UNIVERSIDADE CATÓLICA PORTUGUESA

Spotify vs. Apple: A Battle of Titans

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Católica Porto Business School
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by

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under orientation of
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To my mum, who each day teaches me to be the best person I can be. Thank you for always comforting my heart and for reminding me that there is nothing I cannot do. Your strength and your pure soul inspire me every day.

To my dad, for always supporting me and for being my comrade. You bring joy to my life and cheer up my days in a way that only we can understand. Thank you for always having my back. To that I say "Alright, alright, alright".

To my best friends, for always being by my side and for believing in everything I do.

Abstract

Over the last decades, we have witnessed a drastic change in our habits and routines, mainly due to the growth of digital markets and technologies. Digital markets are, for this reason, more and more under the scrutiny of competition authorities, aiming at protecting consumer interests and ensuring fair competition. Problems arise when tech giants with gatekeeper positions, like Apple, start acting regardless of the other market participants, often abusing their dominant position.

Spotify raised a case against Apple in 2019 regarding its conduct on the App Store. The allegations encompassed the commission associated with the use of Apple's in-app payment system and the lack of viable alternatives offered to app developers that opt to disable the payment system. Furthermore, Spotify complained that Apple repeatedly rejects its app updates and enhancements while favouring its apps (e.g., Apple Music). Spotify stated that Apple was abusing its dominant position, hence breaching Article 102 TFEU, and the European Commission is now investigating this case.

We concluded that Apple seems to be, indeed, abusing its dominant position and attempting to foreclosure competition by applying different rules to app developers that offer similar services and for squeezing their margins. Apple's monopoly position allows it to act in a discriminatory way, favouring its own services.

Keywords: Digital Markets, Apple, Spotify, Gatekeeper, Abuse of Dominant Position.

Resumo

Nas últimas décadas, assistimos a uma mudança drástica nos nossos hábitos e rotinas, principalmente devido ao desenvolvimento tecnológico e ao crescimento dos mercados digitais. Os mercados digitais estão, assim, cada vez mais sob o escrutínio das autoridades de concorrência, que visam proteger os interesses dos consumidores e garantir uma concorrência justa. Os problemas surgem quando gigantes da tecnologia com posições de *gatekeeper*, como a Apple, começam a agir independentemente dos outros participantes de mercado, muitas vezes abusando da sua posição dominante.

O Spotify abriu um processo contra a Apple em 2019 por causa da sua conduta na App Store. As alegações incluem a comissão associada ao uso do sistema de pagamento dentro das aplicações da Apple e a falta de alternativas viáveis oferecidas aos *developers* que optam por desativar o referido sistema de pagamento. Além disso, o Spotify reclamou que a Apple rejeita repetidamente as suas atualizações e melhorias na aplicação, enquanto favorece as suas próprias aplicações (por exemplo, Apple Music). O Spotify acusou a Apple de estar a abusar da sua posição dominante, violando, portanto, o artigo 102.º do TFUE. A Comissão Europeia está a investigar o caso.

Na presente dissertação, concluímos que a Apple parece estar, de facto, a abusar da sua posição dominante e a tentar excluir a concorrência, aplicando regras diferentes a *developers* de aplicações que oferecem serviços semelhantes e esmagando as suas margens. A posição de monopólio da Apple permite que esta atue de forma discriminatória, favorecendo os seus próprios serviços.

Palavras-chave: Mercados Digitais, Apple, Spotify, Gatekeeper, Abuso de Posição Dominante.

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Introduction

The world has been getting more and more digital over time, with fast developing technology and easy access to it. Digital markets are increasingly being controlled by tech giants who offer the most desired, high-end services. The music streaming industry has been growing rapidly and Spotify is a global leader, with 35% of market share, globally. It concentrates 345 million users and, in 2019, it had revenues of around $7.3 billion. Similarly, the mobile operating system market has been gaining relevance over time, with 204 billion mobile app downloads between the Apple and Google app stores, in 2019, which represented a 45% increase since 2016. Apple is the only iOS provider globally and it generated $274.5 billion in revenues in the 2020 fiscal year. According to a Piper Jaffray analyst, Apple's service business was worth $502 billion, in 2019. In that same year, the App Store alone reached $54.2 billion in total revenue.

Both Spotify and Apple have clear market power and there are not many competitors in their respective markets. These businesses involve a significant cut of consumers in both markets and produce considerable revenues, meaning that it is imperative that regulators pay attention to their practices.

In 2019, Spotify raised a case against Apple in the European Commission, alleging that Apple abused its dominant position. A firm's dominant position is related to a favourable position of economic strength that allows it to prevent effective competition, behaving regardless of its competitors and customers. Market dominance is allowed by competition law, as long as it is attained fairly,

and it does not cause any harm to competitors or consumers; what is prohibited is the abuse of this position. Dominant firms have special responsibilities towards the market and Article 102 of the Treaty on the Functioning of the European Union legislates those responsibilities, along with other obligations. According to this article, dominant firms are prohibited of imposing unfair trading conditions, limitating markets to the prejudice of consumers and applying dissimilar conditions to equivalent transactions.

Amongst other complaints, Spotify accused Apple of charging a discriminatory 30% fee for in-app payments in the App Store, while making it unviable for app developers to opt for alternatives. Spotify also complained that Apple restricted communication between developers and end-users and repeatedly rejected third-party apps' enhancements in the App Store. This dissertation aims to analyse the case, considering both Spotify's complaints and Apple's defence. Additionally, it focuses on understanding the existing literature on the subject and assessing whether the current data suggests abuse of dominant position from Apple.

The methodology chosen to address this research agenda consists of first characterizing the sectors in which Spotify and Apple operate, accompanied by an in-depth study of the main concepts on the matter. There is a big debate on the literature on whether competition policy in digital markets must follow the same paradigms as in 'traditional' markets, as the standard analysis of anticompetitive practices may not apply to these markets (Evans, 2013). Digital markets are characterised by being multi-sided markets that connect two (or more) groups of customers which rely on each other to benefit from being on a specific market: the more participants on one side of the market, the more the other side benefits, due to network effects (Evans and Schmalensee, 2013). Therefore, it is necessary to consider these effects and the interdependent demand when analysing these markets.

Then, we briefly reviewed cases of abuse of dominant position analysed by the European Commission, in which the defendants were, similarly, tech giants. In one case, Google was found guilty of abusing its dominant position by favouring its comparison shopping service in its general search results page, hence diverting traffic to its own benefit. In turn, the allegations against Microsoft encompassed its refusal to provide other developers with the necessary information to produce software compatible with Windows. The allegations also addressed the Windows Media Player integration with Windows operating system and how it harms competition in the streaming media player market. Both cases resulted in historical, never-before-seen fines against the giants.

Finally, we present a discussion in which our main goal was to gather all the information displayed throughout the dissertation and conclude whether Spotify's complaints are justified. Given the information we have at our disposal, Apple appears to be abusing its dominant position. Then, we suggest some remedies and recommendations that Apple the European Commission could make if it finds Apple guilty.

Chapter 1
Industry Analysis

1. Apple

1.1 Brief Description

Apple Inc. was founded by Steve Jobs, Steve Wozniak and Ronald Wayne in April 1976. In 2018, Apple became the first US company to have a value of over $1 trillion, and in August 2020, $2 trillion. In January 2020, Apple had more than 1.5 billion products actively in use, worldwide, and it was the world's biggest tech company (in terms of revenue).

Apple designs, produces and sells mobile communication devices, personal computers, music, media portable devices and accessories (like headphones and Beats products), as well as develops and provides services, digital content, applications and software.

It is important to consider two relevant concepts: mobile application (app) stores and mobile operating systems (OS). **Mobile application (app) stores** are digital stores where software developers can distribute their apps to mobile device users (Nadler and Cicilline, 2020). Developers upload their apps to the app stores and users are able to download and install them. The apps can be either free or paid. When apps are paid, mobile app stores charge a fee on sales.

The industry standard for this commission is 30%, which was established for the first time by Apple, in the App Store, in 2009 (Nadler and Cicilline, 2020).

App stores set rules on what types of apps are allowed, the behaviour of app developers, payment processes and on how revenues are shared between the app store and developers. Users like the apps to be in an app store, as this gives them a feeling of trust and security - since the apps they will download have all been reviewed (Nadler and Cicilline, 2020). On the other hand, app developers also benefit from being on the app store since they will be able to reach large user bases. Besides, an app store ensures a secure platform for their apps, trustworthy payment systems and are provided with software-development tools and support (Nadler and Cicilline, 2020).

In turn, a **mobile operating system (OS)** defines specific features of a mobile device, such as interface, motion commands and button controls (Nadler and Cicilline, 2020). It is pre-installed on devices, it cannot be replaced, and it limits the kind of app store and apps that a user can operate on a device. There are high switching costs in the mobile OS market, since, besides the cost of acquiring a new device, users would have to get used to different interfaces and configurations. In 2019, SellCell's survey[1] showed that over 90% of iPhone users would buy another Apple device, in the moment of replacing their old one. Additionally, users tend to own other smart devices that are made to work specifically with their OS.

In January 2021, according to StatCounter, the iOS had the second-largest market share in Europe, following Android[2].

[1] Data collected on 20/11/2020 from https://www.sellcell.com/blog/iphone-vs-android-cell-phone-brand-loyalty-survey-2019/

[2] Data collected on 24/02/2021 from https://gs.statcounter.com/os-market-share/mobile/europe

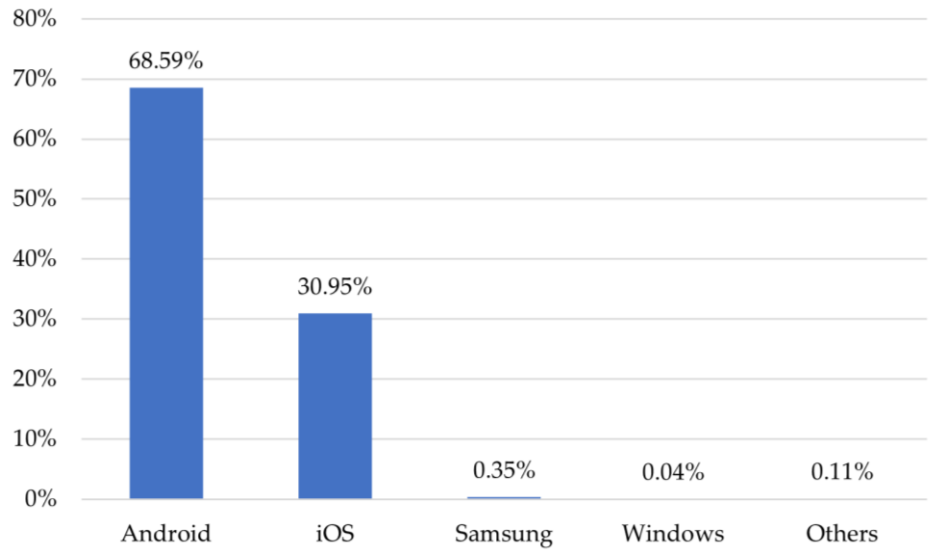

Figure 1: Mobile operating system market share in Europe in January 2021
Source: own elaboration with data from StatCounter[3]

Apple is the only company that produces iOS devices, and it does not provide third-party developers with licencing of iOS, hence having control of this ecosystem (Geradin and Katsifis, 2020).

Apple constructs its financial reports for two business categories: Products and Services.[4] Apple's main source of income comes from the selling of products – which generated $220.75 billion in revenue in 2020. Among the Products' segment, one may highlight[5]:

- **iPhone:** line of smartphones, based on the iOS operating system. Apple's remarkable growth is mainly attributed to iPhone's consistent sales over the years. In 2019, it was the second most sold smartphone in the world (only after Samsung), having generated $142.3 billion in net sales.

[3] Data collected on 20/02/2021 from https://gs.statcounter.com/os-market-share/mobile/europe
[4] Data collected on 04/01/2021 from https://market.us/statistics/smartphone-brands/apple/
[5] Products appear in order of relevance (weight in revenue).

- **Mac:** line of personal computers (both desktop and portable), including several models of iMac, Mac mini and Macbook. These are based on its macOS operating system.
- **iPad:** line of tablets, including iPad, iPad mini and iPad Pro, all based on the iOS operating system.
- **iPod:** line of portable media players, including iPod Classic, iPod Touch, iPod Mini, iPod Nano and iPod Shuffle

Other products Apple offers are: **Apple TV**, **Apple Watch** (with 50% market share for wearables in 2018) and the **HomePod,** as well as accessories.

Services and digital content are Apple's other operating segment, representing the second greatest source of income, having generated $53.78 billion in 2020. More precisely[6]:

- **App Store:** allows customers to download apps and acquire in-app content in their iOS devices.
- **Apple Music:** Apple's music streaming service, offering on-demand music and radio stations.
- **Apple Pay:** an easy, contactless, and secure payment service available in some countries, compatible with all types of both debit and credit cards.
- **Apple TV:** customers can stream TV and movies, as well as download or purchase them.
- **AppleCare:** Apple's assistance service that provides extended warranty and technical support.
- **iBooks Store:** available for iOS and macOS devices, it allows Apple users to read e-books from big publishers worldwide.
- **iCloud:** a storage service, available for iOS, macOS and Windows devices, and Apple TV.

[6] Services and digital content appear in alphabetical order, as no data was found regarding weight in revenue.

- **iTunes Store:** available for iOS and macOS devices and Windows computers, it is the world's largest music retailer.
- **Mac App Store:** available for Mac computers, allows customers to download Mac apps.
- **Tv App Store:** customers can download apps and games for Apple TV.

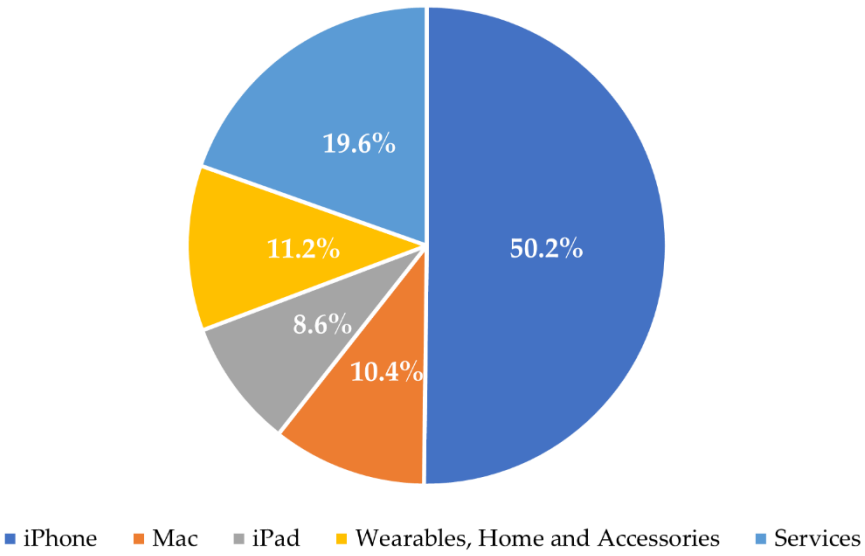

Figure 2: Operating segment by weight in revenue in 2020
Source: own elaboration with data from Statista[7]

1.2. Competitors

Despite Apple's position as one of the most valuable companies in the world and its clear global success among tech companies, there are many well-established firms that represent serious competition to the Californian enterprise. Most rivals are present both in the smartphone and personal computers (PC) markets.

[7] Data collected on 20/02/2021 from https://www.statista.com/statistics/382136/quarterly-segments-revenue-of-apple/.

1.2.1. Competitors in the smartphone segment

As we can see in Figure 3, Apple's main competitors in the smartphone segment are Samsung, Huawei, Xiaomi and Oppo.

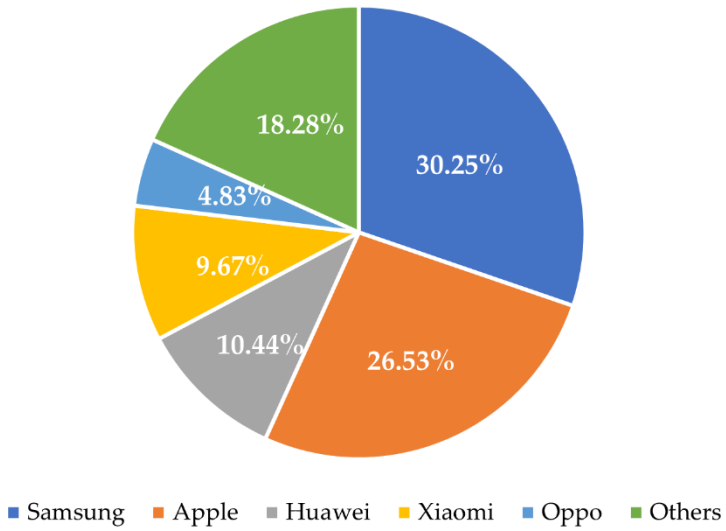

Figure 3: Mobile vendor market shares worldwide in 2020
Source: own elaboration with data from StatCounter[8]

Samsung

Founded in Korea in 1938, Samsung is Apple's biggest competitor in the smartphone segment, positioned as the largest smartphone company, with 30.25% of market share in 2020, worldwide, according to StatCounter. In Europe, Samsung had 32.96% market share, as of January 2021. In this segment, Apple possesses 26.53% of share worldwide and 30.95% in Europe.

Samsung is present in 74 countries and competes with Apple in almost of all its divisions. In 2019, Samsung reported $197.7 billion in revenues.

[8] Data collected on 20/02/2021 from https://gs.statcounter.com/vendor-market-share/mobile

Huawei

Huawei is a Chinese multinational company that commercializes smartphones, tablets, portable computers and smart audio and screens. Founded in 1987, it operates in 170 territories, and, in 2019, it generated $123 billion in revenues. It owns 10.44% of market share worldwide, in the smartphone segment, while owning 15.65% share in Europe.

Xiaomi

The Chinese Xiaomi manufactures and sells smartphones and other smart devices and is currently present in 90 territories. In 2019, it generated $73.8 billion revenues, and smartphones accounted for 61.1% of that value. Xiaomi is the fourth largest smartphone vendor worldwide, with 9.67% of market share, possessing a similar market share of 9.56% in Europe.

Oppo

Oppo commercializes smartphones and other electronic devices and is present in 40 countries. Founded in China, it is the world's fifth smartphone vendor and possesses 4.83% of market share.

In Europe, the market configuration is slightly different from the worldwide scenario depicted in Figure 3. In particular, Oppo is not amongst the top vendors and two other vendors, Motorola and LG, have more expressive market shares.

Motorola

Motorola Inc is an American multinational company that produces digital devices. It owns 1.4% market share in Europe in the smartphone segment.

LG

LG Corporation is a South Korean conglomerate that commercializes several different technology products, including smartphones and portable computers. It owns 1.3% market share in the smartphone segment in Europe.

