and capabilities, including internet-enabled messaging, Wi-Fi voice calls, and video calls. New apps, including Telegram, Signal, or Google Meet, launched. (See Figure 8.) Many capabilities have followed improvements in smartphone technology, such as when Apple added a front-facing camera on the iPhone 4, supporting mobile video calls.

Increased demand for specific features can heighten the popularity of certain apps. For example, the coronavirus pandemic accelerated the need for group video calls to facilitate remote work and socially distanced gatherings, making Zoom the most downloaded free iPhone app in 2020, as well as accelerating the number of users of workplace-focused communication apps, such as Microsoft Teams and Slack.[32] Recently, growing concerns about privacy have led to surges in downloads of encrypted messaging apps like Signal and Telegram.[33] Many of these apps, such as Snapchat and WhatsApp, have appeared on multiple App Store storefront features such as “Get Started” and “The Basics.”[34]

Figure 9: Launch of selected communication apps and features since 2007

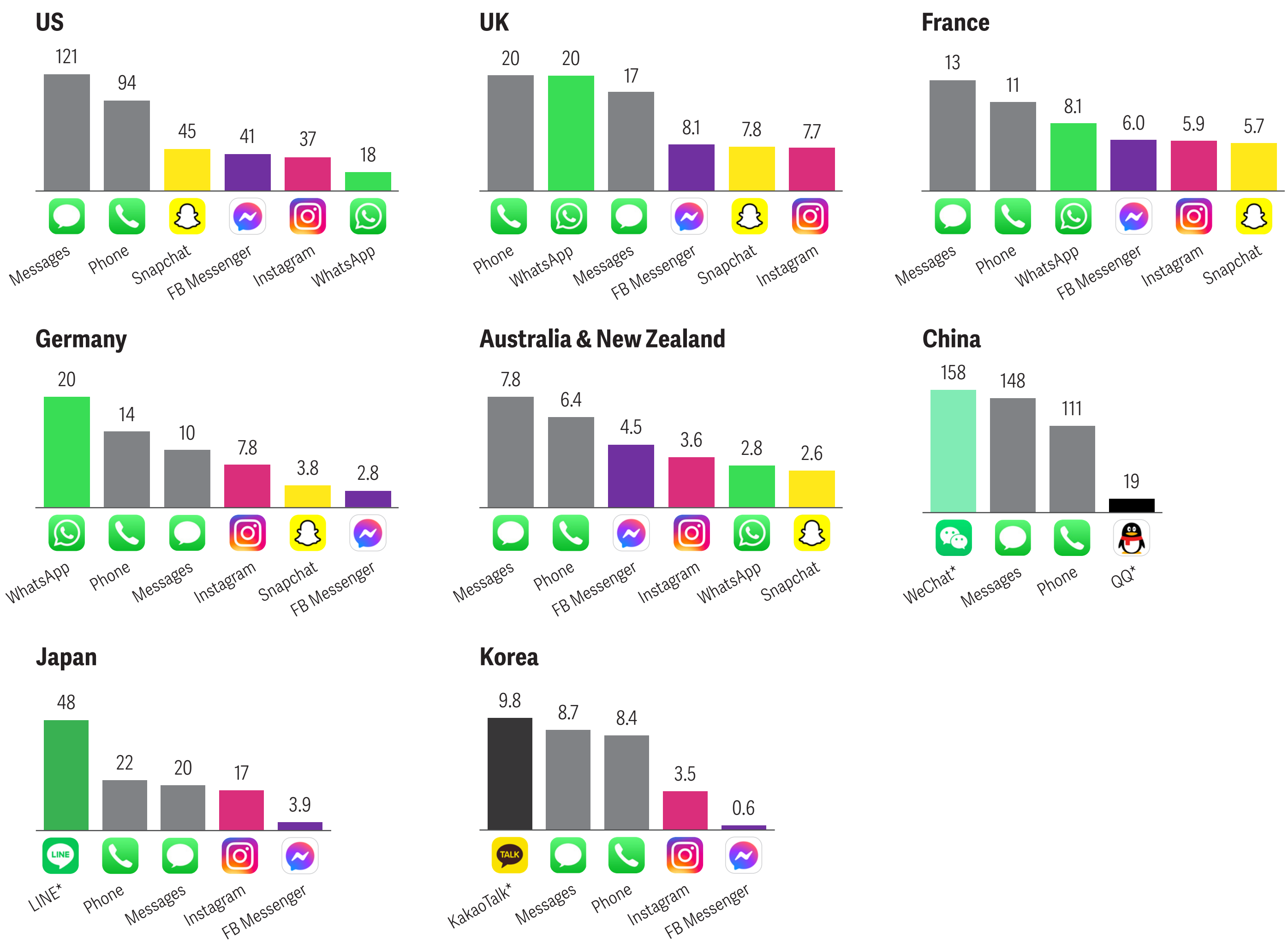


Our quantitative analyses show that three of the most popular third-party communication apps are Facebook-owned WhatsApp, Instagram,[C,35] and Messenger, which have some of the highest numbers of daily active iPhone users globally, according to data.ai. Apple’s Messages or Phone app is the most popular communication app among iPhone users in the US, UK, France, and Australia and New Zealand, but Facebook’s WhatsApp leads in Germany, and regional players WeChat, LINE (from NAVER), and KakaoTalk are the top communication apps in China, Japan, and Korea, respectively. Facebook Messenger and Instagram are among the top five iPhone communication apps across all these regions except China, where they are not available. Among the top communications apps for iPhone users across these countries, Apple apps’ shares range from 23% in Japan to 45% in China.[D] (See Figures 7 and 10.)

C We included Instagram in communication apps due to the popularity of its direct messaging feature. As of 2017, its messaging feature was used by more than half of its 700 million monthly active users.

D For communication apps, Apple offers two complementary apps, Messages and Phone, while third-party apps integrate calling and messaging in the same app. To avoid double counting Apple apps users, we therefore used the maximum number of users across Messages and Phone to calculate Apple’s share.

Figure 10: Top communication apps on iPhone in selected regions



Notes: Number of daily active iPhone users (in millions) between July 2020 and June 2021. * indicates regionally popular apps.
Source: data.ai data for iPhone users.

We also found that consumers often "multi-app," meaning that they rely on multiple communications apps at the same time. Looking at cross-app usage in the US, more than 40% of Snapchat users and around 50% of WhatsApp app users also use the Facebook Messenger app. Similar (or higher) levels of cross-app usage across these three apps can also be seen in the UK and Australia.[36] Preferred communication apps also vary by demographic groups. For example, nearly 60% of Snapchat's global users are age 13 to 24, compared to less than 30% of Facebook Messenger's.[37]

LINE *(Japan, 2011)* – LINE was created by a Japanese unit of NHN Corp (now NAVER) after the 2011 earthquake, tsunami, and nuclear crisis disrupted phone lines, making it apparent that there was a need for internet-based communication tools. LINE reached 50 million users in just over a year and now has more than 165 million monthly active users across Japan and Southeast Asia, where it is most popular. LINE offers users free messaging and voice and video calls, and is known for its tens of thousands of free and paid stickers. The app also integrates other features, including themes, games, and sending or receiving money via LINE Pay.[38]

Kakao Talk *(Korea, 2010)* – KakaoTalk is the leading messaging app in Korea, with 47 million monthly active users in Korea (around 90% of Korea's population). The app offers users free messaging, voice and video calls, paid items like emoticons and themes, and features such as an integrated calendar, KakaoTalk Channel to receive updates from your favorite celebrities, and in-app shopping.[39]

WeChat *(China, 2011)* – Launched by Tencent in 2011, WeChat is the most popular app in China, with approximately 1.2 billion monthly active users. Although WeChat originally launched as a messaging app, it has grown to become an all-in-one app that users can turn to for everything from hailing a ride and ordering food delivery to paying utility bills and purchasing items at a physical store.[40]

Music streaming

Consumers listen to music from large global services, but also from regionally popular ones. In many regions, Spotify is listened to the most, and in recent years Amazon Music Unlimited and YouTube Music have grown significantly.

Apple

Music

Popular third-party apps

Spotify, Pandora, Musi, SiriusXM, Deezer, KuGou (China), QQMusic (China), Amazon Music, YouTube Music

TuneIn Radio, MusicaXM, Melon, SoundCloud, AWA (Japan), Audiomack, iHeartRadio, eSound, Genie (Korea)

LINE Music (Japan), FLO (Korea), Kuwo Music (China), Qian Qian (China), NetEase Music (China), NAVER VIBE (Korea), IDAGIO, Tidal, BBC Sounds (UK)

In 2021, music streaming generated more than $23 billion in global revenue.[41] Users can choose from a wide variety of options, from general audience streaming services such as Spotify, Pandora, YouTube Music, and Apple Music to specialized services that cater to more specific tastes, such as classical music service Idagio. Additionally, a large and increasing number of users stream music and discover new artists through the regular YouTube platform: Google estimates that in 2020, more than 2 billion people used it to listen to music each month, a number twice as high as in 2018.[42]

We found that since Apple launched the iTunes music store in 2003, many music streaming services have emerged, including Spotify in 2008 and Amazon Music Prime and Tidal in 2014. Spotify launched its iOS app in 2009 in Europe and in 2011 in the US. In 2015, Apple Music launched, the same year as YouTube Music and LINE MUSIC (Japan). Other popular services launched shortly thereafter, including Amazon Music Unlimited (Amazon's premium on-demand music streaming service) and FLO (Korea) in 2016, and BBC Sounds (UK) and VIBE (Korea) in 2018.[E] (See Figure 11.)