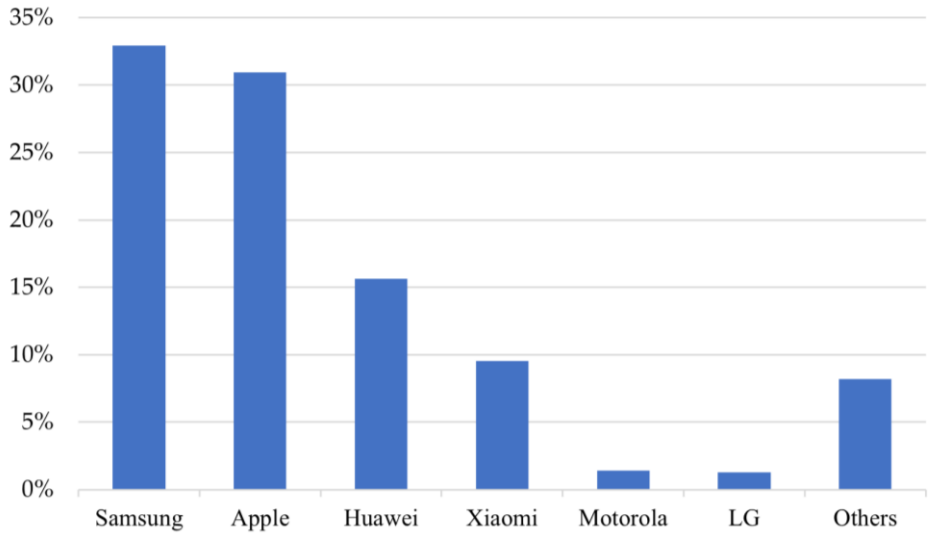

Figure 4: Mobile vendor market share in Europe in January 2021
Source: own elaboration with data from StatCounter[9]

1.2.2. Competitors in the PC segment

As seen in Figure 5, Apple's main competitors in the PC segment are Lenovo, HP, Dell, Acer and Asus.

[9] Data collected on 20/02/2021 from https://gs.statcounter.com/vendor-market-share/mobile/europe

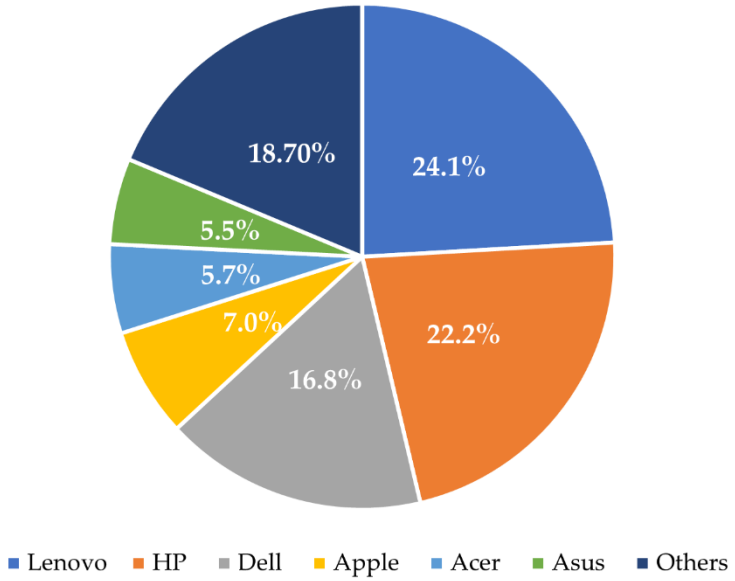

Figure 5: PC market share worldwide in 2019
Source: own elaboration with data from What Competitors[10]

Lenovo

Lenovo is a Chinese tech company founded in 1984 and is the world's largest PC vendor, with 24.1% in market share in 2019. In this segment, Apple is the fourth player with 7% of share.

HP

Created in 1939 in Palo Alto, California, HP is the second largest PC vendor, with 22.2% market share. It generated $58.7 billion revenue in 2019.

Dell

Dell is an American company that sells software and hardware and operates in over 80 territories. In 2019 it generated revenues of $92 billion and owned 16.8% of market share.

[10] Data collected on 20/02/2021 from https://whatcompetitors.com/apple/

Acer

Acer is a hardware and electronics technology company, founded in Taiwan. In 2019 it possessed 5.7% of market share.

Asus

Created in Taiwan in 1989 by four former engineers from Acer, it manufactures computers and other related devices. In 2019 it possessed 5.5% market share, making Asus the world's sixth largest PC vendor.

Microsoft

Created in 1975 by Bill Gates and Paul Allen in the U.S., Microsoft competes with Apple in the devices segment and in software and app development. It is one of the third-largest technology corporation in the world (falling behind Apple and Samsung), having generated revenue of $25 billion in 2019.

1.2.3. App stores – iOS vs. Android

According to app analytics firm App Annie,[11] in 2019 consumers downloaded 204 billion apps globally. This number was a new record, representing a 6% increase from 2018 and a 45% increase since 2016. This record may be attributed to the growth of markets like China, which grew 80% in 2019. At the same time, mature markets like the U.S., Japan and South Korea still show large numbers of downloads, with 12.4 billion, 2.5 billion and 2 billion, respectively. In the same year, $120 billion were spent on in-app acquisitions.

In the first quarter of 2020, there were around 1.85 million apps in the App Store, while there were approximately 2.56 million apps available in the Google Play Store, according to Statista. Nadler and Cicilline (2020) point out that these

[11] Data collected on 18/12/2020 from https://www.appannie.com/en/

app stores do not compete against each other, since users of each mobile OS can only access their respective app store.

In Q3 2020, App Store's revenue grew 31% year-on-year, increasing from $14.5 billion to $19 billion, according to Sensor Tower. In the same period, Google Play's revenue only rose to $10.3 billion, increasing 33.8% since Q3 2019.

According to App Annie, in August 2020, 74.25% of the global total devices were Android devices, while only 25.15% were iOS. The Android's market share has been decreasing year-on-year, as in August 2019, it represented 76.23% of the global share.

App Annie stated that in 2020, five in every seven downloads came from the Google Play Store (Androids). However, in 2019, Apple's App Store broke a record, reaching a total revenue of $54.2 billion, almost the double as Google Play Store's revenue in the same year.

In Europe, consumers spent about $14.8 billion across the App Store and Google Play in 2020, according to Sensor Tower.[12] In the same year, the U.K. produced $1.9 billion in App Store revenues, representing the App Store's largest share of revenue in the region. It accounted for 23.4% of all user spending on the App Store.

The App Store has a clear advantage over Google's, has the latter is not available in China. Notice that China represents a major part of the mobile market and in 2016 it originated more revenue in the App Store than the U.S. However, regarding the Android market, a few Chinese giants come into the picture, such as Tencent with the MyApp marketplace, holding almost 26% of Android market share in May 2020, according to Statista.[13] Next on the top list of

[12] Data collected on 20/02/2021 from https://sensortower.com/blog/european-app-revenue-and-downloads-2020

[13] Data collected on 16/01/2021 from https://www.statista.com/statistics/1058612/china-android-app-store-market-share/

Android App Stores in China comes Huawei App Market with around 15% share, and Oppo Software Store with more than 10%.

Over the years, Apple has presented the highest values of revenue, when comparing to two of its most direct competitors and tech giants, Google and Microsoft.

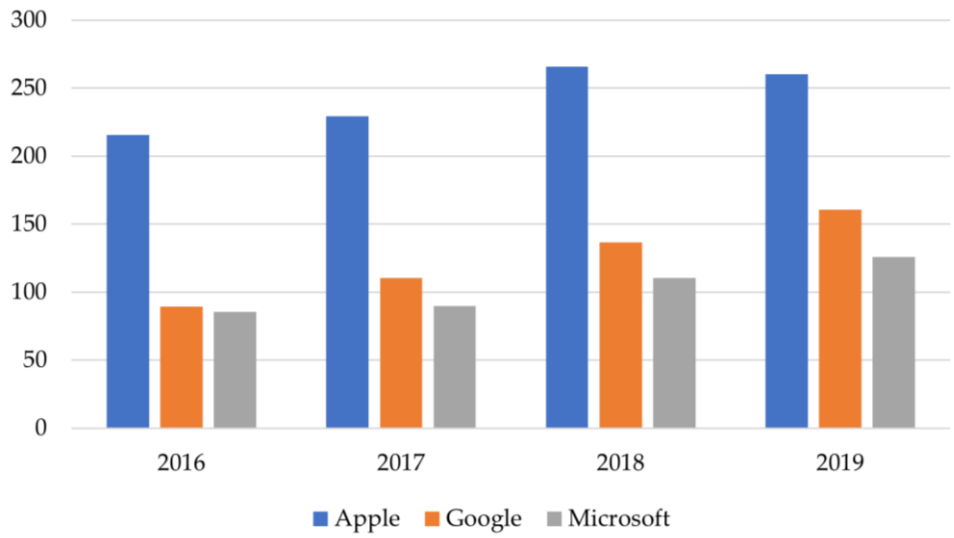

Figure 6: Revenue comparison of Apple, Google and Microsoft, 2016-2019 (billion US dollars)
Source: own elaboration with data from Statista[14]

Apple charges an annual fee of $99 to all free and paid apps.[15] It then charges a 30% commission to transactions of paid apps and/or in-app purchases (such as subscriptions, upgrades to premium content, game levels, among others). In 2016, Apple established that this 30% commission should decrease to 15% after one year of subscription. The Google Play Store applies the same set of rules as

[14] Data collected on 16/01/2021 from https://www.statista.com/statistics/234529/comparison-of-apple-and-google-revenues/

[15] Data collected on 20/01/2021 from https://developer.apple.com/support/purchase-activation/#:~:text=The%20Apple%20Developer%20Program%20annual,currency%20during%20the%20enrollment%20process.

the App Store; however, it only charges a $25 one-time fee for developers to open an account. After paying that fee, developers can upload their apps for free.[16]

1.3. Geographics

Apple currently owns 510 physical stores ("Apple Stores"), located across 25 countries and regions;[17] the (virtual) App Store is present in 175 countries; and Apple Music reaches 167 countries.[18]

Apple segments the market into 5 different business regions:[19]

- Americas (region composed of North and South America)
- Europe (includes European countries, India, the Middle East and Africa)
- Greater China (includes China, Taiwan and Hong Kong)
- Japan
- Rest of Asia Pacific (includes Australia and other Asian countries not included in the previous segments).

The distribution of Apple's profit in 2020 by region is presented in Figure 7.

[16] Data collected on 18/02/2020 from https://appinventiv.com/blog/how-to-submit-app-to-google-play-store/#:~:text=There%20is%20a%20one%2Dtime,your%20name%2C%20country%20and%20more.

[17] Data collected on 16/01/2021 from https://www.macrumors.com/roundup/apple-retail-stores/

[18] Data collected on 10/01/2021 from https://www.apple.com/newsroom/2020/04/apple-services-now-available-in-more-countries-around-the-world/

[19] Data collected on 10/01/2021 from https://www.investopedia.com/articles/markets/031316/apples-5-most-profitable-lines-business-aapl.asp

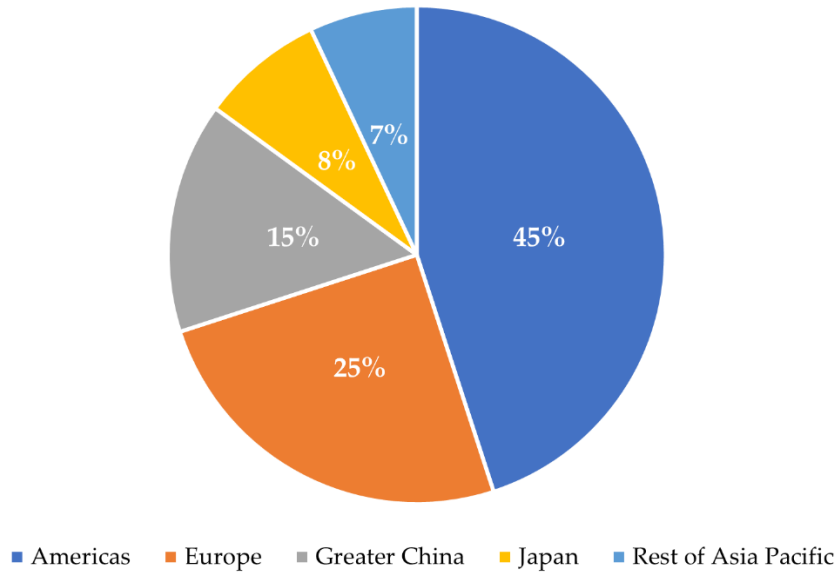

Figure 7: Region contribution to profit in 2020
Source: own elaboration with data from Statista[20]

Americas, the region that contributes the most to Apple's revenue, generated, in 2020, $124.54 billion revenues to Apple. In 2019, this region's revenue was of $116.92 billion, which represented 45% of the total. Europe, the second largest contributor to Apple's revenues, reached a revenue of $68.63 billion, which corresponded to a slight increase in Europe's market share when compared to 2019 (where the region's revenue accounted for 23% of the total). Greater China's revenue accounted for 15% and 17% of the total, in 2020 and 2019, respectively. Japan's revenue reached $21.42 billion in 2020 and $21.50 billion in 2019, representing 8% of the total in both years. The country is the fourth largest contributor to the company's global revenue. *Rest of Asia Pacific* produced revenues of $19.6 billion in 2020, which represented 7% of the total. In 2019, even though it only reached $17.80 billion, it also accounted for 7% of total.

[20] Data collected on 18/01/2021 from https://www.statista.com/statistics/382175/quarterly-revenue-of-apple-by-geograhical-region/

1.4. Sales and Revenue

In the 2020 fiscal year (from October 2019 to September 2020), Apple's revenue reached a total of $274.52 billion, which represented an increase when compared to 2019, when it had revenues of $260.17 billion. In 2018, Apple registered $265.6 billion in revenue. Figure 8 shows the company's revenue evolution.

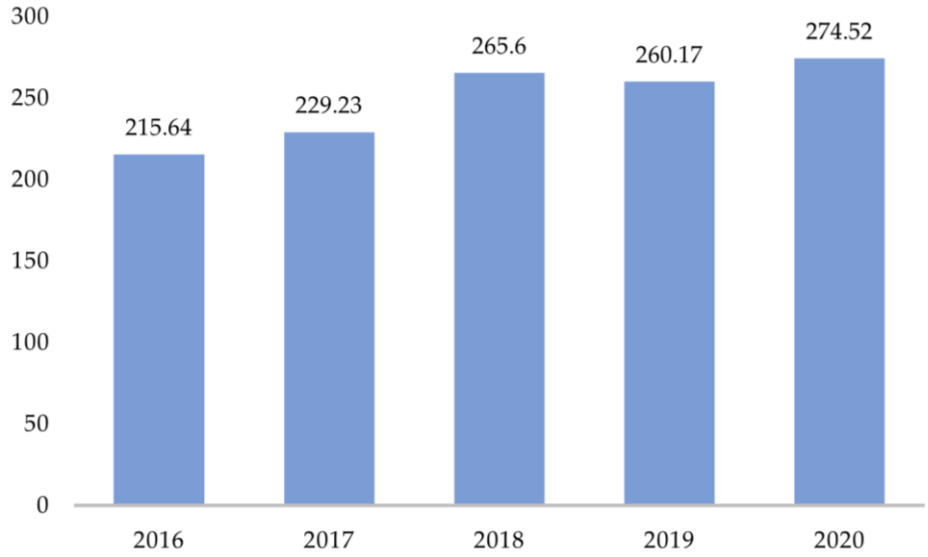

Figure 8: Apple's global revenue 2016-2020 (in billion US dollars)
Source: own elaboration with data from Statista[21]

The iPhone is consistently the company's main source of revenue, accounting for 62% of total revenue in 2018, 55% in 2019 and 50% in 2020. The iPhone's weight on the company's revenue has been decreasing over the last years, while the weight of the Mac, iPad and Wearables, Home and Accessories segments have been slightly increasing. However, the overall products sale still remains Apple's greater slice of revenue, by a large margin, accounting for 85.5% of 2018's total revenue, 82.2% of 2019's total and 80.4% of 2020's. Nonetheless, services have become increasingly important over the last years, slowly gaining share –

[21] Data collected on 06/12/2020 from https://www.statista.com/statistics/265125/total-net-sales-of-apple-since-2004/

14% in 2018, 18% in 2019 and 20% in 2020. In May 2019, a Piper Jaffray analyst assessed the value of each Apple's business, having estimated that the hardware business was worth $398.8 billion, while its service business had evolved so much, that it was worth $502 billion.

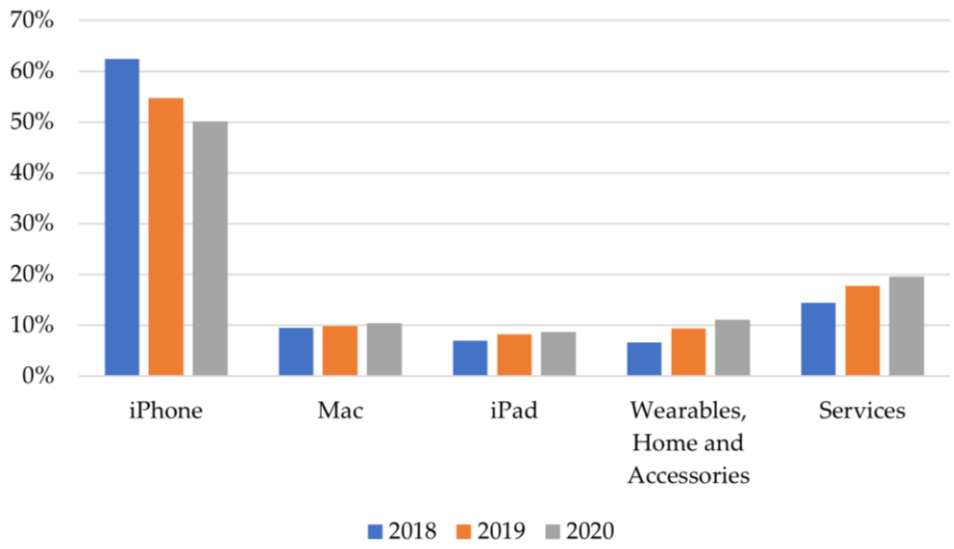

Figure 9: Share of the revenue generated by operating segment on total revenue, 2018-2020
Source: own elaboration with data from Statista[22]

2. Spotify

Founded in 2006 in Stockholm by Daniel Ek and Martin Lorentzon and launched in 2008, Spotify is the largest music streaming platform (in terms of subscribers) in the world.

One of the initial purposes of this streaming service was to fight the ever-growing music piracy that existed in the early 2000s. Since then, it has, without a doubt, transformed the experience of listening to music by providing the users a whole new level of accessibility and personalization.

[22] Data collected on 06/12/2020 from https://www.statista.com/statistics/382136/quarterly-segments-revenue-of-apple/

Spotify offers on-demand access to different sorts of media, without requiring any downloads. Moreover, it uses users' data to recommend and create personalized content, in order to engage them and provide a better experience. Its 299 million users, from which 138 million are paid subscribers, can access more than 60 million songs and podcasts and can create and share playlists, which is one of Spotify's most remarkable and distinctive qualities.

Spotify operates using a *Freemium* model: users who opt for the free access experience lower sound quality, are exposed to ads and need to be connected to the internet to get access to the service. On the other hand, Premium users listen to high-quality tracks, do not get interrupted by unwanted ads, and can even listen to songs without an internet connection. Spotify offers four different plans of the Premium version.

According to a study by SavingSpot, Spotify's prices are not equal across the globe. There are, in fact, major differences in subscription fees between different countries, sometimes even within the same continent. Spotify claims to try setting its prices according to the average income of each country, charging fees proportional to that value. Some examples of tariff differences are shown in **Table 1**.

Country	Basic Tariff, $/month
India	1.58
Argentina	2.06
Vietnam	2.54
Philippines	2.56
Brazil	2.87
Egypt	3.15
South Africa	3.23
Indonesia	3.36
Malaysia	3.44
Australia	7.73
Portugal	8.15
Germany	10.85
Finland	10.85
France	10.85
Iceland	10.85
UK	12.21
Switzerland	13.34
Denmark	14.39

Table 1: Spotify premium subscription per country
Source: own elaboration with data from SavingSpot[23]

2.1. Geographics

Available in 92 markets, Spotify has its biggest market in Europe, followed by North America. According to Spotify's reports, the highest growth rates of users occur in a segment called "Rest of the World", like the example of India, where only after two months of launching, it had already raised 2 million users.

[23] Data collected on 20/12/2021 from https://www.cashnetusa.com/blog/which-countries-pay-most-least-spotify-premium/

Analysing Spotify's graphics concerning its growth in terms of Monthly Active Users (MAU) between 2018 and 2020, presented in Figure 10, it is clear that Europe is leading the chart and that the "Rest of the World" has, indeed, accelerated their growth recently. North America seems to be growing steadily, which, according to Spotify might be related to the large variety of alternatives that users have in that country.[24]

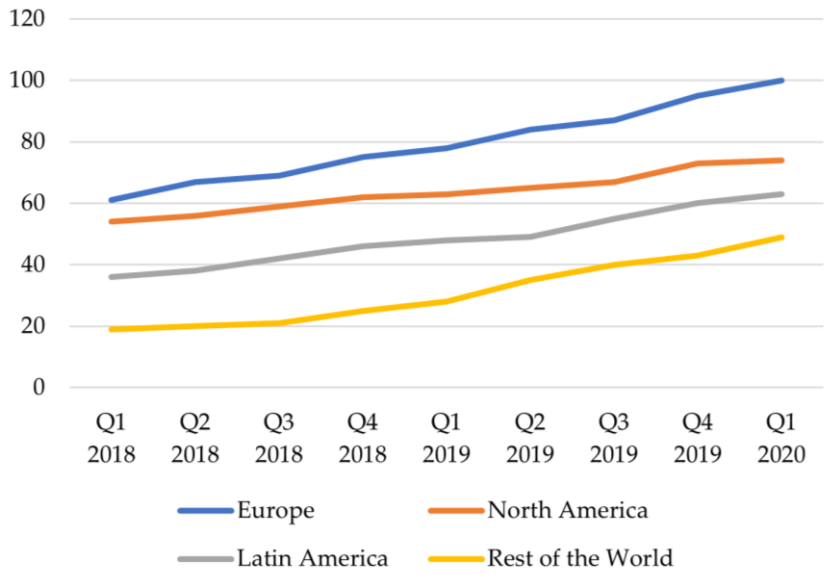

Figure 10: Number of MAU worldwide, 2018-2020
Source: own elaboration with data from Spotify, Goodwater Capital[25]

In terms of subscribers, as Figure 11 suggests, the growth rates have been quite steady all over the world between 2018 and 2020.

[24] See Table 2.
[25] Data collected on 20/01/2021 from https://www.goodwatercap.com/thesis/understanding-spotify and from https://newsroom.spotify.com/company-info/

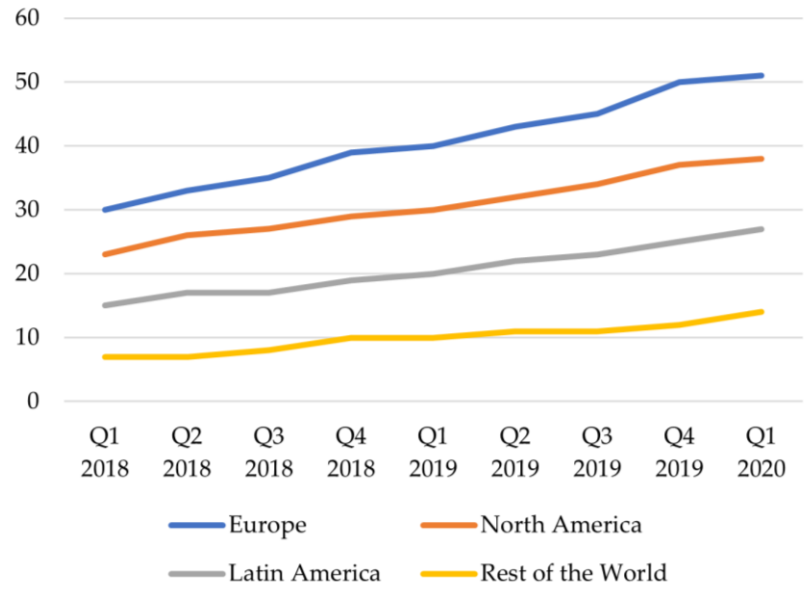

Figure 11: Number of subscribers worldwide, 2018-2020
Source: own elaboration with data from Spotify, Goodwater Capital[26]

Spotify faces a yearly increase of around 32% in number of users and a 30% increase in the number of subscribers. In 2018, the percentage of premium subscribers out of MAUs was around 45% (71 million out of 158 million monthly users). According to Spotify, as of December 2020 this percentage had remained still, with 155 million premium users out of 345 monthly users.

In 2018 Spotify was mainly used via mobile devices in every region, according to GlobalWebIndex. In the U.S., even though 61% of customers used Spotify via mobile, this was also the region with the biggest preponderance of users who listened to it via desktop, with 46% (this percentages allow overlap when users use both mobile and desktop).

2.2. Demographics

According to VertoIndex, in 2018 Spotify showed a dominance of younger users in the US, with most users concentrated on the age slot between 25 and 34 years (the so-called *millennials*), followed by the 18-24 bracket and then the over

[26] Data collected on 20/01/2021 from https://www.goodwatercap.com/thesis/understanding-spotify

55. In fact, more than half of Spotify's users were 34 years old or younger, making its user base the youngest, when compared, for instance, to Apple Music. Regarding gender, Spotify's users were mostly male (56% of male users).

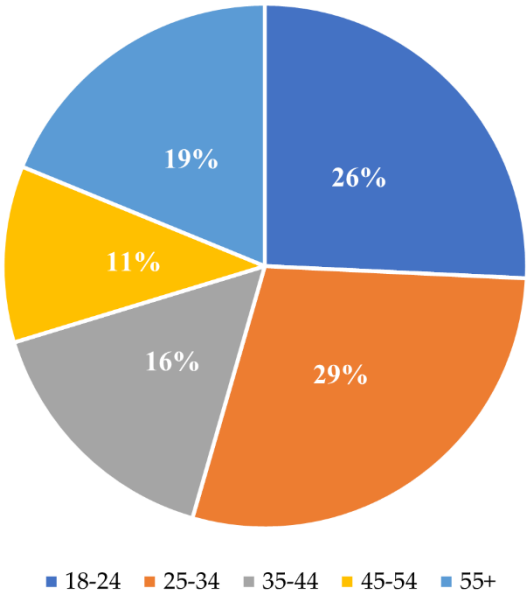

Figure 12: Spotify demographics in the U.S. in 2018
Source: own elaboration with data from VertoIndex[27]

In October 2017, 24% of Spotify's users had been subscribed to the premium service for more than 3 years; 21% had been subscribed to this service for 1-3 years; and, finally, 15% were subscribed for less than a year.[28] This statistic considers three countries – U.S., Germany, and U.K. - which, according to IFPI, were between the top four music markets in 2017.[29]

[27] Data collected on 20/01/2021 from https://vertoanalytics.com/verto-index-streaming-music-services/
[28] Data collected on 24/02/2021 from https://www.statista.com/statistics/800080/streaming-music-subscription-length-worldwide/
[29] The U.S. were ranked the top music market, while Germany and U.K. were ranked third and fourth, respectively. Data collected on 24/02/2021 from https://gmr.ifpi.org/state-of-the-industry

2.3. Revenue and Gross Profit

In Q1 2020, Spotify presented a revenue of around $2 billion, of which $1.84 billion came directly from the *Premium* subscription fees. In turn, the revenue derived from advertisements on the free version only rose to $161 million, which corresponded to 8% of the revenue. These figures were exactly the same in Q1 2019. Overall, in 2019, Spotify had a revenue of around $7.3 billion and had a gross profit of $1.9 billion. This increase has been constant throughout the years, as seen in Figure 13.

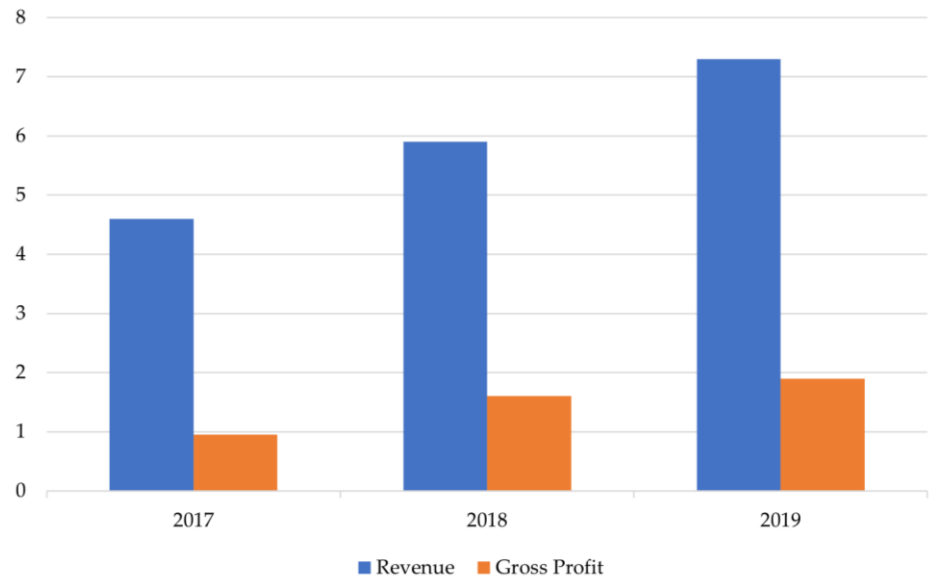

Figure 13: Revenue and gross profit, 2017-2019 (in billion U.S. dollars)
Source: own elaboration with data from Statista

As the name itself suggests, the Average Revenue per User (ARPU) gives the average amount of revenue that each user provides to Spotify, directly or indirectly. In January 2019, Rolling Stone magazine reported that Spotify was receiving, on average, around $5.50/month per user. In Q1 2020, this value decreased to $4.79, mainly due to family subscriptions, discounts, and differences in subscription fees.

Regarding Spotify's revenue distribution by segment, in 2019 only 11% of revenue derived from ad-supported users, while 89% came from *Premium* users.[30]

2.4. Artists and labels payments

Spotify offers artists two different ways of sharing music through its platform:

- they can do it through *music labels*, where Spotify pays 52% revenue to the labels and then the labels pay between 15-50% of that value to the artist (depending on their deal),
- or artists can upload their tracks directly to Spotify, getting a 50% cut of the revenue.

It does sound more appealing to the artist to get the 50% revenue but, due to the strict contracts that artists sign with their labels, it is often impossible for them not to share their pay checks with them.

Regarding royalty pay-outs, Spotify stated that, in the 12 years of its existence, it has paid around $18 billion to the owners of music rights.

A 2019 SoundCharts study showed that Spotify pays artists on average $0.00318/stream, which is one of the lowest pay-outs, when comparing to its competitors. Amazon Music is the streaming service that pays the highest royalty, paying $0.01196/stream. The royalties offered by other music streaming services are shown in Figure 14.

[30] Data collected on 25/02/2021 from https://www.statista.com/statistics/245125/revenue-distribution-of-spotify-by-segment/

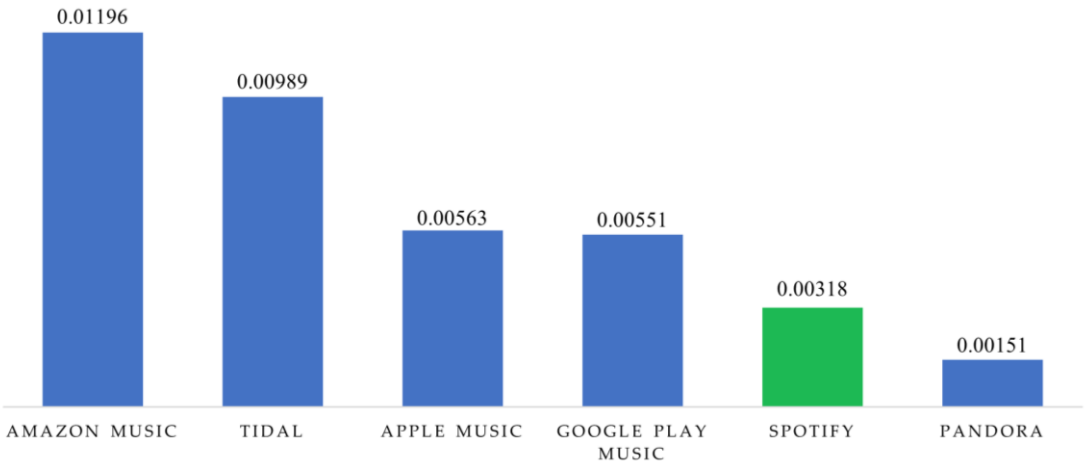

Figure 14: Average pay per stream (in U.S. dollars)
Source: own elaboration with data from SoundCharts[31]

In 2017, Spotify made a request to pay even less royalties to labels, which provoked great confusion amongst fans and originated a lot of criticism towards the Swedish company. Some artists have been actively fighting against Spotify's model, as it does not seem to consider nor protect their interests or even their sustainability.

3. Music streaming industry

Despite being the leader of the music streaming industry, Spotify faces competition. Offering similar services, competitors strive to gain market share and recognition amongst the diverse and miscellaneous target audience.

[31] Data collected on 10/01/2021 from https://medium.com/soundcharts/what-do-music-streaming-services-pay-per-stream-and-why-it-actually-doesnt-matter-96b24247f9b6

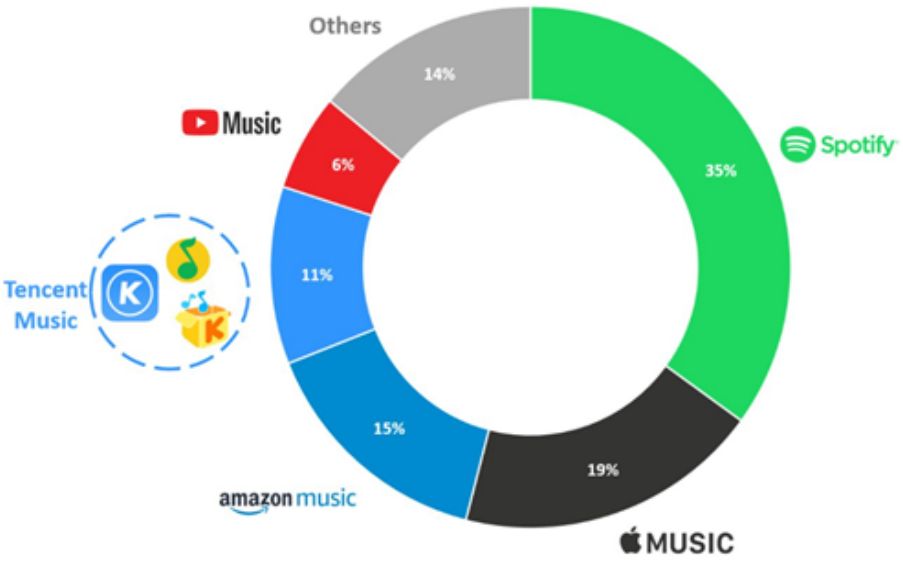

Figure 15: Global music streaming paid subscriptions by brand share in 2019
Source: Counterpoint Research[32]

Apple Music

Apple Music is Spotify's most direct competitor. Launched in 2015 in the US, it also offers on-demand music and video streaming, with personalized playlists. However, Apple Music does not provide the users a free version of the app, which gives Spotify the spotlight, as most users opt, indeed, for the free subscription. Being that said, Apple presents 3 different premium subscription plans.[33]

In 2018, Apple Music had most of its users on the age slot between 25 and 34 years and on the over 55 (each with 23% of users), according to VertoIndex[34]. Right behind those slots is the 35-44 bracket, with 22% of users, followed by the 18-24 with 17%. Lastly, the 45-54 interval with 15% of users. Regarding gender, Apple's users were mostly female, with 44% male users.

[32] Data collected on 20/01/2021 from https://www.counterpointresearch.com/global-online-music-streaming-grew-2019/
[33] Data collected on 20/11/2020 from: https://www.apple.com/apple-music//
[34] Data collected on 20/11/2020 from https://vertoanalytics.com/verto-index-streaming-music-services/

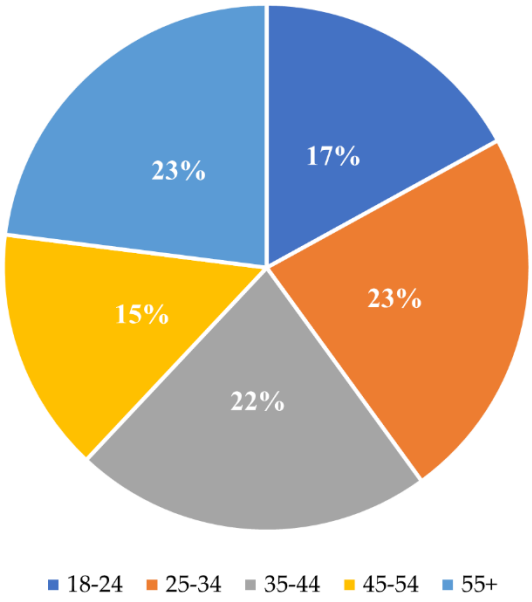

Figure 16: Apple Music Demographics in the U.S. in 2018
Source: own elaboration with data from The Verto Index[35]

Amazon Music

Amazon Music, created in 2007 in the US, did not introduce a free version of the app until 2019. Being Alexa part of the Amazon family, Amazon Music presents an easy and obvious integration with it, which is extremely useful to the users. It offers 4 different plans, including a free version called Amazon Music Free and 3 premium plans – Amazon Music Unlimited, Amazon Music HD, Amazon Music Prime.[36]

According to VertoAnalytics, Amazon has shown the most rapid growth in subscription numbers between competitors in the US, growing around 27% between 2018 and 2019, while Spotify only expanded its subscribers in 25%.

[35] Data collected on 20/11/2020 from https://vertoanalytics.com/verto-index-streaming-music-services/
[36] Data collected on 20/11/2020 from: https://www.amazon.com/music/unlimited/?_encoding=UTF8&ref_=sv_dmusic_1

Google Play and Youtube Music

Google Play and Youtube Music, both owned by Google and founded in the US, present an unique variety of tracks and content. Created with the purpose of transitioning Google Play Music listeners to their platform, Youtube Music offers a free version and also 3 different premium versions.[37]

Youtube is the most popular alternative to premium streaming platforms.

Tidal

Founded in Norway and bought by Jay-Z in 2014, Tidal is known to possess an artist-friendly business model. Resembling Spotify and Apple Music, it provides on-demand music and video and offers exclusive content. Tidal offers 8 different premium plans.[38]

Pandora

Pandora is an American radio streaming service that offers personalized and selected music and podcasts to its users. Pandora offers a free plan and four premium services[39] that, likewise Spotify, offer higher quality and an ad-free experience.