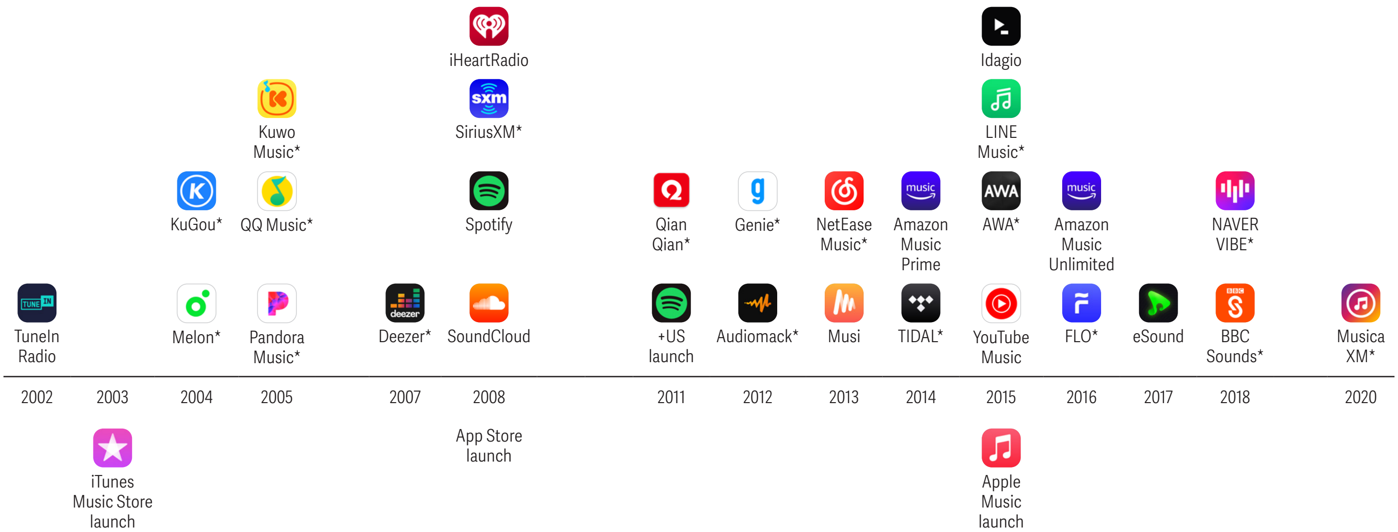
Music streaming services typically generate revenue through ad-supported free versions or subscriptions. While Apple Music is subscription-based only, many popular services, such as Spotify, provide both free and subscription options.

Despite the large number of free options, the number of paid on-demand music subscriptions has grown substantially. Research indicates that there were more than half a billion music subscribers worldwide in mid-2021, an increase of more than 25% in one year.[43] In the US, the number of paid subscribers grew by more than 230% between 2016 and 2020, with the largest increase occurring between 2019 and 2020 (15 million additional

E Amazon Music offers two options, Amazon Music Prime, included in Prime memberships, with 2 million songs, and standalone Amazon Music Unlimited, with 75 million songs.

subscriptions).[44] Globally, Spotify's share has also grown, and is popular among younger demographics.[45] YouTube Music and Amazon Music Unlimited – two services whose apps were heavily featured on the US App Store storefront[F,46] – have grown significantly in recent years: In 2020, their subscriber bases both increased by more than 50%,[47] and they have a substantial presence worldwide.[48]

Figure 11: Launch of selected global and regional music streaming services since 2002



* indicates regionally popular apps.

Our quantitative analyses reflect that many streaming services are popular with iPhone users. (See Figure 12.) Some of these, such as Spotify, Apple Music, Amazon Music, and YouTube Music, have millions of listeners worldwide. Focusing on dedicated streaming services (i.e., not including YouTube), Spotify is by far the most popular music streaming service for iPhone users in the US, UK, France, Germany, and Australia and New Zealand, based on listening time.[G] In the US, iPhone users spend more than 50% more time on Spotify than on Apple Music, and more than double the time on Spotify than on Pandora, followed by Musi, YouTube Music, and SoundCloud. In the UK, Germany, and Australia and New Zealand, the gap between the largest player (Spotify) and other streaming services is larger. Across these countries, Apple Music's share out of the top music streaming apps among iPhone users ranges from 19% in Australia and New Zealand to 29% in Germany. In Japan, Apple Music is the most popular, followed by Spotify and regional player LINE MUSIC.

F Apps are considered featured when included in any feature type (e.g., App of the Day, Our Favorites, The Basics) on the Today page of an App Store storefront. Amazon Music Unlimited and YouTube Music were featured in the US storefront more than 80 times in between April and September 2021.

G Spotify's app allows users to listen to both music and podcasts. Therefore, not all users and time spent using the Spotify app may correspond to music streaming use. The Apple Music app allows users to listen to both music from Apple Music and locally downloaded or streamed music from the iTunes store. Therefore, not all daily active users and not all time spent in the Apple Music app may correspond to Apple Music streaming.

We also found that many local apps are highly successful. In France, local streaming service Deezer is one of the most popular choices among iPhone users, who spent nearly as much time on this local option as on Apple Music. In the US, Pandora is also popular, as is BBC Sounds in the UK, which launched three years ago and is already the third-most popular option in the UK. In Asia, both Korean and Chinese streaming users strongly prefer local apps. Korean users spend the most time on Melon and Genie, and regional newcomers FLO and VIBE are also popular. In Korea, Apple Music's share out of the top music streaming apps among iPhone users is less than 10%. In China, the most popular music streaming options (among all users) are KuGou, QQ Music, Kuwo (all owned by Tencent), and NetEase, while Apple Music is not a significant player.[49]

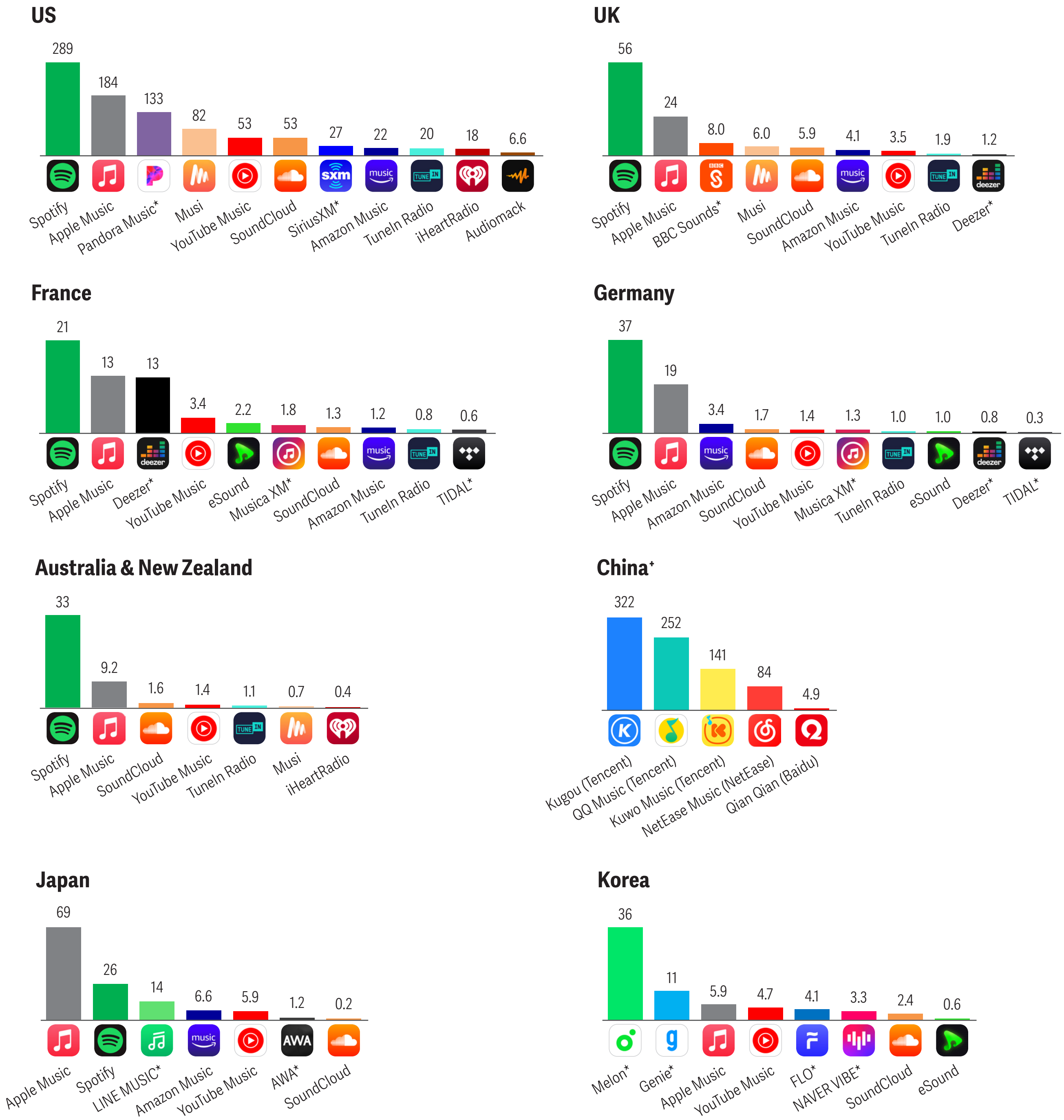
Deezer *(France, 2007)* – Founded by a 23-year-old in a Paris apartment who wanted to make it easier for his friends to listen to music, Deezer has grown into a global music streaming service, available in more than 180 countries, with 16 million active users. It is among the top three most popular music streaming services in France. Deezer's catalogue has more than 90 million songs and 40,000 podcasts, as well as audiobooks and radio channels. It offers listeners features such as curated content picked by Deezer editors and AI-powered, personalized recommendations. In 2019, Deezer was valued at €1 billion, acquiring French Unicorn status.[50]

Pandora *(US, 2005)* – Pandora is a leading music and podcast discovery platform in the US, known for helping consumers discover new music through a highly personalized listening experience powered by its proprietary Music Genome Project technology – in which its team of musicologists have analyzed every song on Pandora for nearly 500 musical traits – and its thumbs-up/thumbs-down feature. Pandora is the third-most popular music streaming app in the US, with approximately 70 million monthly active users, and was acquired by Sirius XM for $3.5 billion in 2019.[51]

KuGou *(China, 2004)* – KuGou is one of China's most popular and comprehensive music streaming apps, and is part of Tencent's family of music streaming services, alongside QQ Music and Kuwo. These are the top three most popular music streaming apps in China. Combined, Tencent's music platforms have more than 620 million monthly active users in China, with KuGou having approximately 300 million users per month. In addition to music streaming services, KuGou also offers users interactive social features such as livestreaming of musical performances and concerts, and in-app karaoke.[52]

FLO *(Korea, 2018)* – FLO was launched by South Korean Telecom in 2018 with partners such as SM Entertainment, Big Hit Entertainment, and JYP Entertainment. In only a few years, it became the fourth largest music streaming service in Korea. One of FLO's popular features is its "FLO Chart," which ranks songs based on their popularity according to FLO's last 24 hours of streaming data, helping listeners discover new music and listen to what others are listening to.[53]

Figure 12: Top music streaming services on iPhone in selected countries



Notes: Average time per day by iPhone users (in millions of minutes) between July 2020 and June 2021 for all countries but China; + Monthly active users (in millions) across all devices for the leading music streaming apps in China, as of September 2021. (iPhone-specific monthly active user data for China and time spent data not available). * indicates regionally popular apps.
Source: data.ai data for iPhone users for all countries but China; iiMedia Research for China.

Mapping

Smartphone users regularly use mapping apps, including both globally and locally popular turn-by-turn navigation apps, and specialized transit, cycling, and hiking mapping apps.

Apple

Maps

Popular third-party apps

Google Maps | Waze | NAVER Map (Korea) | KakaoMap (Korea) | Amap (China) | Baidu Maps (China) | Tencent Maps (China) | TMAP (Korea) | Bikemap | Komoot | Moovit

Today, approximately two-thirds of smartphone users regularly rely on mapping apps.[54] These apps are used to get turn-by-turn directions for various modes of transportation, as well as to check opening hours of businesses and local transportation options, among other features.

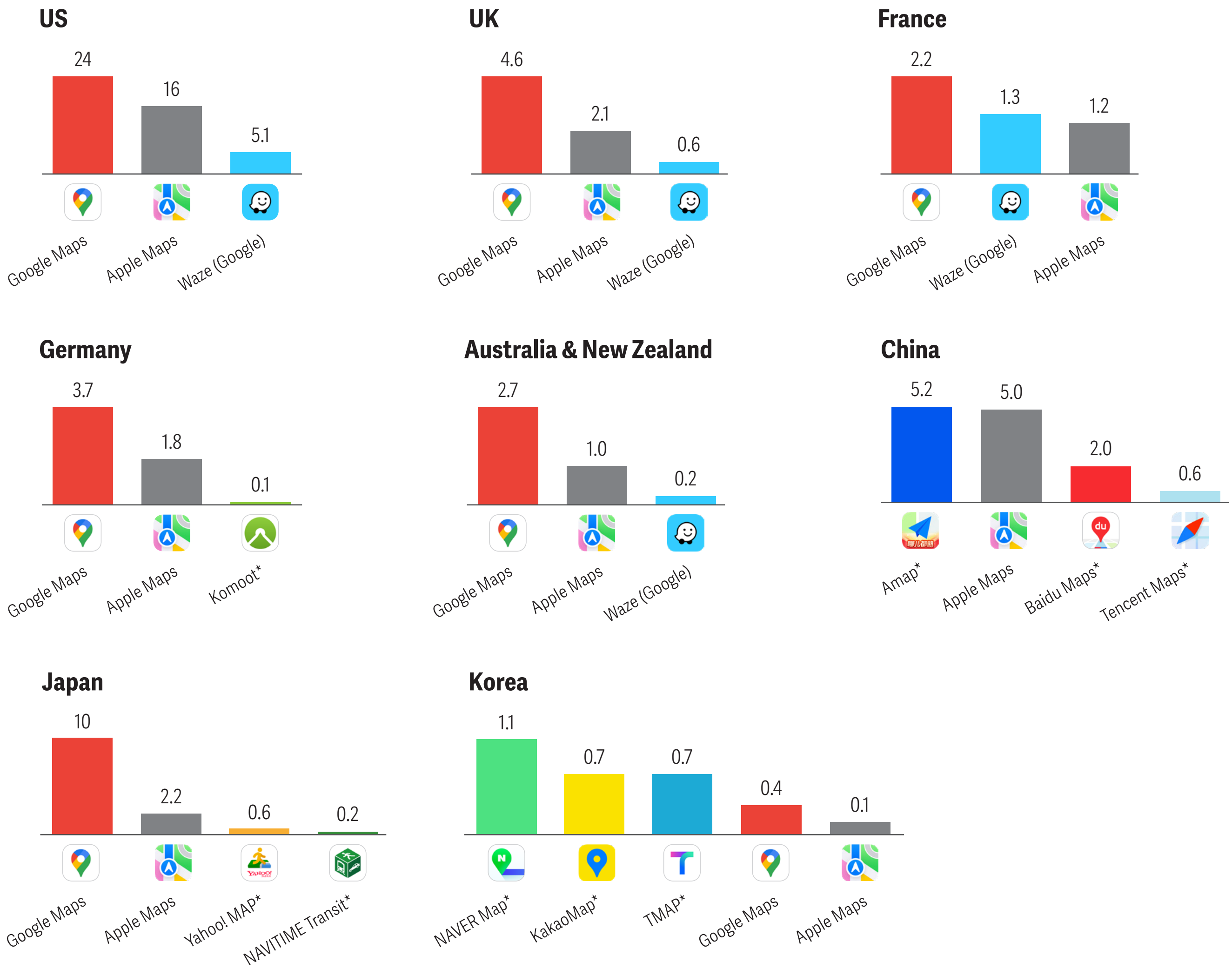
Globally, we found that Google leads the way with more than 100 million daily active iPhone users across its two apps: Google Maps (88 million) and the driving-centric Waze (13 million). By contrast, Apple Maps – the relaunched Maps app using Apple's own mapping service in 2012,[H] the same year as the Google Maps app – has 34 million daily active iPhone users.[55] Together, we found that these apps are the most popular mapping apps among iPhone users in regions such as the US, France, Germany, the UK, Japan, and Australia and New Zealand. Across these countries, Apple Maps' share out of the top mapping apps among iPhone users ranges between 16% in Japan and 36% in the US.

In other countries, we also found that local apps have many iPhone users: In Korea, NAVER Map, KakaoMap, and TMAP (featured twice as App of the Day in the second and third quarters of 2021 in the Korean storefront)[56] are the three most popular iOS mapping apps, ahead of both Google Maps and Apple Maps. In China, Amap is the most popular iOS mapping app, followed by Apple Maps. While smaller, Baidu Maps and Tencent Maps are also popular. In Korea and China, Apple Maps' share out of the top mapping apps among iPhone users is 5% and 39%, respectively. (See Figure 13.)

Users can also choose from many specialized mapping apps. For instance, outdoor enthusiasts can use AllTrails and Gaia GPS to plan their hikes, while cyclists, particularly in Europe, can rely on the capabilities of Komoot and Bikemap for routing and navigation apps with a focus on terrain type and elevation profile. Another popular category is public transit maps. Moovit and CityMapper provide transit estimates and directions for various modes of transportation (including bike sharing programs) in many cities worldwide. Both of these apps rely on Apple's MapKit – a tool available to app developers to easily add maps to iOS apps – which operates on the Apple Maps API and data.

H Until iOS 6, the Maps app on iPhone was developed by Apple but used Google Maps data.

Figure 13: Top mapping apps on iPhone in selected countries



Note: Number of daily active iPhone users (in millions) between July 2020 and June 2021. * indicates regionally popular apps.
Source: data.ai data for iPhone users.

Amap *(China, 2002)* – Amap is one of China's most popular navigation apps and is fully integrated into Alibaba's e-commerce ecosystem. It provides users with access to multiple services beyond navigation, including booking taxis or ridesharing services, finding carpooling services or bicycle rentals, and providing information on tourist attractions nearby.[57]

KakaoMap *(Korea, 2008)* – KakaoMap, one of Korea's most popular mapping services, was first launched as Daum Map in 2009 and relaunched as KakaoMap following the merger of Daum and Kakao in 2014. In addition to driving directions, KakaoMap also provides schedules and real-time tracking for public transportation, as well as user-generated reviews and photos of local attractions. KakaoMap is one of several Kakao transportation apps, which also include Kakao T (a taxi-hailing app), KakaoBus, and Kakao metro.[58]

TV and movie streaming

Consumers have seen a proliferation of TV and movie streaming options, but Netflix is dominant in almost every region.

Apple

Apple TV

Popular third-party apps

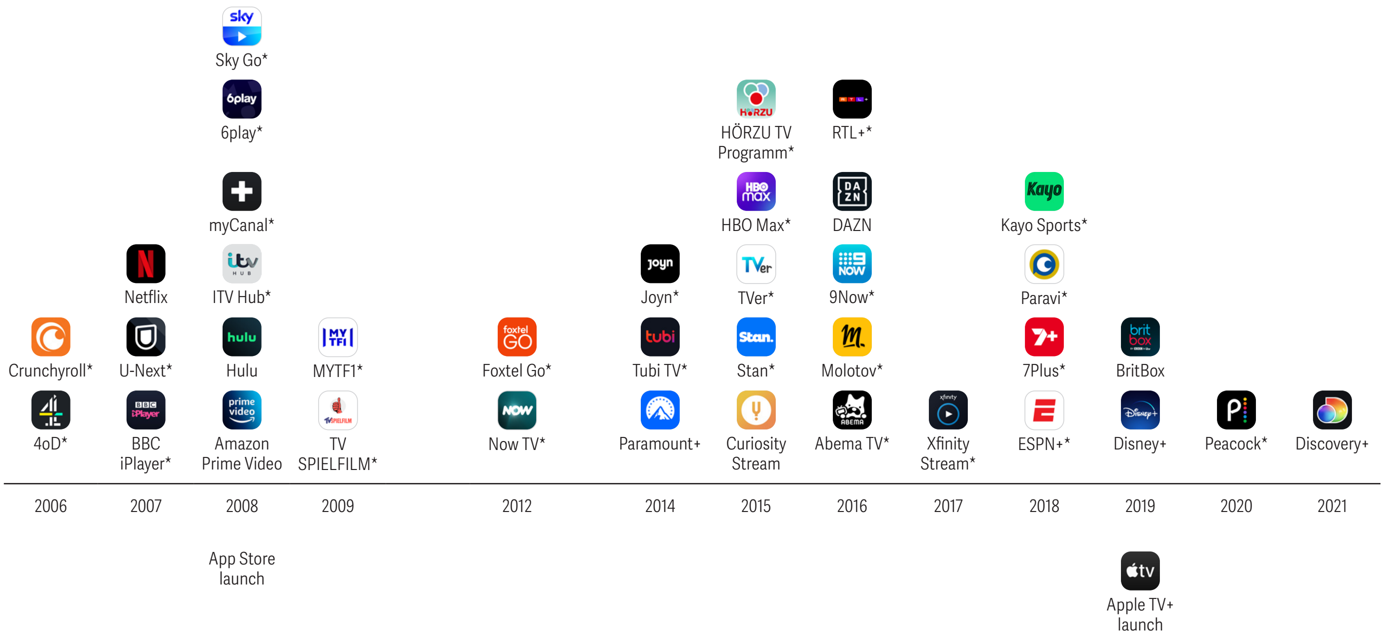
Amazon Prime Video	Disney+	Netflix	HBO Max	Curiosity Stream	Paramount+	Discovery+	Hulu (US)	Sky Go (UK)	Paravi (Japan)
TVer (Japan)	MYTF1 (France)	Joyn (Germany)	Peacock (US)	Crunchyroll (US)	4oD (UK)	Now TV (UK)	6play (France)	ITV Hub (UK)	DAZN
Abema TV (Japan)	U-Next (Japan)	MyCanal (France)	Foxtel Go (AUS)	BritBox (UK)	ESPN+ (US)	Stan (AUS)	Molotov (France)	BBC iPlayer (UK)	Tubi TV (US)