SoundCloud

Despite being more popular with niches like indie music and podcasts, Swedish SoundCloud is well-known for its creation tools and user-generated content. It is an online music sharing platform and its users can upload and

[37] Data collected on 20/11/2020 from: https://www.youtube.com/musicpremium; https://learn.g2.com/youtube-premium

[38] Data collected on 20/11/2020 from: https://support.tidal.com/hc/pt/articles/115003662825-Tipos-de-assinaturas-Pre%C3%A7os-e-Condi%C3%A7%C3%B5es

[39] Data collected on 20/11/2020 from: https://help.pandora.com/s/article/Upgrade-to-Pandora-Plus-or-Pandora-Premium-1519949306612?language=en_US

promote audio. SoundCloud offers a free service and three premium subscription plans.[40]

Tencent Music

Established in 2016, Tencent Music is one of the five streaming services that the Chinese Tencent Music Entertainment Group (TME) offers in China. TME has 800 million active users and 120 million paying subscribers and it is the leading music provider locally, with 60% market share. Tencent and Tencent Music together own 9% of Spotify, being its third-largest shareholder. Tencent music offers both a free and a paid plan.[41]

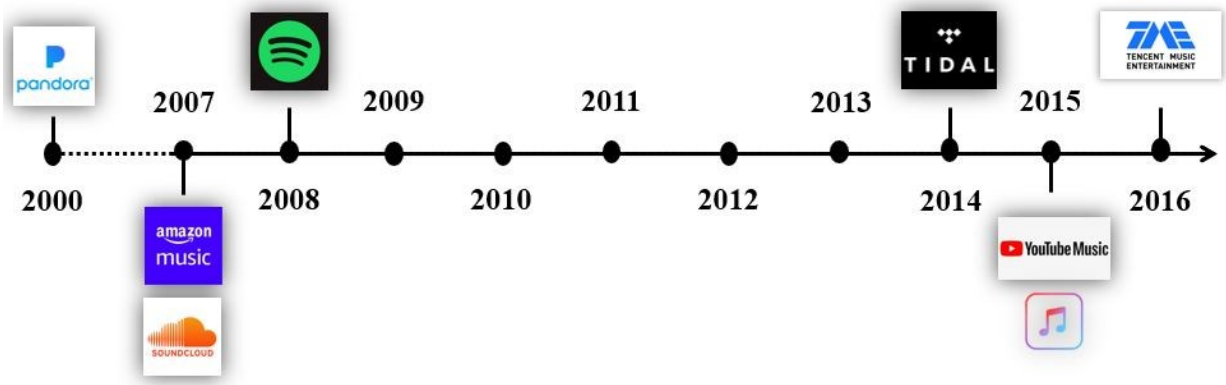

Figure 17: Timeline of the establishment of music streaming services.
Source: own elaboration

[40] Data collected on 20/11/2020 from: https://soundcloud.com/pages/contact
[41] Data collected on 20/02/2021 from: https://daxueconsulting.com/music-streaming-platforms-in-china/

		Spotify	Apple Music	Amazon Music	Google Play and Youtube Music	Tidal	Pandora	SoundCloud	Tencent
Free plan		Yes	No	Yes	No	No	Yes	Yes	Yes
Paid plans	**Individual**	$9.99	$9.99	$3.99 or $7.99 (Single or Multiple devices)	$9.99 (Both)	$9.99 or $19.99 (Premium or HiFi)	$4.99 or $9.99 (Plus or Premium)	$6 or $12 (Premium or Pro Unlimited)	$15.65
	Duo	$12.99	-	-	-	-	-	-	-
	Student	$4.99	$4.99	$0.99	$4.99 (Youtube Music)	$4.99 or $9.99 (Premium or HiFi)	$4.99	$4.99	-
	Family	$14.99	$14.99	$14.99	$14.99 (Youtube Music)	$14.99 or $29.99 (Premium or HiFi)	$14.99	-	-
	Military	-	-	-	-	$5.99 or $11.99 (Premium or HiFi)	$7.99	-	-

Table 2: Music streaming services plans and prices in the U.S.[42]
Source: own elaboration with information gathered from the companies' webpages

According to Reuters, in April 2019, Apple surpassed Spotify in the U.S., owning 28 million subscribers comparing to the 26 million that Spotify had. Globally speaking, Spotify stays in a leading position with 108 million subscribers worldwide in June 2019, against Apple's mark of 60 million.

[42] Since some of the market players do not operate in European territory, we used prices in the US for comparison purposes. The prices were retrieved on 24/01/2021. Spotify's prices were retrieved from https://www.spotify.com/pt/premium/.

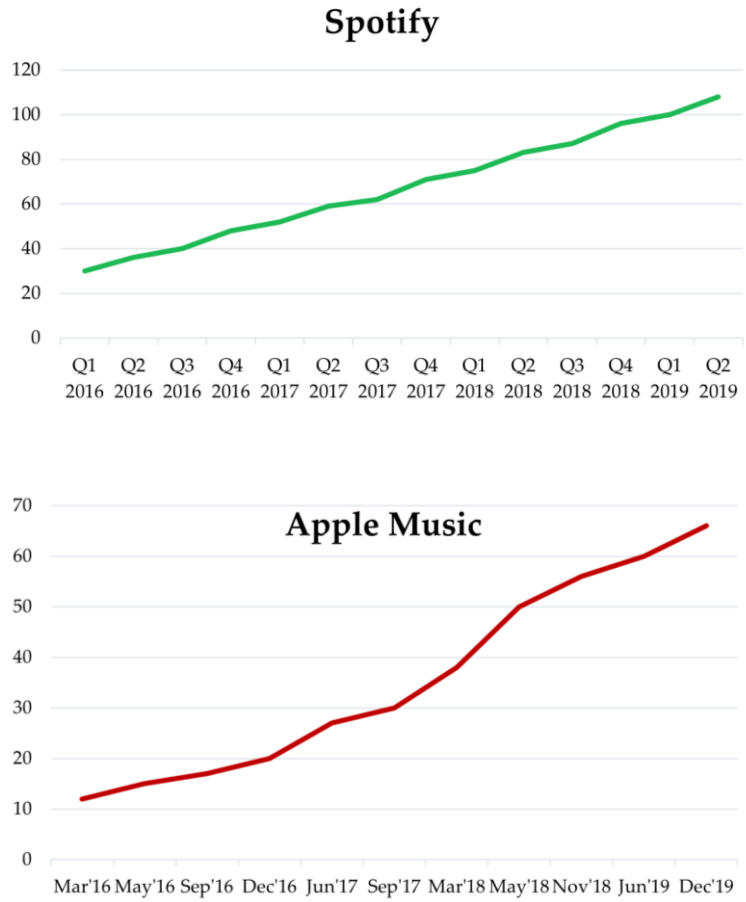

Figure 18: Evolution of the number of premium subscribers worldwide of Spotify and Apple Music, 2016 - 2019
Source: own elaboration with data from Statista[43]

Spotify is a market leader, in terms of market share, owning 35%, followed by Apple Music (19%) and Amazon Music (15%). Tencent Music shows a 11% share, whilst Youtube Music only possesses 6%. Spotify has been consistent over the years, owning 36% of market share globally, both in 2018 and 2017.

In a survey ran by Goodwater Capital,[44] 65% of respondents used at least one music service, in Q4 2020. Among those people, Pandora was consistently the most used streaming service in the previous 3 months (followed by Spotify). The results of this consumer survey, ran in Q1, Q2 and Q3 of 2017 in the U.S.,

[43] The graphs had to be made separately, as the data related to Apple Music did not provide quarterly information, as Spotify's data did.
[44] Data collected on 16/01/2021 from https://www.goodwatercap.com/thesis/understanding-spotify

involving 9 000 people with ages from 18 to 65, are presented in more detail in Figure 19.

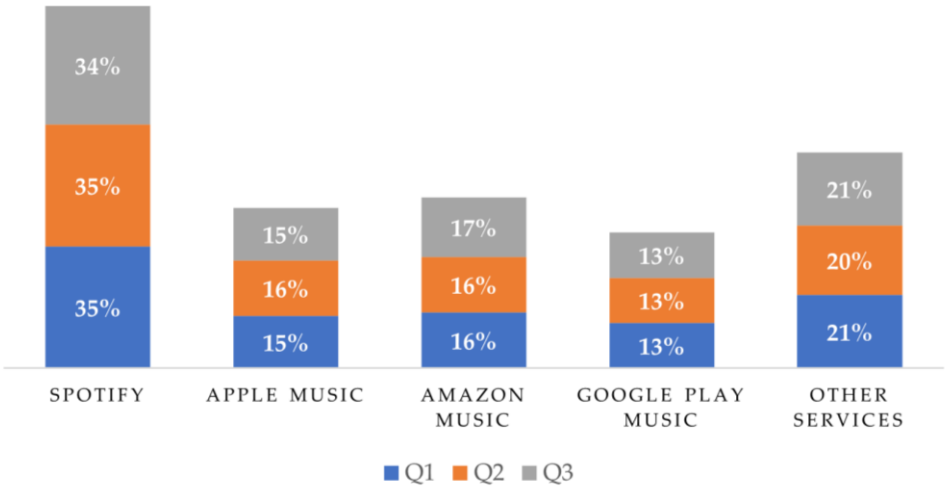

Figure 19: Music streaming usage distribution in 2017
Source: own elaboration with data from Goodwater Capital

Nevertheless, according to the same consumer survey, Spotify leads the chart in terms of user satisfaction. Spotify got the highest Net Promoter Score (NPS), an indicator that measures how likely a customer is to recommend a product or service (Figure 20). Google Play Music presented negative scores in two of the three analysed quarters.

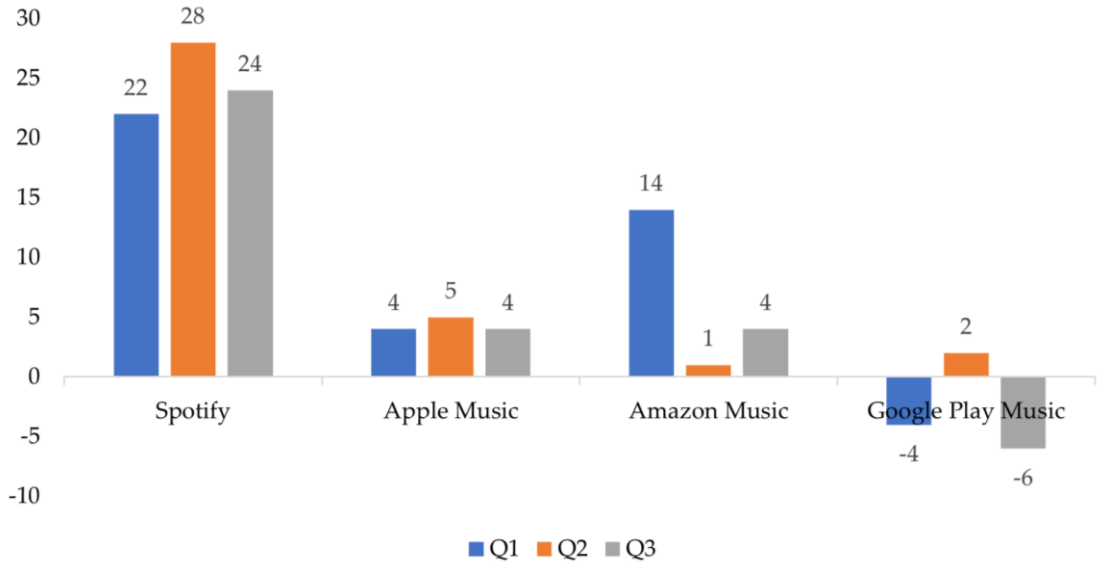

Figure 20: Net Promoter Scores in 2017
Source: own elaboration with data from Goodwater Capital

In 2017, of all consumers that used a streaming service, 56% were free users, while 34% paid for only one service and 10% paid for more than one service (Figure 21).

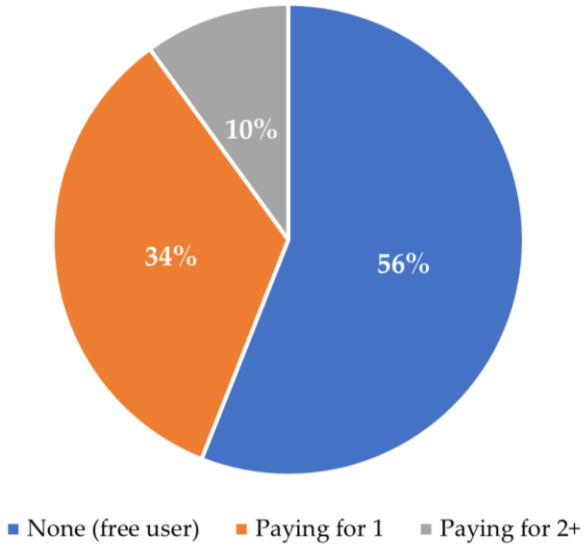

Figure 21: Distribution of users according to the number of subscribed streaming services in the U.S. in 2017
Source: own elaboration with data from Goodwater Capital

Regarding operating systems, iOS users were more likely to use Apple Music, while Android users were more likely to use Google Play Music. Spotify, however, was popular in both operating systems, even though Pandora was consistently the favourite streaming service in the U.S., despite the platform.

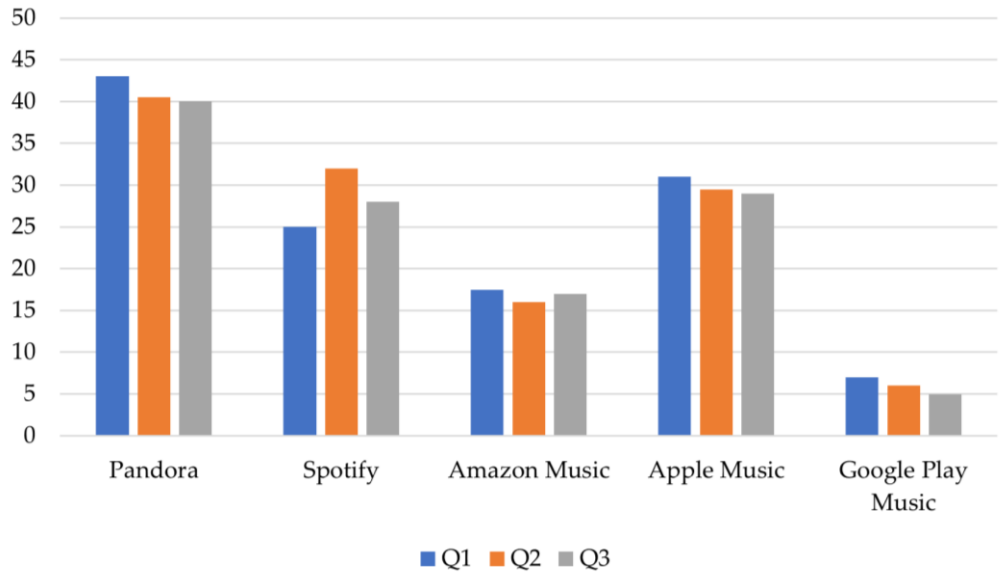

Figure 22: iOS users music streaming usage distribution in 2017
Source: own elaboration with data from Goodwater Capital

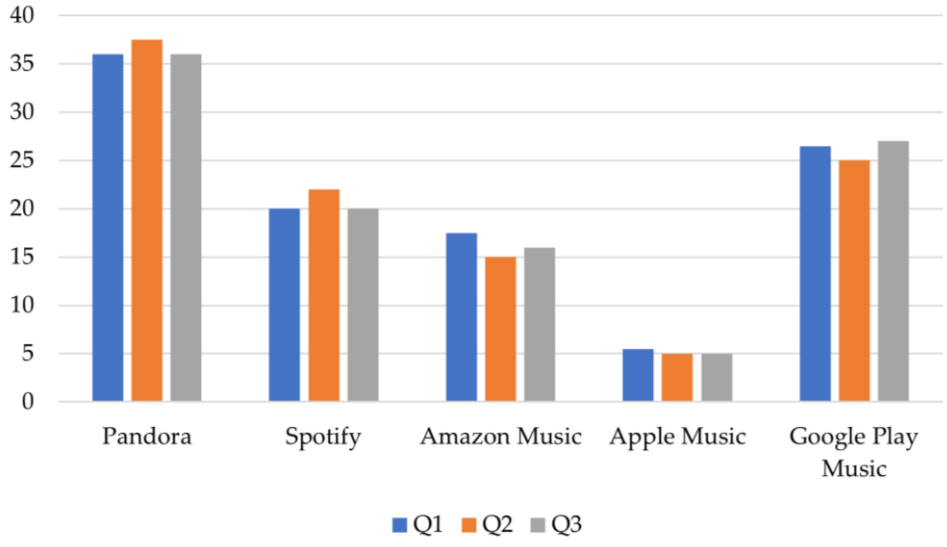

Figure 23: Android users music streaming usage distribution in 2017
Source: own elaboration with data from Goodwater Capital

As shown in Figure 24, among the different services, Spotify and Apple Music show the biggest concentration of paid subscribers and the highest growth rates.

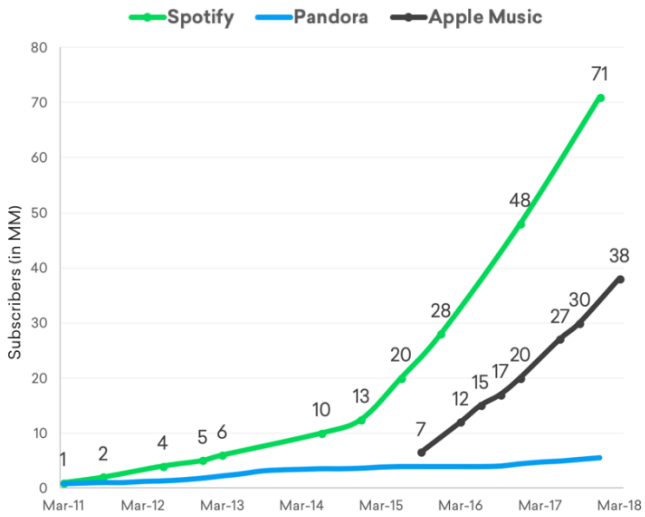

Figure 24: Evolution in the number of paid subscribers.[45]
Source: Goodwater Capital

[45] The number of Apple Music's paid subscribers only starts in 2015, as this corresponds to the year of its creation.

Chapter 2
The Spotify Case

1. Spotify's complaints

In March 2019, Spotify filed a lawsuit against Apple in the European Commission, [46] claiming that Apple was conducting an abusive and anti-competitive behaviour towards Spotify. Alongside other developers, Spotify alleges that Apple has been favouring its services and creating disadvantages for its competitors, namely by creating rules that make it extremely difficult for third-party developers to reach out to and engage with iPhone users. Spotify has created a website called 'Five Fast Facts',[47] where it explains in detail the nature of their complaints.

Later, in October of the same year, the U.S. Department of Justice opened an investigation into Apple, asking Spotify for details and further information on their antitrust lawsuit.

1.1. Use of IAP and commission

The first complaint concerns the mandatory use of Apple's own in-app purchase system (IAP) for free apps with paid content that sell "digital goods or

[46] Case AT.40437: Apple – App Store Practices - music streaming. EC Press Release of 16 of June 2020 available at: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_40437
[47] Data collected on 04/11/2020 from https://timetoplayfair.com/facts/

services" inside the app. Apple charges app developers a **30% commission** on all subscription fees through this system. However, this is not applied across the board, as some companies like Uber, Deliveroo and even Apple Music do not pay such commission. Furthermore, when developers opt for their own payment solution to avoid the commission on in-app subscriptions, Apple forbids users to make payments any other way inside the app, meaning that users must navigate to external pages. However, Apple does not allow showing users alternative links or buttons to do so.

This Apple's policy left Spotify with two options: either use the IAP system and pay the 30% fee, only allowing customers to upgrade to Premium via App Store; or disable the IAP system (which allows Spotify to not pay the commission to Apple) but then getting a limited communication with its users. In both scenarios, Spotify was not allowed to give users useful information, such as subscription possibilities outside the app, therefore getting denied the chance of accessing and providing important data and giving Apple full control over the relationship with customers.