While some providers began offering streaming services in the mid-2000s, the number of streaming options available to consumers worldwide has taken off over the last 10 years. Revenue has also grown: In 2021, revenue in the video streaming market reached $129 billion, more than 20 times revenue in 2010.[59]

Some of the earliest streaming services, such as Netflix, Hulu, Amazon Prime Video, and BBC iPlayer, initially offered web-based streaming, but began launching iOS apps between 2010 to 2012. Apple launched Apple TV+ in 2019, the same year as Disney+ and a few months before HBO Max, NBCUniversal's Peacock, and Foxtel Go (Australia). Paramount+ and Discovery+ followed, launching in 2021. (See Figure 14.) Many services have expansion plans, including Amazon (with its recent MGM purchase), Stan, and BBC iPlayer.[60]

Streaming providers typically monetize their services through subscriptions and/or advertisements, sometimes offering different tiers of service. For example, popular services in the US rely on a range of different monetization strategies. Both Netflix and Apple TV+ are entirely subscription-based (although Apple TV+ provides a free trial option). Hulu and Peacock offer various premium options and a basic ad-supported plan at a lower per-month cost, and Tubi TV, a Fox owned service, is purely ad-supported. Amazon Prime Video is included with the Amazon Prime subscription that more than 55% of US households have, but it can also be purchased as a standalone subscription.[61]

Figure 14: Launch of selected TV and movie streaming services since 2006

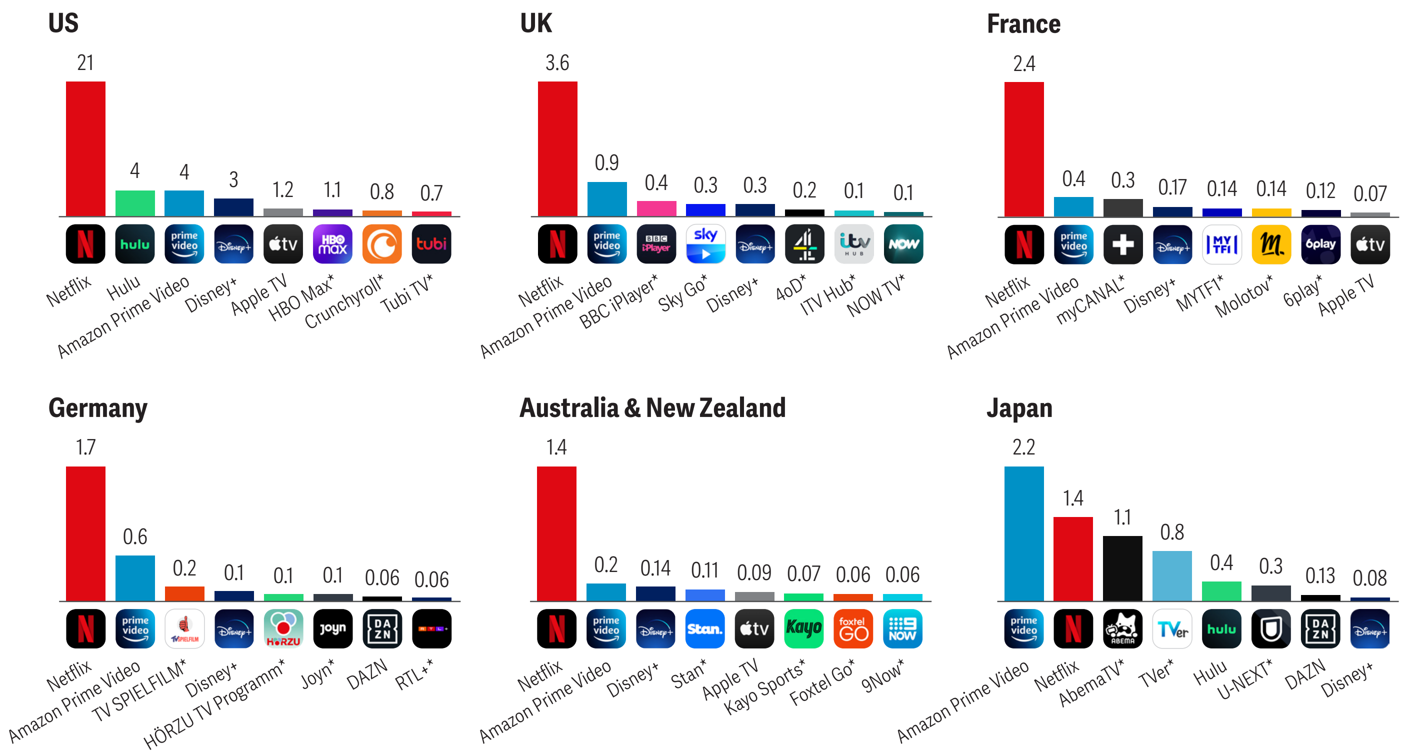


Notes: Services are identified by their current branding (e.g., ITV Player launched in 2008 and rebranded to ITV Hub in 2015, CBS All Access launched in 2014 and rebranded to Paramount+ in 2021). * indicates regionally popular apps.

As with music streaming apps, our quantitative analyses reflect that some of these streaming services are popular globally, and others regionally. In many countries, Netflix is by far the most popular streaming app among iPhone users. In the US, the Netflix app has more than five times more daily active iPhone users than the second- and third-most popular apps, Hulu and Amazon Prime Video (which was featured nearly 100 times in the US storefront), and is seven times more popular than the next competitor, Disney+ (featured more than 100 times).[62] In Australia and New Zealand, France, the UK, and Germany, Netflix is seven, six, four, and three times more popular than Amazon Prime Video, respectively. In Japan, however, Amazon Prime Video is the most popular, with about 60% more users than Netflix.[63] In the UK, Japan, and Germany, Apple TV is not among the top eight streaming apps by average daily active users. In fact, Apple TV's share of the top TV and movie streaming apps among iPhone users is small across all countries analyzed, from just 0.05% in the UK to only 4% in Australia and New Zealand. (See Figure 15.)

Other streaming services are popular locally, often offering regionally targeted content. These streaming services include BBC iPlayer and Sky Go in the UK, myCANAL in France, Stan in Australia, TV SPIELFILM and Joyn in Germany, and AbemaTV and TVer in Japan.

Figure 15: Top TV and movie streaming services on iPhone in selected countries[64]



Notes: Number of daily active iPhone users (in millions) between July 2020 and June 2021. Time use data is not available for Apple TV. * indicates regionally popular apps.
Source: data.ai data for iPhone users.

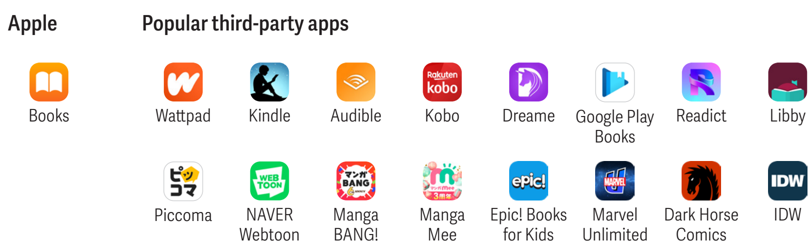
Disney+ *(US, 2019)* – Disney+ is a leading subscription streaming service, with content from Disney, Pixar, Marvel, Star Wars, and National Geographic. Since launching, it quickly became one of the top five most popular streaming platforms across many regions, including the US and Europe. Disney+ provides access to more than 500 films, 15,000 episodes, and 80 Disney+ originals to 118 million subscribers.[65]

Peacock *(US, 2020)* – Peacock, a streaming service by NBCUniversal, is one of the most recent entrants in the video streaming space, offers users different plans: Free (ad-supported), Premium (ad-supported, extra content), and Plus (ad-free, extra content, and offline viewing). Peacock features over 20,000 hours of content, including NBC and Universal originals.[66]

Foxtel Go *(AUS, 2012)* – Foxtel Go is a popular local service in Australia, among the top 10 most popular apps in the country. It allows users to watch live TV and catch up on previously aired content from a mobile device or web browser. Streaming with Foxtel GO requires a subscription with Australian TV provider Foxtel. Users have a wide range of plans to choose from, including sports, movies, and children's channels.[67]

Reading

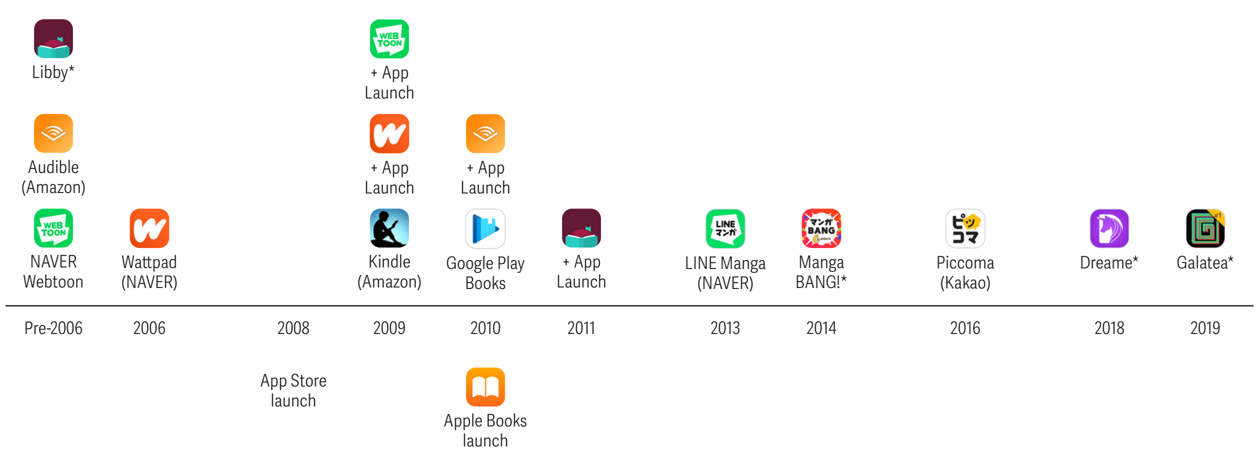
Smartphones have enabled new ways for consumers to read and fueled growth in apps catering to shorter, self-published stories.



Smartphones and tablets provide readers convenient access to read or listen to a wide range of books and reading materials through a variety of apps. Some reading apps specialize in providing certain types of content, such as eBooks (e.g., Amazon Kindle), audiobooks (e.g., Audible, owned by Amazon), manga (e.g., Piccoma by Kakao), or comics (e.g., Marvel Unlimited), while other apps offer multiple types of content on a single platform (e.g., Apple Books in many regions).[I]

Several services – including Webtoon, Wattpad, Audible, and Libby (formerly Overdrive) – initially launched on the web prior to becoming available as iOS apps, while Apple Books, initially branded as iBooks, launched in 2010. Large developers have also expanded through acquisitions, for example with Amazon's integration of Audible in 2008, and NAVER's recent acquisition of Wattpad. In recent years, Dreame and Galatea launched with a focus on romantic stories, allowing users to read a limited number of chapters every day for free and paying to unlock more content. (See Figure 16.)

Figure 16: Launch of selected reading apps since 2006

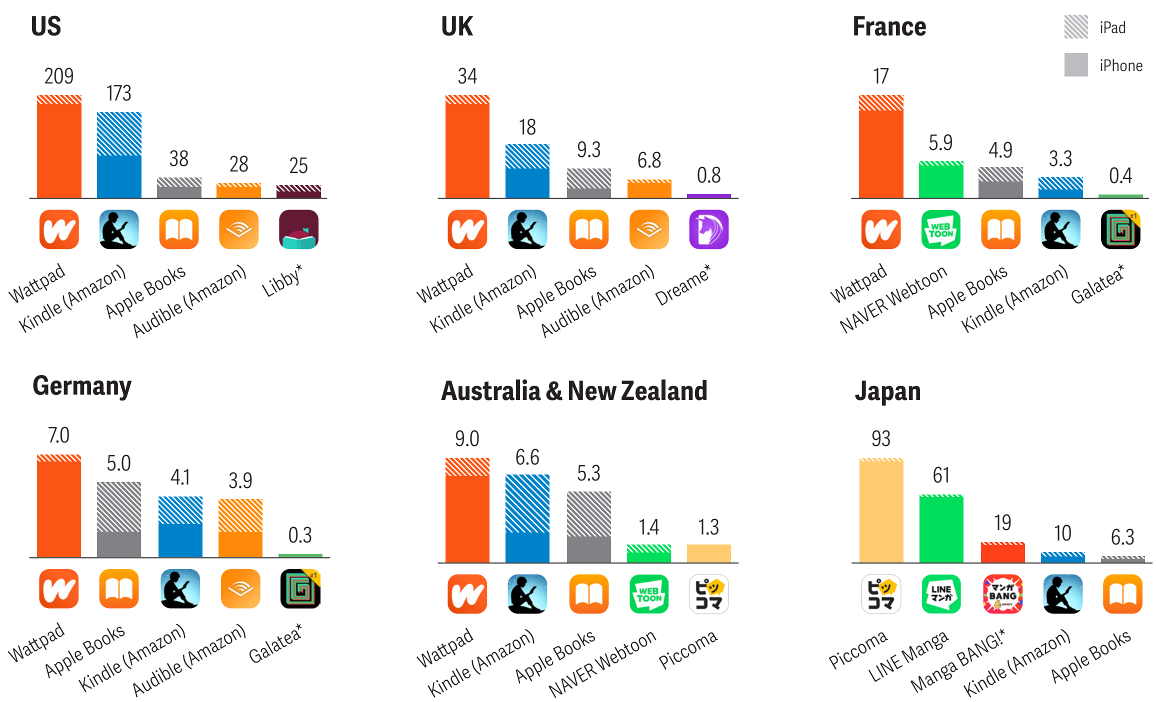


Notes: Timeline displays the first year in which a service became available on smartphones. Services are identified by their current branding (e.g., Overdrive launched before 2006, and rebranded to Libby in 2017, although both coexisted for a period of time). * indicates regionally popular apps.

I Apple Books' offerings vary by region. In some regions, users can only access eBooks (no audiobooks), or eBooks in the public domain. There are no such restrictions for countries such as the US, UK, and Japan.

Our quantiative research of user engagement shows that many third-party reading apps are popular with iPhone and iPad users. In the US, UK, France, Germany, and Australia and New Zealand, iPhone users spend the most time on the popular serialized story app Wattpad. For iPhone and iPad users in the US, UK, and Australia and New Zealand, the Amazon Kindle app is the second-most used app, followed by Apple Books. Apps such as Libby in the US have expanded eBook availability by providing access to local libraries' collections. In Japan, manga's popularity is reflected in the success of specialized manga apps such as Kakao's Piccoma and NAVER's LINE Manga, which dominate among reading apps and have both been featured multiple times in the Japanese storefront.[68] NAVER's LINE Manga is named NAVER Webtoon outside of Japan and is the second-most popular reading app in France. Apple Books' share out of the top reading apps on iPhones and iPads varies across these countries, from 3% in Japan to 25% in Germany. (See Figures 7 and 17.)

Figure 17: Top reading apps on iPhone and iPad in selected countries



Notes: Average time spent per day by iPhone and iPad users in aggregate in the featured country (in millions of minutes). Daily averages calculated as the aggregate of iPhone or iPad time divided by the number of days for which there is data for each device, respectively, between July 2020 and June 2021. iPad data unavailable for Dreame in the UK, Galatea in Germany, and Piccoma in Australia and New Zealand. * indicates regionally popular apps.
Source: data.ai data for iPhone and iPad users.

The increase in mobile device readership has led to the emergence of new types of stories. For example, Wattpad and Amazon's recently launched Kindle Vella provide platforms for amateur and professional writers to self-publish serialized stories directly to readers, chapter by chapter. These apps encourage authors to write chapters shorter than those in traditional books, making it easier for readers to read them on their smartphones while on the go.[69] Serialized storytelling is particularly popular with younger audiences, as illustrated by the fact that a large majority of Wattpad's users are teens or young adults.[70] By contrast, traditional books are read more often on iPad using apps such as Amazon Kindle and Apple Books.

Wattpad *(Canada, 2006)* – Wattpad is a social storytelling platform popular with teens and young adults, with more than 90 million monthly users – including 5 million writers – worldwide, who use the app for more than four hours per month on average. Wattpad provides a platform for users to self-publish original stories or fanfiction and establish a global fan base with whom they can interact. It offers writing resources and has its own in-house publishing and production companies, Wattpad Books and Wattpad Studios, which identify promising stories and help get them published or adapted into films or TV series. It was acquired by NAVER for $600 million in May 2021.[71]

News

Most connected consumers access news through social media, news media and newspaper apps, and search, while news aggregators are a less popular option.

Today, a large share of the world population accesses news on smartphones, and relies on many different online channels to do so.[72] (See Figure 18.) In the US and UK, it is estimated that the share of people who access news via a smartphone has more than doubled since 2013.[73]

On **social media apps**, one of the largest sources of online news, users come across links to articles either shared by their networks or posted by news outlets themselves. For instance, Facebook reported that in 2020, its news feed sent move than 180 billion clicks to news publishers.[74] Globally, more than 25% of people get their news primarily from social media platforms, a figure that is even higher in countries such as the US and UK, and for younger audiences.[75]

Other users prefer to access news directly from **news media websites** or **newspaper apps**, many of which cater to local audiences, or by **searching** for news on browser apps.

Another, less popular option available to consumers is **news aggregator apps** like Google News, Apple News, or Kakao's Daum, which curate news content from a wide array of news outlets.

Figure 18: Primary source of online news, worldwide

Source: Reuters Institute for the Study of Journalism, Digital News Report 2021.

Apple News is a free, personalized news aggregator. Apple News+ is a subscription service accessible in the News app that provides online and offline access to more than 300 subscription-only magazines and newspapers, local news sources, and Apple News+ audio stories, for a flat monthly fee. Apple News and Apple News+ are only available in the US, UK, Canada, and Australia.

Within each of these channels, iPhone users can choose from many different popular apps, and often use several of them. For instance, around two-thirds of connected consumers across 12 selected countries report that they use more than one social network or messaging app for consuming, sharing, or discussing the news.[76] News media and newspaper apps are also plentiful and tend to cater to local audiences. Popular apps with iPhone users include Fox News, CNN, and The New York Times in the US; BBC

News, Daily Mail Online, Sky News, The Guardian, and The Times of London in the UK; and 9News, The Sydney Morning Herald, and ABC News in Australia.