When Spotify became available on the App Store (2008), it used the IAP system. However, Spotify chose to stop using this payment system in 2011, considering the price Apple was setting was too high for customers. Spotify claims that between 2011 and 2014, it felt such pressure from Apple to adhere, once again, to its system that it decided to try it one more time. So, in June 2014, Spotify started using the IAP system, allowing users to subscribe the *Premium* version directly on the App Store and therefore increasing their price to €12.99 a month. Customers did not enjoy this raise, namely because Apple Music only charged €9.99 (partly because Apple Music was not subject to pay the IAP 30% commission). As a result, in May 2016, Spotify disabled the IAP system once again, which allowed to lower its prices.

Apple often updates its App Store Guidelines. In June 2017, an update made Apple's rival apps agree not to target iOS users, directly or indirectly, to use a different system than IAP or to discourage its use, hence making this situation even more challenging. This means that Spotify was not allowed to encourage different methods of subscription or payment for Premium users, such as following these processes on their own website or even through the app. Actually, Apple forbade Spotify to email users (after registering their accounts), prompting them to upgrade to the *Premium* paid service. Apple claimed to consider those emails to be an attempt to retrieve payments outside its system, representing a violation of the established rules.

1.2. App enhancements

Another complaint of Spotify is related to app enhancements. Spotify stated that Apple rejected bug fixes and app enhancement proposals (such as new features and other improvements), claiming these did not obey to their imposed restrictions. A presented example is the problems faced by Spotify in its integration with Siri. The connection of Spotify to Siri is a quite recent achievement, even though Spotify has been attempting this connection for many years. Nevertheless, this integration does not give Spotify an advantage, as Siri uses the Apple Music app by default, only playing on Spotify when specifically asked to ("I want to play [X] on Spotify").

Moreover, in April 2015, when Apple launched Apple Watch, Spotify desired to develop a version of the app to be on it and Apple refused it. In September 2016 and September 2017, Spotify submitted new app proposals, which Apple repeatedly rejected.[48] It was only in 2018 that Apple allowed the enhanced functionality for the Spotify app in the Apple Watch.

[48] Data collected on 16/11/2020 from https://timetoplayfair.com/timeline/

Spotify pointed out other situations, occurred in May and July 2018, where Apple rejected Spotify's updates. Allegedly, the first update was rejected only because the word "Free" was showing on the screen, and the second time because the phrase "Get in, Get Premium" was presented, and both expressions were forbidden. To make matters worse, in February 2019, Apple Music sent notifications to their users that included phrases such as "Give a friend a free month of Apple Music", a kind of message that would not be allowed to other apps.

At the time of the complaint, Spotify's CEO, Daniel Ek, wrote a blog describing the charges. There, he stated that he believes that Apple only imposes these rules to give it an advantage to its app over competitors. In particular, Spotify's CEO wrote: [49]

> If we pay this tax, it would force us to artificially inflate the price of our premium membership well above the price of Apple Music. And to keep our price competitive for our customers, that isn't something we can do. This is not a Spotify v. Apple issue. We should all be subject to the same fair set of rules and restrictions, including Apple Music.

2. Apple's defense

Apple has made a statement in March 2019, shortly after the Spotify's complaints were presented, where it denied all Spotify's claims and said it acts in the best interests of its users.[50]

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[49] Data collected on 02/11/2020 from https://www.theguardian.com/technology/2019/may/06/apple-eu-investigation-spotify-iphone-app-store

[50] Data collected on 02/11/2020 from https://www.apple.com/newsroom/2019/03/addressing-spotifys-claims/

2.1. Use of IAP and commission

According to the tech giant, free apps are not charged any commission, since the 30% fee only applies to paid subscriptions. Thus, according to Apple, 84% of the apps in the App Store do not pay Apple anything at all.

Apple agreed that it does, in fact, charge this commission for apps that use their IAP system but stated that, for subscriptions of more than one year, this rate drops to 15%,[51] which is something that Spotify "forgot" to mention. In the particular case of Spotify, Apple stated that only a small fraction of subscriptions undergoes this revenue-sharing model, as most of the users use the free app version. Indeed, by the time of the complaints, only 680 000 of Spotify's 100 million premium customers (less than 1% of users) were paying the fee, which corresponds to the users that subscribed to the premium version when Spotify was using the IAP, between 2014 and 2016.[52] Therefore, this fee had already decreased to 15% (since the one year period had already passed), meaning that Spotify was not paying the 30% fee for any of its premium users and that it was not paying anything at all for customers who subscribed the service since Spotify stopped using the IAP system. Additionally, Spotify does not pay any fees for customers who signed up outside the App Store.

Finally, Apple argued that, as it provides Spotify a platform by which users can download the app and shares software development tools and a trustworthy payment system, it would not be fair if Spotify retained all its earnings.

2.2. Updates

Concerning the second Spotify's complaint, Apple stated that it updates its rules and restrictions equally for all app developers. As a matter of fact, over the

[51] Data collected on 02/11/2020 from https://www.competitionpolicyinternational.com/eu-brussels-to-start-formal-probe-on-spotifys-apple-complaint/

[52] Data collected on 04/11/2020 from https://www.reuters.com/article/us-apple-spotify-tech-idUSKCN1TP2D0

years, Apple has approved over 200 Spotify updates and claims that it only rejected Spotify's proposals when these did not follow the imposed rules.

Additionally, Apple claimed that Spotify is currently fully integrated with Siri, as it is with different platforms (such as CarPlay). Apple also added that Spotify has full access to the development tools that the other app developers have.

Finally, Apple claimed to be shocked with the accusations concerning the iWatch, claiming it immediately approved Spotify's proposal in 2018.

The European Commission is now investigating the impact of Apple's practices on competition and consumers and, if proven, the practices may breach EU regulation.

Chapter 3
Competition in Digital Markets

1. Literature Review

1.1. Definition of multi-sided markets

There are several definitions of two-sided markets in the literature. Even though a full consensus has not been reached, Filistrucchi et al. (2013) claim that the proposals made by the different authors are consistent enough to identify two-sided markets.

Evans and Schmalensee (2013, p.7) defined a **multi-sided market** (that they called by *economic catalyst*) as having:

"(a) two or more groups of customers; (b) who need each other in some way; (c) but who cannot capture the value from their mutual attraction on their own; and (d) rely on the catalyst to facilitate value creating interactions between them."

According to these authors, the platform's role is to facilitate the interactions between different agents, solving coordination problems between them and, therefore, creating value that would not be created if the platform did not exist.

Rochet and Tirole (2006, pp. 664-665) proposed an alternative definition of two-sided markets, focusing on the price structure:

"A market is two-sided if the platform can affect the volume of transactions by charging more to one side of the market and reducing the price paid by the other side by an equal amount; in other words, the price structure matters, and platforms must design it so as to bring both sides on board."

The authors also claim that if a business reduces transaction costs on both sides of the market, it can be considered as two-sided; otherwise, if economic actors can dodge the pricing structure through alternative payments, the business cannot be considered as such.

There are several examples of two-sided markets such as payment services, video game consoles, operating systems, and many internet-based industries. In operating systems, for instance, there are users and application developers; while, in marketplaces, like Amazon or eBay, there are buyers on one side and sellers on the other.

When an economic actor only uses one platform in a certain industry, the actor is said to **single-home** (Rochet and Tirole, 2003). On the other hand, if he uses more than one platform within the same industry, the economic agent is said to **multi-home**. For instance, in the mobile phone industry, it is common for users to single-home (as they only have one mobile phone), while on music streaming services it is common to use different services (having the Spotify app on the phone and listening to Youtube on the desktop, for example).

Multi-sided markets are evolving into a scenario where users of one side single-home, while the other side multi-homes (Rysman, 2009). Hence, the customers' decisions of using one or more platforms at the same time lead to price asymmetries. As explained by Doganoglu and Wright (2006), compatibility between platforms mitigates the incentives for users to multi-home. For example, if a consumer owns a specific console but wants to play a videogame that only exists for another one, the consumer may end up buying the other console (i.e.,

doing multi-homing), in order to be able to play both games. If, alternatively, the game existed for the user's console, he would most likely single-home. However, Doganoglu and Wright (2006) conclude that, as platforms' profits are increasing with the increase of users that multi-home, they are less prone to compatibility.

Caillaud and Jullien (2003) explain that platforms can dodge aggressive price competition and be profitable with multi-homing, while single-homing contributes to the existence of monopolies. However, Schiff (2003) points out that in single-homing markets with compatible platforms, firms do not feel encouraged to increase production, which results in higher prices.

1.2. Types of Platforms

Evans (2003) proposed the following categorization of platforms according to their features:

- **Market makers:** Members of different groups can interact and/or transact with each other, and the platform reduces/eliminates costs in these interactions. Examples include online platforms, such as Amazon, Uber, or Airbnb.
- **Advertising-supported media**: Platforms acquire a large viewer base by showing content that is attractive to users and then sell "space" to advertisers. Examples could be social networks, like Facebook and Instagram.
- **Operating systems**: App developers are connected with the operating system's users. In these platforms, value is created by performing common talks that would need to be done by most applications, therefore reducing task duplication, and by presenting a single interface for all platforms. A solid example is Apple's iOS for iPhones and MacOS for Macs.

- **Video game consoles:** These platforms connect video game developers to players, similarly to operating systems.
- **Payment systems:** The exchange of goods and services is facilitated, by eliminating the cost of time and risk of theft of carrying physical cash. Examples include Visa and MasterCard.

Damme et al. (2010) and Filistrucchi et al. (2014) suggest another taxonomy, known to be more accurate than Evans' proposal, classifying two-sided markets in two different categories:

- **Non-transactions markets (Media type):** The transaction is not observable or verifiable and, therefore, cannot be monitored. The platforms cannot charge according to the transactions' volume so they can only set **membership fees** (i.e., fees for access to the platform). Advertising-supported media is a good example.
- **Transaction markets (Payment card type):** The transaction between the sides of the market is verifiable and can be monitored. Thus, both access and **transaction fees** can be charged. Market makers, video game consoles, and payment systems belong to this category.

A limitation of this categorization is that the categories may be too comprehensive, with almost all digital platforms fitting the second category (as transactions are observable). Indeed, although several platforms can be inserted into one of Evans (2003)' or Damme et al. (2010)'s categories, many platforms are far more complex, which makes it difficult to categorize them in a straightforward way.

1.3. Network Externalities

According to Weyl (2010), multi-sided markets usually share three main characteristics:

1. The firm is multi-product, providing different services to all sides of the market.

2. The benefits that users get from participating in the market depend on the users on the other side of that market.

3. Platforms set prices on both sides of the market (i.e., there is bilateral market power).

The second feature is usually known in the literature as the presence of ***indirect*** **network externalities**. A firm is in the presence of **network effects** when its total demand has a direct effect on the perceived customer value of a certain product or service (Calvano and Polo, 2020). In other words, network effects exist in a market if consumers are concerned with other users' participation and decisions (Belleflamme and Peitz, 2018). Network effects may be direct or indirect. **Direct network effects** exist when the value of a service increases with the increase in the number of users of that service. For example, having a mobile phone only matters if the user wants to communicate with another user that also owns a mobile phone. In the presence of **indirect network effects**, on the other hand, the value of a certain service increases for one user group with the increase of users on another group. For instance, app developers value platforms with more users, just like users value platforms that have more applications. Notice that, in both examples, we are in the presence of *positive* network effects. However, network effects can be *negative,* for instance, if users value the service the less, the more people use it, like in traffic (where the more cars on the road, the less valuable it is for drivers).

As pointed out by Rochet and Tirole (2006), there are two types of indirect externalities:

- **Usage externality**: when two economic actors are required to act together, in order to create value. This type of externality can be positive for one economic agent and negative for another, so the net value needs to

positive so that there is a benefit. Oftentimes, the platform can capture some of this benefit.

- **Membership externality**: when an increase in the number of agents on one side of the market, increases the perceived value by agents on the other side. This phenomenon is called a **positive feedback loop** and contributes to platforms' growth.

Banerji and Dutta (2005) point out that network effects are often "local" in nature: users' choices are usually connected with the ones made by users they interact with, rather than with users in general.

Calvano and Polo (2020) state that network effects contribute to market concentration, as big platforms will attract more users, sometimes even leading to a monopoly scenario. As a result, Belleflamme and Peitz (2018) claim that concentration may benefit users, as they often prefer to interact on the same platform due to the network effects.

Consumer expectation on network size impacts on demand elasticity: the fewer users join the platform, the fewer users are willing to pay, which reduces demand (Calvano and Polo, 2020). Indeed, in cases where network effects are very strong, a small price variation can even eliminate demand.

1.4. Market characteristics

Competition in two-sided markets presents specific features that will be analysed in this sub-section.

1.4.1. Coordination problem

Evans and Schmalensee (2010) claim that the greatest challenge for platforms is to ensure enough agents on both sides to generate enough (indirect) network effects. In other words, in order to maximize profits, the participation on different sides of the market must be balanced (Saatvic, 2018). Multi-sided platforms must

attract different types of users at the same time, with the risk of facing the so-called '**chicken-and-egg problem'** in case of failing on it. This means that, independently of the price, the demand on one side of the market tends to disappear if there are no users on the other side of that market (Evans, 2003; Caillaud and Jullien, 2001). To overcome this coordination problem, Caillaud and Jullien (2001) suggest a solution, called **Divide and Conquer**, that consists of obtaining a great number of users on one side, by offering a free service or even paying consumers to use it. This solution implies a market division between the "profit side" and "loss side", to then "conquer" the market. Following this strategy, users will be drawn to join the platform on the "loss side" and then consumers on the other side will also be incentivized to do the same.

Weyl (2010) proposes a model in which users are heterogeneous along two dimensions: how much they value the participation of users on the other side of the market **(interaction value)** and how much they value joining the platform if no users on the other side of the market join the platform **(membership value)**. To address the coordination problem explained before, Weyl (2010) proposes the concept of **insulating tariffs**, according to which platforms choose users' utility (and not prices). More precisely, a price is charged on each side setting a utility level for consumers. Therefore, users are not really concerned with the size of the platform on the other side.[53] However, Cabral (2011) points out that, in a dynamic context, if one side of a platform is independent of the size of the other side, platforms are not able to define a utility level because agents will not be assured. By contrast, the author suggests that platforms may "subsidize" early users to make it up for entering the platform at an early stage.[54] This is, therefore,

[53] White and Weyl (2016) present the "residual insulating tariffs" as a solution to this problem. On this solution, the authors applied the concept of insulating tariffs to environments in which there is substantial heterogeneity regarding preferences.

[54] White and Weyl (2016), nonetheless, claim that there is an exact correspondence between Weyl's and Cabral's equilibrium prices.

another potential solution to the "chicken-and-egg problem", which seems to be more suited to the verified practices.

1.4.2. Pricing

The pricing strategies are more complex in two-sided markets than in one-sided markets (Saattvic, 2018). Two-sided platforms must not only define the **price level** (i.e., the *total* price charged on both sides of the market), but also the **price structure** (i.e., the ratio of the charged prices).

In general, multi-sided platforms may define two kinds of fees:

- **Membership fee:** corresponds to the price that users pay to use the platform.
- **Transaction fee:** corresponds to the price that is paid every time a transaction occurs.

Despite the possibility of the two types of fees to coexist, in real scenarios, membership fees are much more common than transaction fees (Sanchez-Cartas and Leon, 2019). Armstrong (2006) argues that the possibility of setting transaction fees is the main determinant of the price structure.

Interestingly, in many real two-sided markets, agents on one side of the market pay a fee, while the other side is subsidized. According to Rochet and Tirole (2006, p.659), this happens due to the "Seesaw principle", according to which:

"a high price on one side, to the extent that it raises the platform's margin on that side, also tends to call for a low price on the other side as attracting members on that other side becomes more profitable."

As a user's decision has a positive effect on other users, multi-sided platforms can charge lower prices in order to attract more users. Calvano and Polo (2020) attest that prices may be charged below marginal costs (negative mark-ups) on

one side of the market, and these losses would be recovered by charging other sides of the market.

Two different models regarding this optimal pricing stand out. Firstly, Rochet and Tirole (2003) model a transaction platform with no access fees. In this model, the authors study the relation between price-cost margin and demand elasticity, concluding that when demand is inelastic, the platform will be able to charge high prices without losing many customers. Additionally, the authors state that the price elasticity on a side of the market directly influences the optimal price charged on that side. For example, for a side with low price elasticity, to attract participants, the price would have to be very low. This second condition dictates the price structure.

In another benchmark contribution, Armstrong (2006) models a non-transaction platform without transaction fees, (i.e., platforms only charge access fees). The author concludes that the higher the demand elasticity, the lower the mark-up platforms are able to charge. In addition, the optimal price on one side of the market is lower the higher the indirect network effects on demand on the other side, due to the participation on the first side.

1.4.3. Incumbency Advantage

Many two-sided markets are characterized by the presence of a well-established firm (*incumbent*), which may have an advantage over entrants with better products, due to a strong, installed base of users. According to Calvano and Polo (2020), **switching costs** represent one of the sources of this so-called **incumbency advantage**. The idea is that users who adopted an early technology will be stuck with it when a new one appears. If the entrant's technology only provides the users with little improvements, users may prefer to maintain the previous technology. However, consumers entering the market later in time will most likely choose a superior entrant's technology (Katz and Shapiro, 1994).

Markets differ in terms of switching costs: while some have high switching costs, others present lower ones. For example, when a consumer owns Apple products, it is quite often to buy various related gadgets, such as the iPhone, iPad, AirPods, iWatch. Therefore, the user will face high switching costs. By contrast, installing an app usually does not require significant monetary investment nor does it oblige users to learn new skills (Calvano and Polo, 2020). Nevertheless, according to these authors, the existence of personal data can increase an app's low switching costs. For example, if a consumer uses the Spotify app, listens to his own playlists, and has his musical taste already predicted by the app's algorithm, the switching costs will be relatively higher than with another app that does not incorporate personal data. Platforms that produce or distribute content, like Spotify, may be interested in gathering users' data to better predict consumer preferences and make better recommend users content they would be interested in (Calvano and Polo, 2020). To do so, these firms use statistical models (algorithms) which, in turn, use consumer information retrieved from certain online businesses, called **Big Data**.

"Big Data" consists of large datasets with high volume, velocity, and variety of formats, and consumers provide information while using the service (Calvano and Polo, 2020). Companies possessing a great amount of data usually benefit from economies of scale: firms that own a larger user base can collect more data, which allows them to improve their products and services, attracting then more customers and data (the so-called **positive feedback loop** phenomenon). However, according to Lambrecth and Tucker (2015), entrants are not doomed, as Big Data is not unattainable and there are several different sources that entrants can access. Still, incumbents show a clear advantage, making it hard for smaller competitors to thrive. According to Nadler and Cicilline (2020), firms that have access to data may target users more easily, understand consumer behaviour more deeply and, therefore, improve the quality of their products or

services. This will eventually attract more users and, consequently, generate more data. Nadler and Cicilline (2020) point out that when a platform functions as a marketplace and as a seller of its products at the same time (like Amazon, for instance), it can have privileged access to data that may grant a competitive advantage and even enable anticompetitive conducts. In this case, the platform can benefit its own products by using information taken from other businesses, including non-public information.

Prufer and Schottmüller (2017) analyse how this advantage from the incumbent can impact R&D competition. The authors conclude that the improvements on products, achieved due to the superior access to data, eliminates competition from entrants. Besides, entrants will present extremely inefficient, low rates of innovation. The authors point out that, oftentimes, collecting data allows incumbent firms to lower marginal costs in connected markets, which drives them to expand to these markets.