Many consumers use multiple apps to access the news. In the US, for instance, around 70% of CNN and The New York Times app users also use the Apple News app; in the UK, more than 55% of BBC News and The Guardian app users also use the Apple News app; and, in Australia, over 50% of 9News and ABC News app users also use the Apple News app.[77] Moreover, in the US, a growing number of consumers subscribe to multiple news sources, mixing international and national news brands with local or regional newspapers.[78]

News app usage often coincides with significant events. For example, many news apps – including ABC News, CBS News, Fox News, and CNN – were featured in the US storefront and saw an increase in downloads on key dates leading up to the 2020 US presidential election.[79]

Health and fitness

The coronavirus pandemic has fueled the popularity of health and fitness apps, and users have a wide range of fitness app options across multiple app subcategories.

iPhone

Health
Fitness

Apple Watch

Heart Rate
Mindfulness
Cycle Tracking
Workout
ECG
Sleep
Activity
Blood Oxygen
Noise

Health and fitness apps provide users with a variety of content and features – including nutrition tracking, workouts, yoga classes, and mindfulness exercises – with many consumers using multiple apps.[80] Substantial growth and innovation have occurred in this area during the ongoing coronavirus pandemic due to the increased demand for platforms capable of hosting content and fitness instructors' virtual classes (e.g., ClassPass), and for mindfulness and telehealth apps. Health and fitness apps vary by monetization strategy, including free ad-supported (e.g., MyFitnessPal), subscription-based (e.g., Peloton and Headspace), companion (e.g., Fitbit), and branded (e.g., Nike Training Club).

In this space, Apple offers two iPhone apps: Apple Health and Fitness. iPhone users can use the Apple Health app to organize important health information – often synced from other health and fitness apps – in a centralized, secure location. It also provides features such as step and weight tracking. The Fitness app provides detailed insights when paired with an Apple Watch, such as enhanced activity tracking. With Fitness+, a recently launched subscription feature, users can also access fitness classes and guided meditations. Apple also offers several health and fitness apps for the Apple Watch, including Activity, Mindfulness, Cycle Tracking, Workout, Sleep, Heart Rate, Noise, Blood Oxygen, and ECG (to identify irregular heart rhythms).

iPhone and Apple Watch users can also choose from a wide range of third-party health and fitness apps, including at least 20 apps that have more than 1 million monthly active iPhone users worldwide.[81] These apps offer a wide array of content and features, across multiple subcategories, described below.

Guided workouts apps

Guided workout apps (e.g., Nike Training Club and Sweat, which both received Editors' Choice awards) offer users access to on-demand and live workout videos taught by fitness instructors. This provides users with a convenient alternative to attending a gym and allows them to exercise at their homes. Our research and quantitative analyses show that these types of apps are popular among users, with many having more than 1 million monthly active iPhone users. (See Figure 20.) While many of these apps are popular globally, some have a more local following, such as Keep in China.[82]

Figure 19: Launch of selected guided workout apps since 2009

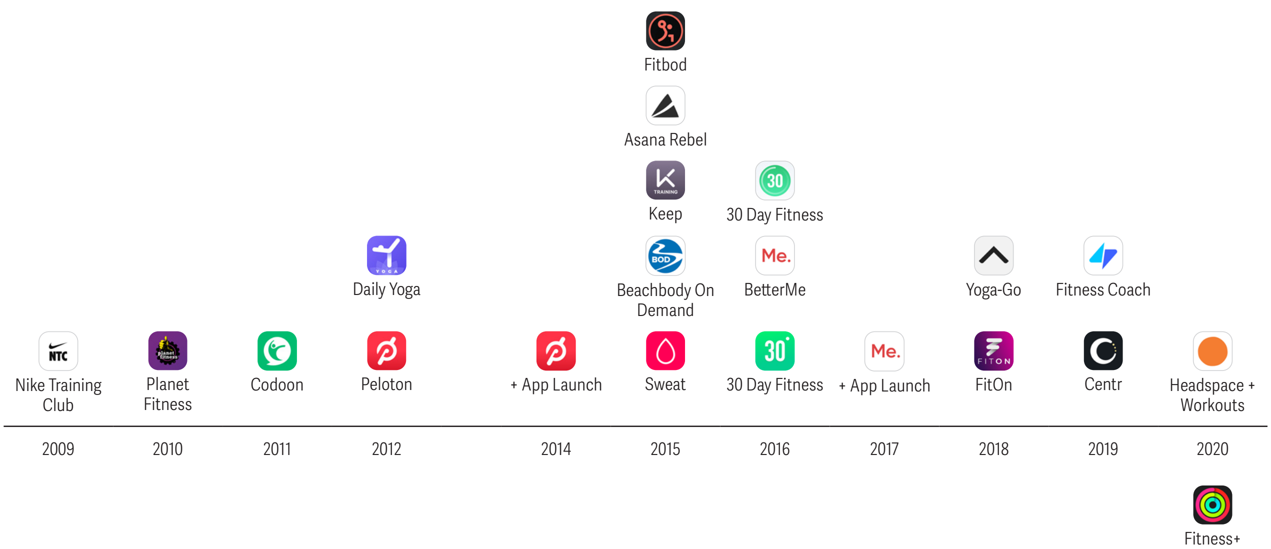
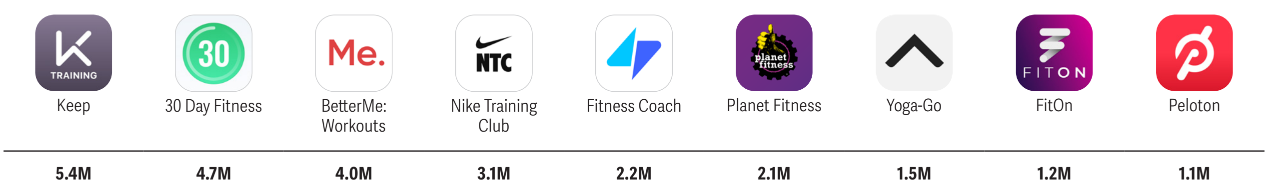


Figure 20: Monthly active iPhone users for select popular guided workout apps



Source: data.ai data for iPhone users.

Sweat *(2015, AUS)* – Launched by Australian fitness instructor Kayla Itsines, Sweat offers users access to thousands of guided workouts. The app quickly grew in popularity, and now generates around $100M in annual revenue.[83]

Mindfulness apps

Mindfulness apps, which focus on users' mental health, providing guided meditation and mindfulness exercises, have become very popular. Calm and Headspace, two of the most popular mindfulness apps, have more than 7 million and 3 million monthly active iPhone users respectively. Calm was featured more than 150 times across multiple storefronts in the second and third quarters of 2021.[84] (See Figure 22.)

Figure 21: Launch of selected mindfulness and meditation apps since 2009

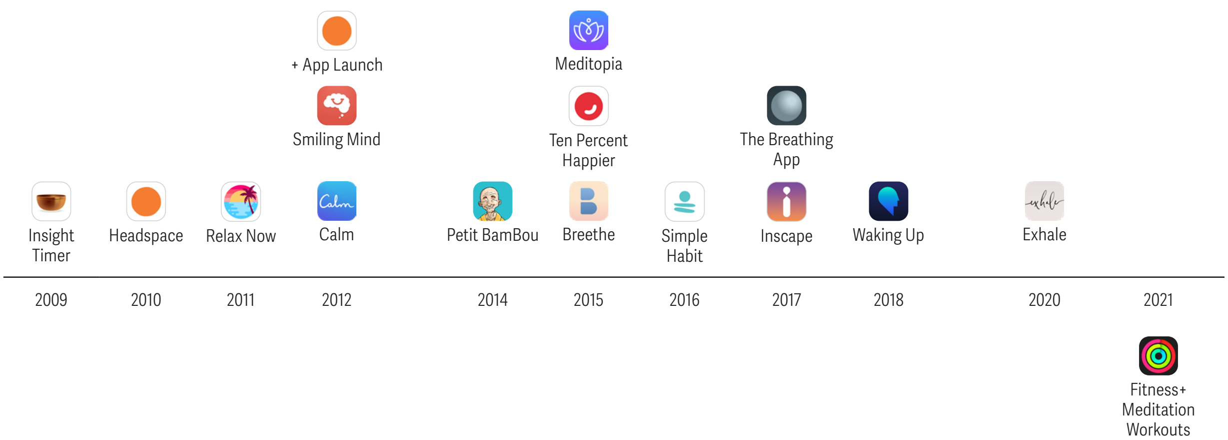
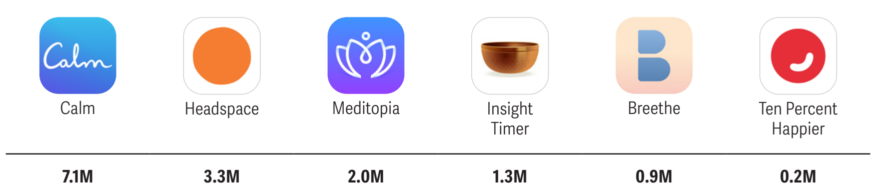


Figure 22: Monthly active iPhone users for select popular mindfulness apps



Source: data.ai data for iPhone users.

Headspace *(UK/US, 2010)* – Founded as a meditation events company in 2010, Headspace launched its app in 2012, and quickly became a global leader in meditation and mindfulness, and the second-most popular mindfulness app. Headspace has more than 70 million members and 2 million paying subscribers across 190 countries, and is available in English, German, French, Spanish, and Portuguese. The app's offerings include hundreds of guided meditations, sleep sounds, focus music, and, as of recently, yoga and other physical exercise classes. More than 2,500 companies – including Starbucks, Adobe, and Unilever – offer Headspace access to their employees as a health benefit.[85]

Others: Running, tracking, nutrition, and medical apps

Other popular apps help with nutrition tracking (e.g., MyFitnessPal, as well as Lifesum, another Editors' Choice award winner), health and activity logging and tracking (e.g., Flo and Fitbit), and running (e.g., Strava and Nike Run Club, also Editors' Choice award winners). There is also a wide range of medical apps, including MySugr, which help users manage diabetes.

While some of these apps are specialized, others have expanded to include more content and features. For instance, both Fitbit and Headspace recently expanded to offer guided workouts.[86] Similarly, Peloton, which started by selling connected spinning bikes, bringing spin classes into people's homes, has since expanded to offer a stand-alone app with spinning, strength training, boxing, yoga, and meditation classes.[87]

Additionally, many innovative health and fitness apps, such as diabetes management app BlueStar and cycle tracking app Flo, rely on Apple-developed HealthKit SDKs to provide advanced features.[88]

Games

Gaming on iOS devices is extremely popular, and users have the choice among thousands of popular apps.