However, Sokol and Ma (2017) point out that more data does not always imply a better product. The insights retrieved from the data and a company's ability to innovate can often make it use its products more efficiently. In fact, according to the authors, new entrants can almost eliminate the incumbent's advantage, if they offer a newer product that meets consumers' needs in a more efficient way.

Nevertheless, powerful incumbents, such as search engines like Google, provide lists of search results that are sometimes biased, either privileging their own websites or other firms that pay them to be advised. The concept of **intermediation bias** arises, consisting of a platform orienting or influencing user interactions. Hagiu and Jullien (2011) conclude that intermediaries tend to decrease the quality of the presented results, in order to receive higher values of revenue per interaction.

Calvano and Jullien (2019) analyse biases in recommender systems (algorithms fed by Big Data), which contribute to consumer engagement and, in

turn, to customer retention. The authors attest that consumers' trust can easily be broken in case a recommendation does not match their preferences, making them less willing to pay for the service in the future. Therefore, these services tend to recommend products that present less risk of disappointing customers. As a result, Calvano and Julien (2019) conclude that platforms face a trade-off: to provide a ranking that maximizes the earned commissions and to risk losing customers' trust and, ultimately, losing demand. Ideally, platforms should be able to earn commissions while providing advice that is according to users' tastes.

Calvano and Polo (2020) also point out the fact that if all users strongly believe that other users will not change to a new entrant, it may be enough for the entrant to fail conquering the market (they call this **favourable expectations**). Halaburda and Yehezkel (2019) present the **focality** concept, stating that incumbents face favourable expectations from the market and are usually expected to be dominant. Hence, an entrant can only thrive by offering additional features or by charging lower prices, which may drive the market to inefficiency.

Another source of incumbency advantage consists of the users' incentives to wait for the entrant's user base to be large enough, in order to join the platform (Biglaiser et al., 2020). Consumers usually fear adopting new technologies early on, and therefore losing the network effects associated with being part of a larger, established user base. Naturally, this causes a problem for entrants, as it will be hard to enter the market if no user wants to join first.

1.4.4. Barriers to Entry

Digital markets are usually two-sided and have strong **economies of scale** (i.e., when the average unit cost decreases as sales increase) **and scope**, as well as substantial **network externalities**, which makes them likely to tip (Committee for the Study of Digital Platforms, 2019). Data is also crucial in these markets, since

it is often used to target consumers more precisely. As explained before, data is many times in the possession of the incumbent firms and hard for entrants to retrieve.

The above characteristics altogether are nearly impossible for an entrant to overcome unless it possesses an equivalent installed consumer based or scale. As a result, these markets present large barriers to entry. The authors of the previous study outline that entrants have to provide different features or better products. Otherwise incumbents will feel encouraged to lower their prices or increase quality in order to shut entrants down.

2. Competition Policy

Competition policy consists of laws and policies with the aim of guarantying that marketplace competition does not face any restrictions that may provoke harm to society (Motta, 2004).

Recent competition policy derived mainly from the creation of antitrust policies at the end of the 19th century in the U.S. The Supreme Court has applied the **Sherman Antitrust Act of 1890** on its verdicts since its early days and still takes it into account nowadays. The Sherman Act's Section 1 declares all contracts, combinations, or conspiracies, which constraint trade or commerce, to be illegal. In case someone engages in any of those activities, they should be considered guilty of the violation of the Act and should be punished either by fine or imprisonment. Section 2 explicitly forbids *monopolisation* (and attempts of), as well as conspiracies to monopolise commerce or trades:

> Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade

or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding one million dollars if a corporation, or, if any other person, one hundred thousand dollars or by imprisonment not exceeding three years, or by both said punishments, in the discretion of the court.

According to Fisher et al. (1983, p.99):

"monopoly power is present when a firm is sufficiently insulated from competitive pressures to be able to raise prices... without concern for its competitors' actions because its rivals cannot offer customers reasonable alternatives".

The penalties that should be applied to anyone who incurs the violation of this section are similar to the ones applied in Section 1.

European Competition Policy is largely based on two articles of the **Treaty of the European Communities**: Articles 101 and 102. These articles are of "direct applicability", meaning that each member state can directly impose them on their courts, as the articles are part of the law.

Article 101 of the Treaty on the Functioning of the European Union (TFEU) forbids agreements that may prevent, restrict or distort competition and that may interfere with trade in the EU. It applies to either horizontal agreements (between companies operating at the same level of the supply chain) or vertical agreements (between companies operating at different levels of the supply chain). In turn, **Article 102**[55] states that:

[55] Data collected on 15/01/2021 from https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:12008E102

Any abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between Member States. Such abuse may, in particular, consist in:

(a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;

(b) limiting production, markets or technical development to the prejudice of consumers;

(c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;

(d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

Thus, Article 102 regards the **abuse of a dominant position**. The European Court of Justice states that **dominance** is related to a firm's favourable position of economic strength that allows it to prevent effective competition by having the power to behave independently of its competitors and customers. Although there is still some competition, the company in the dominant position has a substantial influence on how the competition will evolve, as long as this influence does not cause any harm to it. Motta (2004) claims that dominance regards a situation in which firms possess high market power. The author considers that, in practice, dominance analysis coincides with market power analysis.

In order to decide whether there is abuse of dominant position, it must first be verified that a **dominant position** exists and then that the dominant firm actually

practices an abusive behaviour. **Abuse of dominance** was defined in 1979 in the case Hoffman-La Roche v. Commission of the European Communities[56] as a behaviour that hampers the existence or growth of the competition in the market, using methods that are different than the ones which constrain regular competition.

The abuse of dominant position is punished by the European law, and not the creation of the position itself. Therefore, a firm can legally build market power through innovation and market strategies and it will not be punished. However, dominant firms are considered to have a *special responsibility*, hence they might not have the right to engage in the same practices as non-dominant ones, such as aggressive competitive practices.

According to Motta (2004), exclusionary practices are the most common example of abusive behaviour.

2.1. Exclusionary Practices

A conduct is considered to be **exclusionary** whenever it weakens the rival firms' ability to compete, hence harming competition (Katz, 2018). This conduct is generally labelled either as **predation**, in which a seller offers overly appealing deals to buyers so that business is denied to rivals, or as **raising rivals' costs**, which consists of practices whose main purpose is to increase the cost of a firm's rivals, allowing the firm to increase its prices, while, at least, maintaining market share.

2.1.1. Predation

Predatory pricing is an example of **price-based** exclusionary behaviour and consists of a firm's attempt to exclude competitors by decreasing its prices to

[56] Case 85/76: Hoffmann-La Roche & Co. AG v Commission of the European Communities. - Dominant position. Judgment of the Court of 13 February 1979, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A61976CJ0085

consumers (Evans and Schmalensee, 2013). To do so, firms can provide incentives to consumers (such as improving the products' quality or decreasing prices), and then, once excluding the rival, the firm may increase prices and reduce the incentives again. The authors claim that, doing so, new entrants would feel discouraged from entering the market, and would fear "fighting" for market share with this competitor. Nevertheless, Evans and Schmalensee (2013) advocate these practices are quite unlikely to succeed, as they would require the incumbent company to incur big losses at first, hoping to receive the gains of eliminating competition.

In two-sided markets, it is frequent to find **prices below marginal costs** as a firm's strategy to equilibrate participants from all sides of the market (Saattvic, 2018). However, such a pricing strategy may be profitable, as it will increase market participation on one side and allow the company to recover losses through indirect network effects. Therefore, all sides of the platform should be taken into account and, as long as the company is profitable (due to profits originated on the other side of the market), antitrust analysis cannot state that this behaviour is anticompetitive (Saattvic, 2018). In addition, antitrust authorities should verify if the industry is in an early stage in terms of the lifecycle: if it is, incurring losses may be acceptable and optimal for the firm.

In multi-sided markets, subsidizing one side may attract participants, and then recovering losses on other sides through higher prices is often inherent to the equilibrium pricing structure (Saattvic, 2018). Therefore, a price that seems overly high can result from a firms' profit-maximising competitive behaviour, hence allowing the platform to provide incentives to the other sides. So, as long as the overall platform's price is not excessively high, antitrust authorities should not consider the price to be excessive. According to the author, excessive pricing allegations should only be taken into account in situations when the overall price is disproportional to the firm's global costs.

2.1.2. Tying and bundling

Tying and bundling are examples of **non-price** exclusionary practices. **Bundling** translates into the aggregate sale of two different products in specified proportions. If the bundled products could also be sold individually, we stand before *mixed* bundling; on the other hand, if the goods must be sold together, it is a *pure* bundling. Apple, for instance, incurs in a type of bundling, as it pre-installs certain apps on new devices. For example, a brand-new iPhone contains, by default, Apple Music, iBooks, iCloud Drive, Safari, among numerous other apps.

Tying implies that customers not only acquire a specific product but are also inherently "obliged" to buy subsequent other goods (for example, buying a lamp and a lightbulb).

Sanchez-Cartas and Leon (2019) point out that tying and bundling are strategies frequently found in **multi-sided markets** and are used to captivate customers. Saattvic (2018) also claims that tying can positively contribute to consumer's welfare if participation is encouraged.

Chao and Derdenger (2013) explain that heterogeneous consumers will self-select and reveal their preferences through bundling, allowing platforms to set prices more efficiently. This will increase participation and the indirect network effects will then motivate companies to decrease prices, while still being profitable.

While charging a negative price for a product (as part of an equilibrium strategy) is often unsustainable, Amelio & Julien (2012) point out that bundling such a product with another product whose price is positive will subsidise the bundled product: the bundle may be sold at a discounted price but at least it is not negative. The discounted price would attract customers to the platform and, in a competitive environment, indirect network effects would increase the quality

of the platform, when comparing to others. However, at the same time, this would increase differentiation and ease competition, decreasing welfare.

Choi et. al (2017) and Saattvic (2018) point out that when consumers are able to multi-home, tying increases welfare as it will drive consumers to multi-home, whenever it is advantageous. On the other hand, tying complementary products will eliminate competitors if consumers can only single-home.

Affeldt (2011) states that bundling and tying strategies are often used to discriminate prices and then firms can more easily extract consumer surplus. Still, the author attests that tying and bundling could have positive effects if three conditions are met: (i) the indirect network effects are sufficiently strong; (ii) the side of the market that presents weaker network effects actually benefits from tying or bundling; (iii) multi-homing costs exist and are sufficiently high.

Authors agree that bundling and tying strategies are becoming more complex and are gaining relevance in digital platforms. They also point out that the impact of these strategies must be analysed case-by-case.

2.1.3. Exclusive Dealing

Exclusive dealing is also an example of a **non-price exclusionary practice**. It is essentially a contract between a seller and a buyer, stating that the buyer will buy all or a significant portion of its inputs from that specific supplier (Viscusi et al., 2018). The existing literature cannot reach a consensus on whether this practice, both in one-sided and multi-sided markets is pro or anti-competitive.

Shao (2016) points out that some content creators are able to retrieve more gains from interactions with other sides than others (hence being heterogeneous), and when that happens, exclusive dealing could be an efficient way to increase the number of content providers, consequently contributing to an increase in consumer welfare. The author also points out that platforms also use exclusive contracts to show some differentiation from competitors.

Lee (2013) explains that the video game industry is a good example of a scenario in which exclusive contracts do not deter entry. As video games are differentiated products, having exclusive contracts with attractive games will translate into more effortlessly created user bases and new entrants will be able to enter the market more easily. This sequence of events would not happen if the video games were available on various incumbent firms. Hence, the author concludes that exclusive contracts in this industry presented pro-competitive effects. However, Lee (2013) also points out that exclusivity may decrease total consumer welfare: customers would benefit from a wider variety of video games on their consoles. Besides, since the market would have more participants and the video game consoles that entered the market with exclusive contracts would be less profitable, the dominant firm would take advantage of the network effects and extra profits to more than counterbalance this situation. So, in this case, even though exclusive dealing would translate into more entry, it does not exactly benefit the market.

2.2. Market definition and market power

Antitrust authorities often use market definition and market power analysis to assess whether competitive limitations are able to prevent anticompetitive actions from companies (Evans and Schmalensee, 2013).

Market definition identifies the limitations of the markets' demand-side and supply-side and the origin of those limitations. **Market power** is a firm's ability to influence the market regardless of competition, i.e, the ability to raise prices well above the price in a scenario of perfect competition (Evans and Schmalensee, 2013). The authors claim that, in equilibrium, prices cannot be equal to marginal costs, as companies must cover fixed costs. Similarly, Calvano and Polo (2020) define market power as a firm's ability to raise prices above marginal cost, remaining profitable. According to these authors, companies usually trade off

quantity for prices (fewer units sold but for higher prices) when deciding on how much to increase its prices (mark-up) and this trade-off depends naturally on the consumer demand's elasticity to price: the more elastic the demand, the lower the mark-up.

However, marginal cost is not the most appropriate "tool" to analyse market power, namely in markets for products or services with insignificant marginal costs (as it is the case of several digital markets). The **Lerner Index** arises as an alternative to assess market power through market shares, measuring the extent to which a firm can increase prices and earn profits above marginal costs. This index identifies a firm's "degree of monopoly" and gives information regarding its ability to control its own prices.

However, as pointed out by Evans and Schmalensee (2013), the standard approaches to assess market power may not be suited for multi-sided platforms and there is no consensus on which method to use to assess platforms' market power. In particular, the authors explain that, while in single-sided markets the use of the **market share** is quite usual for market power assessment, multi-sided markets have to be analysed carefully, as the nature of the market is distinct. For instance, traditional market shares cannot be calculated as, in multi-sided platforms, one side of the market often subsidizes the other side. Therefore, **interdependencies** must be taken into consideration, so that indirect network effects are included. Evans and Noel (2005) point out that the feedback effects, caused by the interlinked demand between both sides of the market cannot be ignored, risking failing in assessing the size of the market. Nevertheless, Evans and Schmalensee (2013) claim that, in transaction platforms, the market share should correspond to the share of the number of total transactions. The authors conclude, therefore, that market shares should be used only as a first step in assessing market power and a further assessment should be undertaken.

Evans and Schmalensee (2013) argue that profitability would be a good indicator to analyse, with the rate of return providing information on how a firm is able to earn profits through setting prices for all sides of the platform. However, they suggest analysts should take into account all possible sources in order to reach the most realistic conclusions.

Tremblay (2017) presents the **Generalised Lerner Index**, applicable to multi-sided platforms, as a more suited way to assess market power using market shares, considering that multi-sided platforms can optimise prices throughout all interactions, at the same time. The author's model fits both transaction and non-transaction platforms and consists of a mathematical expression that includes variable profits (numerator) and total revenue (denominator), hence being arguably easy to calculate in practice.

2.3. Vertical agreements and vertical restraints

The production of final goods is often made of several different stages and producers hardly ever sell products directly to final customers, opting to use intermediaries to reach them (Motta, 2004). Usually, companies sign agreements in order to guarantee stability, reduce transaction costs, and coordinate actions between those stages of the vertical process. Common examples include: non-linear pricing, which specifies a set amount, independent from the number of units acquired, plus a variable amount; quantity discounts, in which the transaction gets cheaper (on average), the more units sold; quantity fixing, where the producer defines the number of units to be sold by the retailer; exclusivity agreements such as exclusive dealing. However, vertical agreements may prevent, restrict or distort competition, and in such a case they are called **vertical restraints**.

There is **foreclosure** when a firm raises an input's price so high or even excludes it, in order to make it impossible for rivals to compete (Belleflamme and

Peitz, 2015). Motta (2004) also highlights that **raising rivals' costs** practices and **exclusive dealing** can be seen as examples of foreclosure, as they make it difficult for rivals to find distributors to sell their products. Nevertheless, the author points out that some activities can increase the rivals' costs as a consequence of, for example, an increase in product quality, and those activities may not harm consumers. In that case, the rivals' costs may be increased without it being an anti-competitive behaviour.

Viscusi et al. (2018) present two kinds of raising rivals' costs practices in the context of vertical mergers and vertical restraints. **Input foreclosure** happens when, in an integrated firm, the upstream division refuses to sell input to a downstream rival, making this firm use inputs with lower quality or higher prices, hence resulting in higher costs. On the other hand, **customer foreclosure** is when the downstream division denies the upstream rival suppliers selling input. If a downstream firm refuses to buy input from a supplier, the supplier may eventually be eliminated from the market or, if it is a new entrant, it can be deterred.

To sum up, even though vertical restraints may have anti-competitive effects, they should not be forbidden, as they often produce positive effect, due to efficiency gains (Motta, 2004). According to the author, vertical restraints can only create negative effects when the firms involved show considerable market power.

2.4. Essential Facilities

An **essential facility** consists of an input that is necessary so that a participant of a given industry is able to operate in it, and that is not easily duplicated (Motta, 2004). For example, for maritime transportation, a port represents an essential facility. Motta (2004) points out, however, that, in practice, deciding whether an

input really is an essential facility can be quite complex. If it only provides a minor competitive advantage to a firm, it should not be called essential; but, at the same time, the alternative inputs may be so poor that rivals would not be able to compete at all.

The owner of an essential facility may deny its rivals access to the facility as an attempt to exclude competition in the downstream market, which may be seen as an abuse of dominant position.

In order to protect competitors from discriminatory behaviour, antitrust authorities use the **essential facilities doctrine,** which requires that a firm that possesses an essential facility must provide it to its competitors at a fair price (OECD, 1996). However, as pointed out by Tye (1987), this doctrine should be used only to avoid anticompetitive behaviour and not to make it easier for competitors to access other firms' services.

Chapter 4
Comparison with Other Cases

1. Google Shopping

1.1. Introduction

Google is a search engine, whose business model consists of intermediating the interaction between products/services and advertisers. Google's users can either make: a *generic search* (via Google Search), which consists of a free service where an algorithm ranks results by relevance, and Google makes revenues by selling advertising space (usually in the form of search ads, that are retrieved from Google's auction-based advertising platform AdWords, where advertisers compete to buy ad space); or a *specialised search* (via Google Shopping), which is mainly used when users are looking for a certain type of information, in which case Google makes money per click and per listing (websites pay to appear).

Google's Comparison-Shopping Service (CSS) was originally launched as Froogle, in 2004, and was renamed Google Product Search, in 2007. In the same year, Google launched a website that identified specialised results and displayed them with appealing images and relevant information, such as item prices, called Product Universal. Specialised results can be free and appear according to relevance in one's search or they can be paid. Both services were renamed in 2012,

acquiring the names of Google Shopping (previous Google Product Search) and Shopping Unit (previous Product Universal).

In 2011, Google introduced an algorithm, known as the Panda update, which purpose was to improve users' search results by "downgrading" websites that do not offer enough content quality or originality.

1.2. Allegations

In 2010, the European Commission (EC) started an investigation against Google for **abuse of dominant position**[57]. The investigation was concluded in June 2017 and Google was found guilty of abusing its market dominance, by favouring its own CSS.

Google was accused of leveraging its market power in general search into CSS. More precisely, EC considered Google abused its dominant position when placing its CSS in a favourable position and display (in its general search results page) and demoting competing CSSs by its algorithms (while this never happened to Google Shopping). This behaviour was considered abusive as it decreased the traffic to Google's rival CSSs, while increasing the traffic to Google's CSS (a phenomenon called **traffic diversion**). According to EC, the traffic to Google's CSS more than doubled since the launch of Shopping Unit in the U.S. (between October and November 2007). In fact, there was a clear long-lasting increase in traffic to Google Shopping in all the analysed European Economic Area (EEA) countries. These practices were capable of (and likely to) have **anti-competitive** effects in the CSS market as they may lead to higher fees for sellers and higher prices for consumers, while decreasing innovation and altering the consumers' ability to access relevant CSSs.

[57] Case AT.39740: Google Search (Shopping). EC decision of 27 June 2017 available at: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_39740

According to the EC, to prove an abuse of dominant position, it is enough to detect a firm's **ability** to have anti-competitive effects in a certain market, not necessarily actually producing those effects. Thus, Google's traffic diversion was considered abusive.

1.3. Case description

1.3.1. Abuse of Dominant Position

When assessing this case, the EC distinguished two relevant product markets: General Search Services market (for Google Search) and Comparison-Shopping Services market (for Google Shopping). Geographically, the relevant market was considered to be at the national level for both product markets, as results are country and language-specific.

The EC concluded that, since 2008, Google's market shares were **higher than 85%** in all EEA countries, except for the Czech Republic and Slovenia. The EC considered the existence of **barriers to entry and expansion**, due to the high investment and volume of queries required to establish a viable general search engine. The EC also pointed out that **network effects**, the usage of **big data,** and the fact that most of Google's users are **single-homers** create additional barriers to entry. For all those reasons, the EC found that Google had, in fact, a **dominant position** in each national market for general search services.

1.3.2. Google's response

Google did not contest the EC's allegation of dominant position on General Search Services. However, Google denied that its conduct was abusive (and breaching, therefore, Article 102 of the TFEU). Google claimed that the decrease in traffic from its general search results to rival CSS had not been consistent, so Google (and its algorithm, Panda) could not be blamed for that decrease. Google

instead suggested that the incidental decrease in traffic observed in certain countries was most likely caused by rival CSS business models and the existence of merchant platforms, such as Amazon. Furthermore, according to Google, traffic to Google Shopping only increased due to the specific relevance criteria applied when displaying results in the general search results. However, Google pointed out that competing CSS could easily display and position themselves as Google Shopping did.

1.3.3. Decision

The EC found Google's claims groundless and showed that the Panda algorithm definitely caused traffic diversion, only decreasing the traffic to competing CSSs and never to Google Shopping. The Commission also pointed out that the display clearly favoured Google, as users generally see highly ranked results as the most relevant ones. In fact, evidence shows that moving a result that is positioned in the first place in a results page to the third place decreases the number of clicks by around 50% (Buttà, 2018).

The Commission was also able to prove that the diverted traffic constituted a major part of competing CSS's traffic and that they could never recover traffic in the same proportion from other sources.

The EC found the Article 102 of the TFEU applicable to this case, since Google was extending its dominance in one market to another one - hence it could not be considered "competition on merits" - and imposed a fine of €2.42 billion for infringement of this Article. The Commission added that Google Shopping should be under the same processes for positioning and display in Google's result pages as competing CSSs and that Google should not take any measure that included charging a fee to competing CSSs or any other form of possible harm.

As part of the remedy, Google started having Google Shopping functioning as an independent business, also participating in the auctions (jointly with the rival CSSs) to be placed in the first results for searches. Competing CSSs could also pay to appear in those results.

The Google Shopping case is an example of "leveraging market power", where the dominant position in one market (search services) is extended to adjacent markets. This case will set the example for other similar cases involving platforms, as the leverage of market power can be seen in distinct contexts and firms with completely different business models and core activities.

A bit surprisingly, the U.S. Federal Trade Commission (FTC), which had also started an investigation on this case in 2013, ended up closing it, justifying that as it was not clear whether Google was obliged to provide unbiased search results to its users. At the same time, the FTC concluded that Google's display of content (using its algorithm and design) only increased the quality of search results and represented no harm to consumers.

2. Microsoft / Windows Media Player

2.1. Introduction

Microsoft Corporation is the leading designer and developer of different types of computing devices, software, and applications.[58] Microsoft offers operating systems (OS) for client personal computers (client PCs), OS for work group servers, and streaming media players. Microsoft also provides technical support for its products.

[58] Data collected on 12/01/2021 from https://www.britannica.com/topic/Microsoft-Corporation

2.2. Allegations

In December 1998, Sun Microsystems, an American firm, filed a complaint to the EC against Microsoft. Sun claimed that Microsoft had refused to provide it with the required information to develop products that could adequately operate with the Windows system, installed in the vast majority of PCs. Sun needed that information in order to compete in equal terms in the OS market for work group servers.

In February 2000, the EC started another investigation against Windows, but this time concerning the Media Player integration with Windows O. Along with the 1998 complaint, ended up finding Microsoft guilty of infracting the Article 102 of the TFEU and the Article 54 of the EEA Agreement, in March 2004.[59] Microsoft was punished for tying and refusal to supply interoperability information.

1.3. Case Description

1.3.1. Abuse of Dominant Position

To assess Microsoft's market power, the Commission first proceeded with the definition of the relevant markets. The EC distinguished three relevant markets: *operating systems for PCs* (software products that control a PC's basic functions – PCs that are compatible with Intel OS and PCs that are not compatible with it), *operating systems for work group servers* (basic services daily used in offices, such as shared files and servers, printers and administration of users and groups) and

[59] Judgment of the Court of First Instance in Case T-201/04, 17 September 2007, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62004TJ0201&from=en

streaming media players (client's software, with the function to decode and stream digital audio and video files downloaded from the internet, as well as DVD or CD content). Regarding geography, the EC found that each market had a worldwide dimension.

The Commission concluded that Microsoft had a **dominant position** regarding the client PC's operating system, with market shares over 90%. The EC claimed that Microsoft's market power was stable and continuous since 1996 and demonstrated the existence of **high barriers to entry in the market**, as consumers generally prefer an OS that already possesses a vast variety of compatible applications. Besides that, app developers also show a preference towards constructing apps that are compatible with an OS, which has a large installed user-base.

The Commission also found market dominance on the work group server OS market since 2002, with market shares of, at least, 60%. The EC verified substantial barriers to entry in this market, mainly due to Microsoft's refusal to share interoperability information.

1.3.2. Microsoft's Response

Microsoft did not contest the EC's allegation of dominant position. However, Microsoft stated that it offered Windows and Windows Media Player together because they were a unified product. Besides, Microsoft pointed out that consumers were not obliged to use the streaming media player, and they were not required to pay any extra value to use it. In addition, Microsoft claimed that consumers who preferred to use a different streaming media player could always install a new one (despite having Windows Media Player). Microsoft justified that bringing Windows and Windows Media Player together originated efficiency gains, as distribution was easier and users' transaction costs would be

lower. For all these reasons, Microsoft alleged that having Windows Media Player pre-installed could only benefit consumers.

Regarding the accusations on the refusal to disclose information, Microsoft claimed that the Commission could not ask it to proceed differently, as it would infringe Article 13 of the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement:[60]

> Article 13 of the TRIPS Agreement requires that limitations and exceptions to exclusive rights (1) be confined to certain special cases, (2) do not conflict with a normal exploitation of the work, and (3) do not unreasonably prejudice the legitimate interests of the right holder (…).

Microsoft stated that if it provided that information, other server OS suppliers could potentially imitate Windows' server OS functionalities when creating their products. In other words, Microsoft alleged that rivals would be able to exploit their intellectual property rights, which would decrease Microsoft's sales, as competitors would offer products with the same technologies and compatible with Microsoft's products.

1.3.3. Decision

The EC concluded that Microsoft's tying practices restricted market competition and had the ability to block the market to new entrants, allowing Microsoft to reach the great majority of PC users worldwide.

Even though the Commission did not consider that Microsoft had a dominant position in the streaming media players market, it was clear that it had a near-monopoly position in other markets, considering the market shares and the existence of barriers to entry.

[60] From: https://www.wto.org/english/res_e/publications_e/ai17_e/trips_art13_jur.pdf

The EC also outlined that Windows Media Player and the Windows OS were two distinct products, which could and should be seen separately, as consumers can acquire just the streaming media player, and producers can develop that kind of software independently.

Additionally, the Commission pointed out that Microsoft did not give consumers the choice to acquire Windows OS without Windows Media Player. In fact, even if users would install another streaming media player, they could only add it to the existing one and could not dismiss it. The EC found that, when users buy a PC that already has Windows Media Player pre-installed, they prefer to use it rather than to install an additional streaming service, as this would translate into additional costs and possible incompatibility issues. The EC also added that consumers did not necessarily benefit from using Windows Media Player, as competing streaming media players were often reviewed as better than Windows'. For all these reasons, the Commission ended up obligating Microsoft to offer a version of Windows OS without Windows Media Player.

Regarding the sharing of information, the Commission claimed that it should be analysed on a case-by-case basis. Microsoft was not obliged to disclose copyright specification, but it should assure that interoperability was attained. The Commission also explained that the TRIPS Agreement could not cover this case, since Microsoft's rivals' "right of disclosure" was only a moral right.

In the end, the EC imposed a fine of a historical value of €497 million.

3. Similarities with Apple

According to the Wall Street Journal, Apple favourably displays its own apps in the App Store search results, appearing in the top position in 95% of searches when it comes to apps that collect revenues by sales or subscriptions, such as

Apple Music or Apple Books (and in over 60% of basic searches).[61] Apple stated that this only happens because its apps have generic names such as Music or Books that are usually close matches to users' searches. However, Nadler and Cicilline (2020) point out that Apple's apps are still often ranked in the first results, even in cases where the search is exactly a title of another app. This has clear resemblances with the Google Shopping case, where the EC found Google guilty of giving a preferential placement to its own CSS, leveraging its market power in one market and extending it to other markets, aiming to foreclose downstream competitors. Apple's dual role as both intermediary and competitor to third-party companies can be used to leverage its monopoly position and expand it to other markets (just like Google did) while exploiting data.

Apple, of course, rejected these claims and stated that the App Store's search results are ranked according to Apple's algorithm, which consists of a 42-factor system that relies (among other criteria) on users' data and reviews. However, the Wall Street Journal points out that most Apple's apps are already pre-installed and are not subject to ratings nor reviews. Nadler and Cicilline (2020) outline that Apple pre-installs about 40 of its own apps into its devices and set often sets them as default. The authors believe that this often harms app developers since they feel they cannot compete with Apple's apps, since they are already pre-installed on iOS devices and users will be most likely to use them, rather than searching for other options.

Apple stated that these apps do not need rating since they come integrated with the devices, which seems curious, since many apps that had once been qualified for reviews presented extremely low results. This allegation shares obvious similarities with the Windows Media Player case: just like with the streaming media player, Apple Music clearly benefits from being pre-installed

[61] Information consulted on 12/01/2020 from https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221

on devices, since users may prefer to use it for convenience. Also, it may harm consumers since they may not be getting the best service.

At the same time, it was not until very recently that Apple users could erase the pre-installed apps from their devices. After several complaints and to protect itself from regulators, Apple introduced the capability of removing most of those apps (excepting those required for basic functionality) with iOS 11, going further with iOS 14 and giving users the ability to change some of the default apps, such as web browser and email. While other mobile OS already allowed users to set their default browser, until the iOS 14 Apple devices opened the Safari browser by default. (Nadler and Cicilline, 2020).

Chapter 5
Discussion and Recommendations

1. Discussion

When analysing whether Apple violates Article 102 TFEU, it is crucial to define the relevant market and assess Apple's market power.

According to Nadler and Cicilline (2020), Apple has a significant and durable market power in the mobile OS market. As it controls the iOS mobile operating system, it can and exerts monopoly power in this market. According to the authors, Apple's dominance persists due to network effects, alongside high entry barriers and high switching costs in the mobile OS market.

Apple is a monopolist in app distribution on iOS devices. Geradin and Katsifis (2020) pointed out that iOS users face high switching costs, such as the investment in OS-specific gadgets and apps, that prevent them from changing to Android devices. As a result, the authors point out that for app developers that produce apps for both iOS and Android, abandoning the iOS market would remarkably decrease their customer reach and user base. In the EU, for instance, it would drop by around 31%.[62] Even though Android has a higher market share in the EU than Apple, the iOS market is more profitable for developers since a

[62] iOS market share in Europe. Retrieved on 10/02/2021 from: https://gs.statcounter.com/os-market-share/mobile/europe

regular mobile app makes four times the revenue on iOS than Android (Geradin and Katsifis, 2020). Besides, Apple's App Store generates twice the revenue for app developers (despite only registering half the downloads when compared to the Play Store).

As Apple does not provide licensing of its operating system (iOS) to third-party manufacturers and it is the exclusive producer of the devices (iPhone and iPad), it has absolute control of its ecosystem (Geradin and Katsifis, 2020). So, it seems natural to say that Apple is a **monopolist in the iOS market**, where it holds a 100% market share, hence being an essential facility to developers who want to operate in this market. However, Apple could claim that its market power is questionable since it could be a matter of product differentiation, hence a matter of individual preference. As explained by Tirole (1988), consumers may have different preferences and different acquisition patterns: they may value product attributes differently among them (horizontal differentiation), and their ability to pay for quality may also be heterogeneous (vertical differentiation). Still, it would not change the fact that Apple is, in fact, the only iOS provider in the market, making its market power (and dominance) clear.

Given its dominant position, Apple has specific obligations[63] towards the market, and Spotify alleged that Apple fails to rise to them.

Spotify first complained about Apple's payment system, **In-App Purchase** (IAP), and the associated charged **commission of 30%**. Apple charges this commission to apps that offer "digital goods or services" or "goods or services consumed within the app". This means that all developers who want users to be able to unlock features **within the app**, i.e., without leaving the app environment (such as subscriptions or access to premium content), must use the IAP and pay the commission.

[63] As seen in the previous chapter "Competition in Digital Markets".

If, on the other hand, the app allows the purchase of "physical goods or services" or "goods or services consumed outside the app", app developers *must* use alternative payment solutions other than Apple's IAP.

Spotify pointed out that paying this fee leads to an increase in price to consumers. Since Apple prohibits any buttons or links to external payment methods, users do not have any other option. However, after one year of service, the commission paid for the so-called "free with paid subscription" apps decreases to 15% (while paid apps remain paying the 30% commission), meaning that those developers earn 85% of revenue for all the following years in which the users remain subscribers.[64] Apple pointed out that most of Spotify's users used the free, ad-supported version of the app and that the commission was paid for only 0.5%[65] of its premium users. That percentage corresponds to 680 000 users that subscribed to Spotify through the IAP system, between 2014 and 2016, since outside that time slot, Spotify acquired its premium users without the IAP, meaning that they do not pay any commission on them. Additionally, the fee paid on those 680 000 users could be of 15%, since, by the time of the complaint, the one year period had already gone by. Furthermore, in its website, Spotify suggests users a way to cancel their payments with Apple and resubscribe directly in Spotify's webpage.[66] So, potentially, even those 680 000 users could have already subscribed directly to Spotify, meaning that no commission was being paid. At the same time, Spotify did not use the IAP until 2014, nor has it used it since 2016 until now, and still presented the highest global shares of subscriptions, which makes it unclear to understand how exactly Spotify is

[64] Information retrieved on 14/02/2021 from https://www.apple.com/newsroom/2019/03/addressing-spotifys-claims/

[65] Data gathered on 14/02/2021 from https://www.macrumors.com/2019/06/24/apple-responds-to-spotify-app-store-complaint/

[66] See https://support.spotify.com/us/article/spotify-through-the-app-store/.

harmed by Apple's commission.[67] Given all this information, a natural question arises: Why would Spotify fail to mention this in its claim?

It should be noticed that Google offers a similar system, called Google Play Billing (GBP) and applies the same set of rules, with a slight exception: whenever the app is related to "physical goods or services", app developers may still opt for GBP. Google also charges a 30% commission in the first year of an app's service, cutting the fee to half after that year. So, the question that arises is: why do Spotify's claims only address Apple? According to Business Insider,[68] the difference resides on the way they act with apps that opt to avoid the commission. While Apple does not allow advertising cheaper solutions inside the app, Google does not prevent developers from doing so.

It is also interesting to notice that the Google Play Store only charges a $25 one-time fee to developers opening an account (then allowing them to upload their apps for free), while the App Store charges an annual fee of $99 for an Individual Developer Account. Since these companies are aligned regarding the commission, it would be interesting to understand why they charge such dissimilar fees in terms of account opening/maintenance.

In 2020, Apple funded a study ran by Analysis Group,[69] which showed that its commission was a standard practice in the industry: Google Play, the Samsung Galaxy Store, the Microsoft Store and the Amazon Appstore also charged the default 30% commission on sales, with only little variance for specific deals. PlayStation, Xbox and other video game sellers also shared that number. However, it is important to note that this standard is different worldwide, with

[67] Data collected on 15/02/2021 from https://www.musicbusinessworldwide.com/apple-music-gains-global-streaming-subscription-market-share-as-spotify-holds-firm/

[68] Data collected on 24/02/2021 from https://www.businessinsider.com/why-spotify-european-competition-complaint-about-apple-not-google-2019-3

[69] Information collected on 15/02/2021 from https://www.bloomberg.com/news/articles/2020-07-22/apple-defends-app-store-revenue-cut-ahead-of-antitrust-hearing and https://www.protocol.com/apple-app-store-commission-study

Tencent's Android App charging 55% in China and the Huawei AppGallery varying between 20% and 50%. Nevertheless, Analysis Group pointed out that Apple was a pioneer in setting this fee, having the industry followed its practice. However, the analysts outlined that Apple set this level by observing similar commissions previously charged by Nokia and BlackBerry. In Apple's defence, the study's authors pointed out that when physical copies of video games or books are sold in brick-and-mortars, developers do not usually get more than 50% of the cut, so it seemed fair if they got the 70% when selling via App Store.

According to Geradin and Katsifis (2020), this study's arguments are flawed since the competitors who charge the same fee are tech giants, like Apple. Just like Apple with iOS, Google, for example, has bottleneck power on Android. Nadler and Cicilline (2020) point out that Apple and Google's dominance in the mobile OS market allows them to dictate the terms in the software distribution market. So, it would be unreasonable if Apple justified its commission using these examples. It should also be taken into account that selling apps via App Store does not encompass the same kind or amount of costs as brick-and-mortars sales: physical stores carry out infrastructure, personnel and storage costs, among others, that online stores do not.

Geradin and Katsifis (2020) outline that Apple's ability to charge unreasonable fees is due to its bottleneck position. Apple (like Google, Facebook, Amazon and Microsoft) functions as a gatekeeper, meaning that a significant share of other businesses depends on it to access consumers (Cabral, et al., 2021). EU's antitrust head Margrethe Vestager[70] stated that it is necessary to monitor Apple's rules and reassure that they do not harm competition, especially when competing with rival app developers, since Apple has a gatekeeper role. Nadler and Cicilline (2020) point out that market participants who rely on dominant platforms usually

[70] Data collected on 18/02/2021 from https://www.nytimes.com/2020/06/19/opinion/apple-app-store-hey.html?referringSource=articleShare

fear speaking out on their abusive practices since those firms could retaliate, threatening the sake of their businesses. According to the authors, this power allows dominant firms to define terms that are only consented because of the lack of alternatives. Interestingly, according to CNBC,[71] the App Store had sales of $50 billion in 2019, which generated about $15 billion in revenue, meaning that, on the Fortune 500, the App Store alone would be ranked nº 64 (ahead of companies like Morgan Stanley and Cisco).