Gaming on iOS devices has become increasingly popular, generating $60 billion in revenue worldwide in 2021 through in-app purchases, subscriptions, and advertising revenue.[89] iOS users can enjoy advanced graphics and gaming functionalities in apps supported by innovations in hardware and advanced developer tools developed by Apple, such as the Metal API and SceneKit SDK, which simplify the production of games.

(Built into App Store)

Apple's gaming subscription, Apple Arcade, is available in the App Store. Apple Arcade provides users with access to a catalogue of individual game apps for a monthly flat fee. Each app needs to be downloaded individually and has no ads or in-app purchases. Games available through Apple Arcade are developed by independent developers with backing from Apple. Apple Arcade is not yet available in China.

When it launched in September 2019, Apple Arcade included approximately 70 games; it now includes more than 200.[90] Despite this growth in its catalogue, Apple Arcade does not account for a substantial share of the overall gaming space. For example, the number of games on Apple Arcade is a tiny fraction of the number of games in the broader Games category on the App Store, which includes thousands of popular games. While a large number of iOS users play mobile games on their iPhone, research estimates that only a small share of them are paid subscribers of Apple Arcade.[91] As a result, Apple Arcade revenue is estimated to account for only a small portion of gaming revenues generated on iOS devices.[J,92]

In the growing category of subscription gaming services, GameClub started in late 2019, and Netflix Games launched in late 2021. These services allow users to download mobile games from the App Store.

Additionally, game titles that were traditionally played only on consoles and computers have become more widely available to smartphone and tablet users thanks to cloud gaming, which allows users to play games through mobile browsers on iOS.

Users can choose from thousands of games in over a dozen genres on the App Store, with many popular games – such as Candy Crush Saga and Subway Surfers – featured more than 100 times on the Today page.[93] More than 1,000 games have an average of more than 100,000 daily average iPhone users.[94] Gaming has become a significant part of the mobile experience – worldwide, users play between two and five mobile games every month, taking up 10% of their mobile screen time.[95]

J Research estimates that Apple Arcade's 2021 revenue was approximately $1.3 billion, compared to total revenues generated by iOS games of more than $60 billion.

Appendix C: Apps by major developers

Figure 23: Apps by major developers, selected apps

	Music streaming	TV & movie streaming	Reading	Podcasts	Cloud storage	Mapping	Email and calendar services	Communication
Apple	Music	TV	Books	Podcasts*	iCloud Drive (Built-in feature)	Maps*	Mail*, Calendar*	Phone, Messages, FaceTime*
Google	YouTube Music	YouTube, YouTube TV, Google Play Movies & TV, YouTube Kids	Google Play Books	Google Podcasts	Google Drive	Google Maps, Waze	Gmail, Google Calendar	Google Duo, Google Chat, Google Voice, Google Meet
Amazon	Amazon Music	Amazon Prime Video, Amazon Fire TV, Amazon Kids+, IMDb TV	Kindle, Audible, Amazon Kids+	Amazon Music	Amazon Drive, Amazon WorkDocs			Amazon Chime, Amazon Glow
Microsoft					OneDrive		Outlook	Microsoft Teams, Microsoft Kaizala, Skype, GroupMe
Tencent	QQ Music, Kugou Music, Kuwo Music	Tencent Video, Tencent Animation, Tencent Sports	WeChat Read, QQ Reader	QQ Music, Lazyaudio, Qi'e FM	Tencent Weiyun	Tencent Maps	QQ Mail	WeChat, Tencent QQ
Baidu	Qian Qian	iQiyi	Baidu Read		Baidu Wangpan	Baidu Maps		
Kakao	KakaoMusic, Melon	Kakaopage, KakaoTV	Kakaopage, Piccoma, KAKAO WEBTOON, Radish Fiction		Talk Drive	KakaoBus, KakaoMetro, Kakao Navi, KakaoMap	Kakao Mail, Talk Calendar, Daum Mail	KakaoTalk, Kakao Work
NAVER	NAVER VIBE, NAVER CLOVA, LINE Music	SERIES ON, NAVER TV, Juniver TV	Wattpad, NAVER Webtoon, SERIES, LINE Manga	Audioclip	NAVER MYBOX	NAVER Map	NAVER Mail, NAVER Calendar	BAND, BAND for Kids, LINE Messenger, NAVER Tok Tok

Note: This figure shows a subset of popular apps by major developers.

Appendix D: About the authors

Juliette Caminade, Ph.D., is a vice president at Analysis Group. Dr. Caminade specializes in the economic analysis of various antitrust issues and complex business disputes in multiple industries, including health care, pharmaceuticals, and consumer and industrial goods. Dr. Caminade's articles have appeared in publications such as the *Journal of Competition Law & Economics* and *The Antitrust Source*. Dr. Caminade has taught an undergraduate course on competition economics in the economics department of Dartmouth College.

Markus von Wartburg, Ph.D., is a vice president at Analysis Group. Dr. von Wartburg specializes in the application of econometric methods and microeconomic theory to complex problems in antitrust and competition, commercial litigation, media and telecommunications, finance, and intellectual property.

Analysis Group is one of the largest international economics consulting firms, with more than 1,000 professionals across 14 offices in North America, Europe, and Asia. Since 1981, Analysis Group has provided expertise in economics, finance, health care analytics, and strategy to top law firms, Fortune Global 500 companies, and government.

Appendix E: Sources and notes

1 InMobi, “Google I/O Keynote,” May 18, 2021.
2 TechTheLead, “2007–2018: How Far Has the iPhone Camera Come in a Decade?” November 1, 2018.
3 Apple 3.0, “Morgan Stanley: Spotify is huge in key demo. Apple Music is an also ran,” December 21, 2021.
4 Statista, “Digital Market Outlook.”
5 Statista, “Digital Market Outlook.”
6 Business Wire, “Global E-Book Market Report 2021: Growth, Trends, COVID-19 Impact, and Forecasts 2020–2026 – ResearchAndMarkets.com,” February 26, 2021; GlobeNewswire, “Global Audiobooks Market Outlook to 2027 – Impact of COVID-19,” October 14, 2020.
7 The Wall Street Journal, “The Rise of Phone Reading,” August 14, 2015.
8 Pew Research Center, “One-in-Five Americans Now Listen to Audiobooks,” September 25, 2019.
9 Alliance of Independent Authors, “Facts and Figures About Self Publishing: The Impact and Influence of Indie Authors,” June 22, 2020.
10 See, e.g., CNBC, “Pow! Bang! Slam! Indie Comics Go Digital,” March 11, 2014.
11 Statista, "ePublishing," 2021.
12 Ofcom, “Media Nations: UK 2021,” August 5, 2021; PiplSay Survey, “Pay TV vs. Streaming vs. Cinema: Who is Winning the War?” February 25, 2020.
13 PiplSay Survey, “Pay TV vs. Streaming vs. Cinema: Who is Winning the War?”
14 Statista, "Over-the-top (OTT) TV and video revenue worldwide from 2010 to 2026," May 27, 2021.
15 Across 46 countries representing over half the world’s population, around 70% of people access news via smartphone. Reuters Institute for the Study of Journalism, “Digital News Report 2021,” p. 25.
16 Reuters Institute for the Study of Journalism, “Digital News Report 2021,” p. 25.
17 IMARC Group, “Fitness App Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021–2026.”
18 Grand View Research, “Fitness App Market Size, Share & Trends Analysis Report By Type (Exercise & Weight Loss, Diet & Nutrition, Activity Tracking), By Platform (Android, iOS), By Device, By Region, And Segment Forecasts, 2022–2030,” January 2022.
19 YouTube, “Watching The Pandemic.”
20 CCS Insight, “Good Times for the Smart Wearables Market,” September 2, 2021.
21 Visartech, “Seven Hyper Casual Games to Build a Bridge to the Video Games Industry.”
22 Newzoo, “Newzoo Global Games Market Report 2021,” July 1, 2021.
23 NPD Group, “2020 Gamer Segmentation Report.”
24 SuperData, “2016 Year In Review,” December 2016, p. 5; SuperData, “2020 Year In Review,” December 2020, p. 6; Newzoo, “Global Games Market to Generate $175.8 Billion in 2021; Despite a Slight Decline, the Market Is on Track to Surpass $200 Billion in 2023,” May 6, 2021; data.ai, “2021 Gaming Spotlight: The Trends You Need to Know Across Mobile, Console, Handheld and PC/Mac Gaming,” June 15, 2021.
25 Forbes, “The Decline of the Native App and the Rise of the Web App,” April 5, 2019.
26 Apple Inc., 10-K filings.
27 Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “A Global Perspective on the Apple App Store Ecosystem: An Exploration of Small Businesses within the App Store Ecosystem,” June 2021.
28 Wired, “Apple Registers Trademark for ‘There's an App for That’,” October 11, 2010.
29 CNET, “Here are 5 ways Apple's App Store changed how we use smartphones,” July 10, 2018; Innospective, “The Smartphone Revolution: Why the App Store Was More Important Than the iPhone,” June 21, 2018; Platform Revolution, “How Apple Drank Its Own Kool-Aid And Created A Thriving Developer Ecosystem.”
30 Simform, “App Usage Statistics 2021 that’ll Surprise You (Updated),” January 5, 2021.
31 Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “A Global Perspective on the Apple App Store Ecosystem: An Exploration of Small Businesses within the App Store Ecosystem,” June 2021, pp. 4–5.
32 Apple, “Best of 2020: Get the Top Apps of 2020”; The Verge, “Microsoft Teams usage jumps to 145 million daily active users,” April 27, 2021; Statista, “Slack’s Customer Growth Accelerates During the Pandemic,” December 2, 2020.
33 According to data.ai, Signal and Telegram’s global average daily downloads jumped from 17,000 and 148,000 in December 2020 to 235,000 and 326,000 in January 2021, respectively. See also Nikkei Asia, “Asians Dump WhatsApp for Signal and Telegram On Privacy Concerns,” January 14, 2021; The Guardian, “Is It time to Leave WhatsApp—And Is Signal the Answer?” January 24, 2021; The Wall Street Journal, “WhatsApp, Signal, Telegram and iMessage: Choosing a Private Encrypted Chat App,” January 15, 2021.
34 data.ai.
35 TechCrunch, “Instagram’s Growth Speeds Up as It Hits 700 Million Users,” April 26, 2017.
36 data.ai.
37 We Are Social, Hootsuite, “Digital 2021 Global Overview Report,” January 27, 2021, pp. 150, 161.
38 Reuters, “Born from Japan disasters, Line app sets sights on U.S., China,” August 16, 2012; LINE, “Messenger App”; LINE, “LINE’s Philosophy”; LINE, “Services”; Naver Annual Report 2020, p. 22; The Korea Herald, “NHN renamed Naver after split,” August 1, 2013.
39 Kakao, “KakaoTalk, where people and the world come to get connected”; Wired Korea, “How Kakao Talk Won the Throne in South Korea”; Kakao Investor Relations, “Q4 2021 and Annual Earnings Results,” February 11, 2022, p. 3; Kakao, “KakaoTalk Customer Service.”