In August 2020, Epic Games, the creator of *Fortnite*, implemented its in-app payment system, resulting in Apple immediately removing the app from the App Store. According to 9 to 5 Mac, the Fortnite maker described Apple as a monopolist that prohibits any competitive entry and made a warning to other developers: "This was a clear warning to any other developer that would dare challenge Apple's monopolies: follow our rules or we will cut you off from a billion iOS consumers – challenge us and we will destroy your business."[72] Apple claimed that this feature had not been reviewed and that Epic had the clear intention to violate the App Store Guidelines regarding apps that offer digital goods or services.[73]

In February 2021, Epic Games made a formal antitrust complaint to the EU[74] claiming that Apple designs its rules with the purpose of eliminating any kind of competition in app distribution and payment processing.

In September 2020, Epic Games, along with dating company Match Group and Spotify, launched the Coalition for App Fairness, aiming to defy Apple over its actions and laws.[75] The members of the group keep adding up, representing a

[71] Data collected on 18/02/2021 from https://www.cnbc.com/2020/01/07/apple-app-store-had-estimated-gross-sales-of-50-billion-in-2019.html
[72] Data collected on 20/10/2020 from https://9to5mac.com/2020/09/05/epic-asks-court-fortnite-app-store/
[73] Data collected on 18/02/2021 from https://theverge.com/2020/8/13/21366438/apple-fortnite-ios-app-store-violations-epic-payments
[74] Data collected on 18/02/2021 from https://www.theverge.com/2021/2/17/22286998/epic-games-apple-european-comission-antitrust-complaint-app-store-fortnite
[75] Data collected on 20/11/2020 from https://www.washingtonpost.com/technology/2020/10/22/apple-coalition-antitrust-app-store/

shift in companies' way of thinking. Many developers who used to fear speaking up against Apple, as they were afraid it would remove their app from the App Store, are now joining the coalition. It was extremely rare to hear any bad words about the California tech giant as it once contained the following message in the App Store Review Guidelines: "If your app is rejected, we have a Review Board that you can appeal to. If you run to the press and trash us, it never helps." Both Microsoft and Facebook supported the coalition. In October 2020, the House Judiciary Committee released a 450-page report, which included a whole section about Apple's practices, mainly focusing on its control over what software can be installed on iOS devices and how. The coalition members support these complaints and are mainly fighting to have alternatives beyond installing apps through the AppStore and alternative payment methods, refusing to pay the 30% commission.

It is also important to add that the commission is most likely to impact innovation negatively since a significant cut of developers' revenue is destined to paying the fee, which diverts their funds from R&D. In some cases, apps may never attain profitability, considering the fee, especially in their first year of service, when they are still getting established in the market and may struggle to collect customers and revenue. According to Geradin and Katsifis (2020), this may be seen as a way of raising rivals' costs, and it can have the ability to deter new entries. Apple's IAP system is also accused of hampering app developers from capturing customer data necessary to improve their products. In an investigation against the App Store, the Dutch Autoriteit & Consument Markt[76] (ACM) interviewed developers that claimed that they could not even access their customers' payment (or other) details.

[76] Autoriteit & Consument Markt, Market study into mobile app stores, Report, 11 April 2019, available at https://www.acm.nl/sites/default/files/documents/market-study-into-mobile-app-stores.pdf

This use of commercially sensitive information makes Geradin and Katsifis (2020) question whether Apple should be allowed to compete on the App Store, given its dual competitor and intermediary position for third-party apps. The ACM interviewees pointed out that Apple is biased when reviewing apps, usually being a lot stricter when analysing companies with larger turnovers. This is in accordance with Spotify's claims regarding Apple's constant denial of other apps' updates and enhancements. Geradin and Katsifis (2020) point out that this can be attributed to Apple's leverage of monopoly position in the iOS market, giving it the ability to abruptly and unilaterally change its policies. Additionally, Spotify's allegations concerning the fact that Apple devices always default to Apple Music (for instance, when using Siri) are also related to this phenomenon, enabling Apple to make the most of this vertical integration.

Spotify also complained about the fact that **Apple Music is not obliged to pay any fees** at all.

Given all this in mind, a natural question arises: Is Apple attempting to foreclose downstream competition?

Geradin and Katsifis (2020) claim that imposing the use of IAP is also likely to restrict competition in the payment processing market as competitors are eliminated. Nadler and Cicilline (2020) point out that some developers would agree to use third-party payment processors such as PayPal, for instance, since it is already used globally for online transactions.

Geradin and Katsifis (2020) point out that imposing the commission may represent a form of "margin squeeze". This happens when the difference between the price at which the integrated firm (in this case, Apple) sells the downstream good (in this case, Apple Music's subscription plan) and the price at which it sells the necessary input to downstream rivals (in this case, the in-app payment system) is so small that makes it difficult (and

sometimes impossible) for competitors (Spotify, in this case) to be profitable and thrive in the market, which ultimately harms downstream consumers.

So, to dodge the 30% commission, the only solution would encompass avoiding IAP. App developers could disable it, meaning that users could no longer subscribe within the app, being obliged to navigate to the apps' websites and use their alternative payment systems. Netflix, for example, uses this approach. However, it has limitations. First, if an app developer only offers its service in app form (i.e., does not have a website), this strategy will not be viable. At the same time, switching off the IAP system can harm user experience: it becomes a less intuitive process and, worse than that, Apple forbids communication between developers and users (even outside the app), meaning that users could not know that they had the ability to make purchases via web.

Apple claims that this restriction is a way to ensure that Apple earns the deserved commission and to prevent developers from free-riding. In response to Basecamp app's claim regarding the commission,[77] Apple's Vice-President, Kyle Andeer pointed out that the commission was not a payment processing fee and that it contemplated the value of App Store's distribution of apps, as well as other services such as app review, app development tools and marketing services, outlining that all developers were treated equally. Geradin and Katsifis (2020) did not find this argument convincing. According to Apple itself, 84%[78] of the apps do not pay any commission, even though they are distributed in the same way as the remaining 16% of apps. Following Apple's "distribution" logic, all apps in the App Store should pay a 30% commission.

[77] Written Testimony of David Heinemeier Hansson Before the Committee on the Judiciary, Subcommittee on Antitrust, Commercial, and Administrative Law, U.S. House of Representatives *supra* note 65, page 8

[78] Value collected on 12/02/2021 from https://www.apple.com/newsroom/2019/03/addressing-spotifys-claims/

Speaking of incoherence, in July 2020, controversy arose with the surface of an email exchanged between Apple and Amazon.[79] In this email, the tech giants negotiated special terms that shocked the industry: between other perks, Amazon got a special deal where Apple agreed to take a commission of only 15% on Prime Video subscriptions made on iOS while providing additional access to data. How does this go with applying rules evenly to all developers? Can this kind of practice be considered a breach of Article 102 TFEU? Geradin and Katsifis (2020) consider it can be breaching Article 102(c) since Apple is literally applying "dissimilar conditions to equivalent transactions", placing them at a "competitive disadvantage". However, Apple could argue that the nature of the transactions with Amazon are not "equivalent"; hence they can be subject to different conditions.

Following this controversial deal, in November 2020, Apple introduced a program[80] aiming to reduce its commission to 15% for small developers that sell digital goods and services in their apps and earn $1 million (€830.000) or less a year. This applies to existing developers, but new ones can also qualify.[81] The program began in January 2021 and took into account 2020 numbers. Apple stated that most iOS app developers would reunite the conditions to access the program. Nevertheless, it did not provide any figures on its prediction.

According to Geradin and Katsifis (2020), Apple's app distinction based on the nature of the good or service (physical or digital) and way of consumption (inside or outside) appears to be quite inconsistent: why would Tinder pay the commission and Uber escape it when both apps operate as intermediaries to match two types of users, outside the app? The authors point out that such differences could only be attributed to the charge of additional services such as

[79] Data collected on 12/02/2021 from https://www.theverge.com/2020/7/30/21348108/apple-amazon-prime-video-app-store-special-treatment-fee-subscriptions

[80] Data collected on 12/02/2021 from https://www.bbc.com/news/technology-54985971

[81] The $1 million consists of post-commission earnings (and not revenues), however if the value goes beyond that mark, the fee rises to 30% again.

payment processing, contradicting Apple's previous claim. Apple argued that apps that offer "digital goods or services" require extra work, for example, billing and tax services, as well as compliance and credit card fees. However, even in such a case, the 30% (or even the 15%) commission would be excessive since payment processors usually charge between 1.7%-3.5% of the transaction value, plus a fixed value, often below €1.[82]

Similarly, if the commission were charged for Apple's distribution, it would still be concerning, as it raises rival apps costs, hence producing exclusionary effects (Geradin and Katsifis, 2020). The authors point out that Apple could be infringing Article 102(a) TFEU since it states that dominant firms are forbidden from imposing "unfair purchase or selling prices or other unfair trading conditions".

App developers, when interviewed by the ACM, point out that Apple only requires the use of IAP to digital services since these are the only kind of services which Apple's own apps can compete with. They state that it is quite unlikely that Apple would enter markets that would require physical infrastructures, while it would be more convenient for it to expand on digital services. So, is Apple, once again, favouring its own interests by making this distinction? It would be interesting to assess if it makes sense and whether digital goods or services require any additional work than physical goods, as Apple claims.

In June 2020, Apple introduced new policies enabling app developers to appeal decisions by Apple's app reviewers and to challenge the App Store's guidelines (Nadler and Cicilline, 2020).

To conclude, even though Spotify might feel threatened by Apple's position and its impact on Apple Music (Spotify's greatest rival), the commission related to the IAP does not seem to impact its business as much as it claims. Notice that,

[82] Data collected on 12/02/2021 from https://www.fundera.com/blog/credit-card-processing-fees and https://www.mollie.com/en/pricing

despite charging higher prices,[83] Spotify still remains the market leader in the *music streaming* industry. As presented before, the commission does not seem to affect a significant cut of its users. At the same time, it is important to take switching costs and network effects into account. A similar but more expensive service can offer greater variety of "media" as well as specific features that consumers value (e.g., curated playlists), which may translate into more utility. This would mean that they would not necessarily migrate to a different service just because it offered a lower price. At the same time, if a user uses a specific music streaming platform and most of his peers use the same platform, the consumer may opt to stick with the service, due to network effects.

However, if Spotify's claims regarding Apple's continuous rejections of its app enhancements and updates are true, as well as the barriers to communicate, Apple appears to be interfering with Spotify's ability to give users what they want, hence harming users' experience. With its claim, Spotify is alerting antitrust authorities for Apple's practices in the App Store, which seem, in fact, concerning: Apple has been treating developers differently and applying its rules in a way that clearly benefits its own business disregarding competition and consumers (as in the Google Shopping case). Apple appears, therefore, to be abusing its dominant position, breaching Article 102 TFEU.

If Apple's conduct, indeed, breaches Article 102 TFEU, Apple should be fined for the damage caused to app developers, and remedies should be implemented, as in the similar cases presented in the previous chapter.

[83] As seen in the chapter "Industry Analysis".

2. Remedies and Recommendations

Finding that the existing ex-ante platforms' obligations are not enough to prevent these types of situation, the European Commission published a proposal for a Digital Markets Act (DMA) in 2021. This Act encompasses many gatekeeper obligations to which app stores should be subject, mainly through Article 6(c), which obliges them to: (i) allow third-party apps in the OS of the gatekeeper; (ii) include third-party app stores; and (iii) allow access to apps through alternative channels. Following these obligations, OS gatekeepers would have to allow side-loading of apps from other app stores, which Google Android currently permits, while iOS forbids.

Article 6(b) DMA obliges gatekeepers to allow uninstalling pre-installed apps, while still being capable of forbidding the un-installation of apps that are essential for the functioning of the device.

According to Article 6(f), gatekeepers who provide complementary services together with the core platform services must allow interoperability to third-party providers and equal access to the hardware and software features that the gatekeeper can use (e.g., access to voice assistants). In turn, Article 6(k) mandates gatekeepers to apply fair, non-discriminatory conditions of access to its software app store.

Regarding user access to data, the DMA includes two obligations: Article 6(h) obliges gatekeepers to provide data portability to business users, under consent of end users; while Article 6(i) mandates gatekeepers to provide business users with free access to full aggregated and non-aggregated information generated in the use of the service, considering the limitations of data protection law. Both articles oblige the gatekeeper to provide continuous and real-time access to data.

The DMA appears to propose reasonable obligations that would encompass the main complaints from app developers.

In turn, Geradin and Katsifis (2020) first recommend ordering Apple to **quit obligating** app developers **to use the IAP** on **in-app payments**. Of course, Apple could still offer its payment solution but would have to allow developers to use other payment systems, letting them decide as they would prefer, while still allowing users to make in-app purchases (just like Google does with its payment system). This strategy would not keep Apple from receiving compensation for its services. If the commission is meant to cover costs related to payment services, whenever developers opted for alternative payment systems, Apple would not be affected by not receiving the fee (since it would no longer be providing those services). Indeed, based on the fact that only 16% of apps are charged the 30% commission, and all apps are distributed the same way, Geradin and Katsifis (2020) consider the fee as a payment processing one. Hence, they conclude it is unlikely that the fee aims to cover distribution costs.

Removing this obligation would benefit app developers, as they would be able to either reduce prices for end users or to use that surplus to invest in R&D or marketing.

Geradin and Katsifis (2020) offer an alternative solution, in case removing the obligation seems a little too drastic or too difficult to attain: Apple should remove its anti-circumvent rules. All app developers that decide to opt out of the IAP, should be allowed to insert links or buttons to external websites so that users know their means to upgrade their apps. Developers should also be allowed to communicate with users outside the app (e.g., through email). This could potentially erase most of the problems raised by app developers, like Spotify, since the issue may reside not exactly in the 30% commission but on the lack of viable alternatives. Nevertheless, given all complaints regarding the commission, a benchmark analysis should be undertaken, to assess if it is, indeed, excessive.

Regarding the App Store Review Guidelines, Geradin and Katsifis (2020) point out that rules should be clarified so that app developers do not run the risk of

infringing them because they are dubious. Apple should also be obliged to clearly explain why it does not approve certain updates or app enhancements (whenever it happens) instead of simply failing them without further explanation, like it did with Spotify. Spotify points out that these rejections are unjustified and often coincide with promotional campaigns.[84]

Besides, app developers should also be warned before having their apps removed from the App Store to have the opportunity to alter whatever is failing to comply with Apple's Guidelines. Geradin and Katsifis (2020) outline that it should be ensured that the App Store treats its apps and rival apps evenly by establishing governance mechanisms. It could be suggested that Apple's apps should have an independent administration, however it is quite difficult to attain.

Regarding the App Store's sudden and unilateral changes on policies, developers should be warned about these with due antecedence. They should also be informed about when the new policies are enforced.

Apple's presence in the music streaming industry should also be reviewed. For example, maybe Apple devices should not have Apple Music pre-installed, so the app is not favoured. Just like in the Windows Media Player case, the app would still be available in the App Store, and all users would be able to download it if they intended to. Also, instead of playing songs on Apple Music by default whenever using Siri, users should have the ability to choose their preferred default app, as they do with the web browser, for example (whenever opening a link, one can choose whether they want to open it on Safari or on any other browser they have installed).

[84] Information obtained on 02/11/2020 from https://timetoplayfair.com/timeline/

Conclusion

Apple is the exclusive producer of iOS devices and a monopolist in-app distribution on those devices, having absolute control of its ecosystem. As a gatekeeper, Apple has the ability to charge unreasonable prices, given its bottleneck position.

Spotify, among other companies, complains about the 30% commission that Apple's App Store charges for (free) apps that include in-app payments (IAP). The 30% commission seems to be a standard practice in the industry. However, the benchmark is made using companies such as Google and Microsoft, which, like Apple, are gatekeepers. Such a high commission is likely to impact innovation negatively since developers' funds are diverted from R&D, sometimes preventing them from attaining profitability. Apple justifies the commission as a distribution fee. However, this argument seems incoherent, as 84% of the apps do not pay any commission, even though they are distributed in the same way as the remaining 16% of apps. If Apple's commission were to be seen as a payment processing fee, either the 30% or the 15% (for subscriptions of more than a year) might still be excessive, since payment processors usually charge between 1.7%-3.5% of the transaction value, plus a fixed value, often below €1.

We conclude that, even though Spotify might feel threatened by Apple's position and its impact on Apple Music, the commission related to the IAP does not seem to impact its business as much as it claims. Despite charging higher

prices because of the commission, it does not seem to affect a significant cut of its users. At the same time, consumers may still opt to stick with a certain service (even if it is more expensive) due to network effects and switching costs.

Besides, using the IAP system hampers developers from collecting customer data crucial to improving their products. Finally, the use of IAP is also likely to restrict competition in the payment processing market as competitors are eliminated.

In the end, what appears to be wrong about Apple's IAP system and commission is the lack of alternatives to app developers. If app developers do not use the IAP, users cannot subscribe to specific features within the app and must navigate to the developer's website and perform the required actions from there. This makes it a less intuitive process and, worse than that, since Apple forbids communication between developers and users (even outside the app), users could not know that they could make purchases via web.

Spotify's allegations concerning the fact that Apple devices always default to Apple Music (for instance, when using Siri) are related to Apple's monopoly position in the iOS market, which enables it to make the most of this vertical integration. Due to this position, Apple is also able to change its policies unilaterally and abruptly. Thus, Apple seems to foreclose competition in the downstream market.

Regarding Apple's continuous rejections of Spotify's app enhancements and updates, as well as the barriers to communicate, they do interfere with its ability to give users what they want, hence harming users' experience.

In sum, it seems to us that Apple has been treating developers differently and applying its rules in a way that clearly benefits its own business, disregarding competition and consumers. Apple appears, therefore, to be abusing its dominant position, breaching Article 102 TFEU.

Following this, we present a set of **recommendations**. The first one would be to quit obliging app developers to use the IAP for in-app purchases. Apple could still offer its payment solution but would have to allow developers to use other payment systems, letting them decide as they would prefer. In case this recommendation seems too drastic or too difficult to attain, an alternative would be removing Apple's anti-circumvent rules. All app developers that decide to opt out of the IAP, should be allowed to insert links or buttons to external websites so that users know their means to upgrade their apps. Developers should also be allowed to communicate with users outside the app (e.g., through email).

Regarding the App Store Review Guidelines, these should be clarified so that app developers do not infringe them for not being clear. Developers should also be warned before having their apps removed from the App Store, as they should be informed about changes in policies with due antecedence.

We also suggest not having Apple Music pre-installed on iOS devices, so the app is not favoured. The app would still be available in the App Store for users who would want to download it.

It would also be interesting to consider the European Commission's proposal of a Digital Markets Act, which encompasses many gatekeeper obligations to which app stores should be subject. Implementing this Act would contribute to the reinforcement of ex-ante antitrust mechanisms and perhaps avoid situations like this.

We proceed to identify the main **limitations** of this work. The first limitation is the liability and accuracy of data. We retrieved information from reliable sources, yet some of it was deceitful (e.g., "worldwide information" only regarded three countries). Another limitation is the difficulty in characterizing music streaming markets. For example, some of Spotify's greatest competitors are not present in European territory, therefore we had to assume prices in the U.S.

We were also limited in terms of information availability. Spotify's contract with Apple is not public, so we cannot be sure if the rules applied to Spotify are exactly those in the App Store Guidelines. For instance, Amazon got a special deal with Apple and it only became public when an email discussing the deal's details leaked. So, it is possible to not be aware of the specific agreements made between Apple and developers.

Regarding our proposed recommendations, these do not cover the adverse effects of the commission on innovation and the struggles of new entrants still getting established in the market. Besides, one of the major concerns of Apple's abuse regards data exploitation and the consequent developers' lack of access to essential customer data. This is also a rather important topic to further analyse but, in this study, we focused on the IAP system and on the App Store Guidelines.

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