40 TechInAsia, "7 years of WeChat," January 20, 2018; Tencent, "Tencent Announces 2021 Third Quarter Results," November 10, 2021, p. 3; Business Insider, "This Chinese super-app is Apple's biggest threat in China and could be a blueprint for Facebook's future. Here's what it's like to use WeChat, which helps a billion users order food and hail rides," December 21, 2019; PYMNTS.com, "Now Available Through WeChat: Utility Bill Pay" August 26, 2014.

41 Statista, "Digital Market Outlook."

42 Think with Google, "Why marketers should care about the music industry's latest transformation," November 2020; YouTube Official Blog, "YouTube Music, a new music streaming service, is coming soon," May 16, 2018.

43 MIDiA, "Music Subscriber Market Shares Q2 2021," January 18, 2022.

44 Recording Industry Association of America, "Year-End 2020 RIAA Revenue Statistics," 2021.

45 Apple 3.0, "Morgan Stanley: Spotify is huge in key demo. Apple Music is an also ran," December 21, 2021.

46 data.ai.

47 Seeking Alpha, "Amazon Music Will Be A Game Changer," March 12, 2021; Music Ally, "Report claims YouTube Music is fastest growing music DSP," July 12, 2021.

48 MIDiA, "Music Subscriber Market Shares Q2 2021," January 18, 2022; 9 to 5 Mac, "Apple Music is the second most used music streaming service—but still far behind Spotify," January 19, 2022.

49 iiMedia Research, "Number of monthly active users (MAU) of the leading music streaming apps in China as of September 2021 (in millions)," December 2021; Billboard, "Tencent Music Partners With Apple Music on Global Streaming," November 2021.

50 Deezer, "About Deezer"; Deezer, "Press."

51 Pandora, "About Pandora"; Pandora, "Music and Podcasts, Free and On-Demand"; Variety, "Sirius XM Completes Acquisition of Pandora," February 1, 2019.

52 KuGou, "Company Profile"; Tencent Music Entertainment, "Our Business"; TechCrunch, "Tencent Music now has joint labels with all 'big three' record labels," March 22, 2021; iiMedia Research, "Number of monthly active users (MAU) of the leading music streaming apps in China as of September 2021 (in millions)," December 2021.

53 The Korea Times, "YouTube Music emerges as leading streaming platform in Korea," January 17, 2022; KpopStarz, "Korean Streaming Platform FLO Under Fire after Songs by Artists Including BTS and IU were Excluded from the Chart," July 2, 2021. See also Music Ally, "Music's global evolution: K-Pop, China, and Eastern Europe," January 20, 2020.

54 eMarketer, "People Continue to Rely on Maps and Navigational Apps," July 18, 2019.

55 data.ai.

56 data.ai.

57 Alibaba Cloud, "Amap"; TNW, "Alibaba acquires Chinese mapping giant AutoNavi in $1.5bn deal," April 11, 2014; After Market News, "Amap selects here for global map and traffic data," January 9, 2020.

58 Go! Go! Hanguk, "All the Apps You Need While in Korea!" May 27, 2020; ZDNet, "Kakao launches map service with 3D sky view," September 18, 2016.

59 Statista, "Over-the-top (OTT) TV and video revenue worldwide from 2010 to 2026," May 27, 2021.

60 The Washington Post, "Amazon merger with MGM bolsters its Prime ambitions," May 27, 2021; Business Insider, "Stan is beefing up its original content to more than 30 productions a year for the next five years," August 24, 2020; The Jakarta Post, "BBC plans expanded iPlayer to compete with streaming giants," April 27, 2019.

61 eMarketer, "Amazon's Move to One-Day Shipping Propels Sales," March 1, 2020.

62 data.ai.

63 Rankings based on time in app are similar to rankings based on daily active iPhone users. data.ai.

64 ESPN+ is a popular sports streaming service, but the ESPN app also includes written news and analysis, as well as score checking, so we exclude it from this analysis. The ESPN app ranks much lower for time use than daily active users, suggesting that its other features are used more than streaming.

65 Disney+, "Getting started with Disney+"; Business Insider, "Disney Plus: All your questions answered about Disney's ad-free streaming service," December 27, 2021.

66 Peacock TV, "Choose a Plan"; PC Mag, "Peacock Review," 2021.

67 Foxtel, "Watch anywhere, anytime with the Foxtel Go app"; Foxtel, "Choose from popular Bundles"; Canstar Blue, "Foxtel Go Review & Guide," October 1, 2022.

68 data.ai.

69 Wattpad, "Write Better: Tips and Tricks—Chapter Length."

70 Wattpad, "Hi. We're Wattpad."

71 Wattpad, "Hi, we're Wattpad. The world's most-loved social storytelling platform"; The Verge, "Next Gen Favorites: Wattpad," July 26, 2021; The Verge, "From Fanfiction to Netflix Hits," January 14, 2021; Wattpad Company, "Naver Completes Wattpad Acquisition," May 10, 2021.

72 Reuters Institute for the Study of Journalism, "Digital News Report 2021," p. 26.

73 Reuters Institute for the Study of Journalism, "Digital News Report 2021," pp. 62, 112.

74 In 2021, Facebook reached agreements in France and Australia to begin paying newspaper publishers for resharing their content on its platform. Facebook, "Facebook France et l'Alliance de la presse de l'information s'associent pour renforcer l'expérience de l'actualité pour les utilisateurs et les éditeurs en France," October 21, 2021; TechCrunch, "Facebook agrees to pay French publishers for news reuse," October 21, 2021.

75 As of 2021, the Reuters Institute for the Study of Journalism estimates that more than 40% of people in the US and UK get their news from social media, and that one-third of global users under 35 list social media as their primary source of online news. A 2020 survey by the Pew Research Center found that 53% of US adults get their news from social media "sometimes" or "often." A 2021 report by Ofcom found that 49% of adults people in the UK follow the news using social media. Reuters Institute for the Study of Journalism, "Digital News Report 2021," pp. 25, 62, 112; Ofcom, "News Consumption in the UK: 2021," July 27, 2021, p. 2; Pew Research Center, "News Use Across Social Media Platforms in 2020," January 12, 2021.

76 Based on a sample of twelve countries: the US, UK, Germany, France, Spain, Italy, Ireland, Denmark, Finland, Japan, Australia, and Brazil. Reuters Institute for the Study of Journalism, “Digital News Report 2021,” p. 22.

77 data.ai.

78 Reuters Institute for the Study of Journalism, “Digital News Report 2021,” pp. 10, 15.

79 data.ai.

80 Journal of Medical Internet Research, “Determinants of Fitness App Usage and Moderating Impacts of Education-, Motivation-, and Gamification-Related App Features on Physical Activity Intentions: Cross-sectional Survey Study,” July 13, 2021.

81 data.ai.

82 data.ai.

83 Startupdaily, “Fitness app founder Kayla Itsines sells Sweat for $400 million,” July 15, 2021.

84 data.ai.

85 Headspace, “About Headspace”; TechCrunch, “Headspace raises $93 million in equity and debt as it pursues clinical validation for mindfulness,” February 12, 2020.

86 Business Wire, “Fitbit Launches Fitbit Premium, New Health and Fitness Subscription Service,” August 28, 2019; Metro UK, “This mindful cardio workout could help strengthen both your body and your mind,” February 29, 2020.

87 The New York Times, “Peloton is a Phenomenon. Can It Last?” August 28, 2019; Bicycling, “Peloton Expands Its App To Include More Workouts,” June 21, 2018.

88 Apple App Store, “BlueStar Diabetes”; Apple App Store, “Flo.”

89 Omdia estimates $19 billion in iOS advertising sales from iOS games, and Newzoo estimates $41 billion in iOS app and in-app revenue. Newzoo, “2021’s Mobile Market: Almost Four Billion Smartphone Users, $90.7 Billion in Game Revenues & Huge Changes to Come,” September 23, 2021; Omdia, “App Ecosystems Forecast 2020–2025,” February 11, 2021.

90 The Sydney Morning Herald, “Apple Arcade reviewed: our thoughts after two weeks,” October 4, 2019; Apple, “Apple Arcade.”

91 Evercore estimated that Apple Arcade revenue was $1.3 billion in 2021 and would be $2.2 billion in 2022, equivalent to 26–44 million annual subscribers at a $49.99 annual subscription rate; Evercore, “EVR Monthly App Store Update: Services Upside Ahead?” December 1, 2020. In January 2021, Apple announced that there were over 1 billion active iPhones; Reuters, “Apple sees revenue growth accelerating after setting record for iPhone sales, China strength,” January 27, 2020. Statista estimates that worldwide mobile game penetration was 23.9% in 2021; Statista, “Digital Market Outlook.”

92 Evercore, “EVR Monthly App Store Update: Services Upside Ahead?” December 1, 2020; Newzoo, “2021’s Mobile Market: Almost Four Billion Smartphone Users, $90.7 Billion in Game Revenues & Huge Changes to Come,” September 23, 2021; Omdia, “App Ecosystems Forecast 2020–2025,” February 11, 2021.

93 data.ai.

94 data.ai.

95 data.ai, “State of Mobile Games: Robust Growth in 2019 & Beyond.”